



2024, Volume 24, June, Issue 02

AOGD BULLETIN

Shared Decision Making - Enhancing Women Emancipation



Theme

Minimal Access Surgery: Principles and Practices

AOGD SECRETARIAT
Department of Obstetrics & Gynaecology
Maternity Nursing Home
ABVIMS & RML Hospital, New Delhi - 110001
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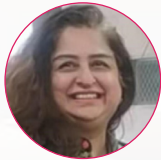


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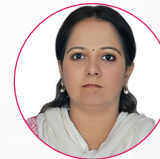
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AOGD Bulletin

2024, Volume 24, June, Issue 02



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Disclaimer

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Message from the President



President

Dear AOGDians,

Warm Summer Greetings!

We are very pleased to receive an overwhelming response for the first issue. I hope everyone found the May issue of AOGD bulletin useful in clinical as well as academic practice. In the present issue of AOGD bulletin, our hardworking editorial team will be apprising you with developments in the field of gynaecological endoscopy along with added benefit of robotic surgery.

This month AOGD organized CMEs and workshops on important clinical topics. An interesting one was the awareness program on menstrual health with discussion on menstrual hygiene, sanitation and relevant social implications. It was attended by motivational speakers doing great work in the field. Another well appreciated program on an important maternal issue was the Hands on workshop on Post-partum haemorrhage with various live stations demonstrating life saving measures. The workshop was thoroughly enjoyed by students and teachers alike. Month of May is dedicated to Pre-eclampsia awareness, a potentially dangerous pregnancy complication with increased blood pressure. This message needs to be spread far and wide to prevent the awful consequence of maternal mortality, to increase timely referrals from periphery health centres and to place high risk patients on prenatal aspirin prophylaxis.

International Yoga Day falls on 21st June and it would provide us an opportunity to promote measures beneficial for body, heart, mind and soul in the form of a grand Yoga Day programme.

Looking forward for continuation of your support to AOGD

Happy Reading.

Dr. Ashok Kumar MD, PhD, FICMCH, FICOG, FAMS

President, AOGD

Vice Chairperson, Elect, ICOG, an Academic Wing of FOGSI

National Corresponding Editor, Journal of Obstetrics & Gynaecology of India

Director Professor & Head

Department of Obstetrics & Gynecology,

Atal Bihari Vajpayee Institute of Medical Sciences &

Dr. Ram Manohar Lohia Hospital, New Delhi

Message from the Hon. Secretary



Hon. Secretary

Dear AOGD Members,

Warm greetings to all from AOGD secretariat at ABVIMS & Dr. RML hospital.

The previous AOGD bulletin was well received and we are thankful to all of you for the terrific response. Minimal access surgery has become a standard practice for management of a variety of gynaecological pathologies. The authors in the current issue supported by our adept editorial team have done a tremendous job at addressing some pertinent issues regarding minimal access surgery. Hope you enjoy reading.

2 Last month was full of academic activities in the form of webinars, awareness programs, online campaigns and skill development sessions. We are pleased to inform that we already have conducted one certificate course for basic endoscopy training and two hands on training programs for PPH management. The coming month also has a series for programs including first module of certificate course in medicolegal training and International yoga day celebration.

The AOGD annual conference will be held from the 22nd to 24th Nov, 2024 with the pre-conference workshops being conducted on the 22nd Nov. Early bird registration is now available. We are looking for an enthusiastic participation from all AOGDians.

In an era where medical fraternity is under lot of scrutiny and vigilance, I pray to almighty that may each one of us be blessed with the ability to choose the right path. I would like to thank all the AOGDians for their support and implore them to bless us with their continued encouragement.



Left to Right: Dr. Vandana Agarwal, Dr. Neha Pruthi Tandon, Dr. Kamna Dutta and Dr. Geetanjali Nabiyal

1st May 2024

Webinar on “Update on ART regulations” – AOGD Infertility and Reproductive Endocrinology subcommittee, SIG Early Pregnancy and Indian Fertility Society.

18 Min - Decoding ART Regulations

Speaker
Dr. Bindu Bajaj

Chairpersons
Dr. Sunita Anora, Dr. Indu Chawla, Dr. Meenakshi Singh, Dr. Pooja Prakash

Panel Discussion: ART Regulations

Moderators
Dr. Pooja Saxena, Dr. Leena Wadhwa

Panelists
Dr. Sarvesh Ghoshan, Dr. Sweta Gupta, Dr. Ronu Tawar, Dr. Alpana Singh, Dr. Shalini Chawla, Dr. Pooja Gupta

2nd May 2024

The Second Episode of Webinar “Pukaar Series: Navigating Adolescent Health Challenges”- Adolescent Health Committee, FOGSI with Association of Obstetricians and Gynaecologists of Delhi (AOGD) & Forum of Obstetricians and Gynaecologists of South Delhi (FOGSD)

FOGSI Office Bearers
Dr. Jaydeep Tank (President FOGSI), Dr. Madhuri Patel (Secretary General FOGSI), Dr. Neeraja Bhatta (Vice President FOGSI), Dr. Supriya Zaiswal (Chairperson Adolescent Health Committee FOGSI)

Chief Guest
Dr. Jaydeep Tank (President FOGSI)

Guests of Honour
Dr. Hrishikesh Pal (President FOGSI), Dr. Alka Kripalani (Past President FOGSI), Dr. Ashok Kumar (President AOGD)

Special Guest
Dr. Sunita Tendulkar (President Elect FOGSI)

Coordinators
Dr. Anita Sabharwal (President FOGSD), Dr. Kamna Dutta (Secretary AOGD)

3rd May 2024

Webinar on “Demystifying endometriosis” Part 1 - AOGD, ABVIMS & Dr RML Hospital

Chief Guest
Dr. Neera Aggarwal (Patron, AOGD)

Guests of Honour
Dr. Dinesh Pathak (President, Ferozpur Obs & Gyne Society), Dr. Gitanjali Kaur (President, Ludhiana Obs & Gyne Society)

Speaker
Dr. T Ramani Devi

Chairpersons
Dr. Sharda Jain, Dr. Indu Chawla

Moderators
Dr. Sonia Malik, Dr. Vandana Bhatia

Panelists
Dr. Aradhna Singh, Dr. Asha Rao, Dr. Garima Kapoor, Dr. Neeru Thakral, Dr. Poonam Sachdeva, Dr. Sarita Bhalerao, Dr. Shivani Sabharwal

Master of Ceremony
Dr. Neha Mishra

4th May 2024

Skill Enhancing Course in Colposcopy and Treatment of CIN, Interim CME AOGIN India & AOGD Oncology Subcommittee at Skill lab, AIIMS



12th May 2024

CME on “Anemia in pregnancy – Optimising mother and babies” - AOGD at ABVIMS & Dr RML Hospital.

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On the Occasion of **Mother's Day**



Association of Obstetricians & Gynecologists of Delhi

Atal Bihari Vajpayee Institute of Medical Sciences & Dr Ram Manohar Lohia Hospital, New Delhi

in association with **National Neonatology Forum**

Awarded **4 ICOD Credit Points**

ANEMIA IN PREGNANCY: OPTIMIZING MOTHERS AND BABIES

Sunday | 12th May, 2024

LT4 (Near Auditorium), ABVIMS & Dr RML Hospital

Dr Ashok Kumar
President, AOGD

Dr Indu Chawla
Vice President, AOGD

Dr Kamna Datta
Hon. Secretary, AOGD

Dr Sushma Nangia
President, NNF

Dr Jaya Chawla
Convener

Dr Mrinalini
Co-Convener



13th May 2024

CME on “Obstetric Anal Sphincter Injury Evaluation” – AOGD Urogynaecology Subcommittee

Webinar Series 4 of “Endotalks- Exploring the Enigmatic disease” : Theme- Inflammation in Endometriosis - Indian Fertility Society- Pondicherry Chapter (IFS PC) and AOGD

CME ON Obstetric Anal Sphincter Injury Evaluation
Organized by **AOGD Urogynaecology Committee**
Monday | 13th May, 2024 | 3:00 - 5:00 PM

Guest of Honour

Dr. Ashok Kumar
President AOGD

Convener

Dr. Geeta Mediratta

Co-convener

Dr. Monika Gupta
Chairperson, AOGD Urogynaecology Committee

Time	Topic	Speaker
Expert Chairpersons: Dr. Achla Batra, Dr. Sonal Bathla, Dr. Amita Jain, Dr. Uma Rani Swain		
3:00 - 3:10 PM	Welcome	Dr. Monika Gupta
3:10 - 3:40 PM	Introduction to OASI	Dr. Geeta Mediratta
3:20 - 4:20 PM	Role of Tomographic Translabial Ultrasound in Evaluation of OASI	Dr. Hans Peter Dietz
4:20 - 4:50 PM	Role of Anorectal Manometry in Anorectal Disorders	Dr. Shrihari Anikhindi
4:50 - 5:00 PM	Discussion	

Indian Fertility Society-Pondicherry Chapter (IFS PC)
In collaboration with
Association of Obstetricians and Gynaecologists of Delhi (AOGD)

presents
“Endotalks – Exploring the Enigmatic disease” – Webinar Series 4
Theme: Inflammation in Endometriosis
13th May 2024 5.00pm to 7.00pm

Chief Guest

Dr. Prof. Kamal Buckshee
Chief Patron, AOGD

Guest of Honour

Dr. Col. (Prof.) Pankaj Talwar
President, IFS

Guest of Honour

Dr. (Prof.) Shwetha Mittal
Secretary, IFS

Guest of Honour

Dr. Ashok Kumar
President AOGD

Guest of Honour

Dr. Indu Chawla
Vice President AOGD

Dr. Chitra T
Secretary, IFS-PC

Dr. Kamna Datta
Secretary, AOGD

Expert Speakers


Dr. Asha Rao


Dr. Leena Wadhwa
National Treasurer, IFS



Dr. Renu Tanwar
Joint Secretary, IFS


18th May 2024


**Certificate course in “Basic Endoscopy and Endosuturing”
AOGD at ABVIMS & Dr RML Hospital**


Association of Obstetricians & Gynaecologists of Delhi
Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, New Delhi


CERTIFICATE COURSE ON BASIC ENDOSCOPY & ENDOSUTURING
Saturday | 18th May, 2024
Vaccination Centre & Room 104, ABVIMS & Dr RML Hospital

Chief Guest

Dr. Malvika Sabharwal

Guest of Honour

Dr. Arti Maria


Dr. Ashok Kumar
President, AOGD


Dr. Indu Chawla
Vice President, AOGD


Dr. Kamna Datta
Hon. Secretary, AOGD



23th May 2024

Meeting - AOGD with AICC RCOG North Zone at The Royal Plaza, Delhi.



Association of Obstetricians & Gynaecologists of Delhi
AICC RCOG North Zone

in association with



Cordially Invite you for Product Meeting on

Lunch : 1:00pm-2:00 pm

Date : 23-05-2024 (Thursday)

Venue: The Royal Plaza,
19, Ashoka Road, Janpath



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24th May 2024

Meeting on “Preconception care and fertility optimisation in medical disorders” by
AICC RCOG North Zone with Infertility and Reproductive
Endocrinology Sub-committee of AOGD at the Apollo Auditorium, Delhi



Pre Conception Care & Fertility
Optimization in Medical Disorders
RCOG North Zone



AOGD, Sub-committee of Infertility & Reproductive Endocrinology

Friday | 24th May, 2024 | 3:00 - 5:00 PM | Apollo Auditorium, Sarita Vihar, Delhi



Dr. Ranjana Sharma
Chairperson RCOG NZ



Dr. Asha Kaif
Chairperson Emer RCOG NZ



Dr. Ashok Kumar
President AOGD



Dr. Indu Chavla
Vice President AOGD



Dr. Sneha Gupta



Dr. Pooja Saxena



25th May 2024

Webinar on “Postmenopausal bleeding”
AOGD Oncology subcommittee in association with medical education committee & food, drugs and medicosurgical committees of FOGSI



Association of Obstetricians and Gynaecologists of Delhi (AOGD) Oncology Committee

In Association with

Medical Education Committee & Food, Drugs & Medicosurgical Equipment’s Committee of FOGSI

Presents Webinar on

Post-Menopausal Bleeding

DATE: 25th May 2024, Saturday | TIME: 04:00 PM – 06:00 PM



Dr. Jaydeep Tank
President
FOGSI



Dr. Madhuri Patel
Secretary General
FOGSI



Dr. Neerja Bhatia
Vice President
FOGSI North



Dr. Ashok Kumar
President, AOGD



Dr. Kamna Datta
Secretary, AOGD



Dr. Indu Chawla
Vice President
AOGD

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Chairperson, Oncology
Committee of AOGD



Dr. Kiran Pandey
Chairperson, Medical
Education Committee, FOGSI



Dr. Ritu Khanna
Chairperson, Food, Drugs and
Medicosurgical Equipment
Committee of FOGSI

Inauguration (04:00 PM)



Dr. Ashok Kumar
President AOGD

Chief Guest



Dr. Prakash Trivedi
Past President FOGSI

Guests of Honour



Dr. Niranjan Chavan
Joint Treasurer, FOGSI



Dr. Archana Baser
Vice President, FOGSI 2020

Master of Ceremony



Dr. Nilanchali Singh
Assoc Prof.
ObGyn AIIMS, Delhi

Webinar on “Breast cancer screening: Newer concepts in preventive strategies”
by Breast & Cervical cancer awareness & prevention subcommittee, AOGD



WEBINAR ON
Breast Cancer Screening: Newer Concepts in Preventive Strategies
 under the aegis of
Breast & Cervical Cancer Awareness & Prevention Committee, AOGD

Saturday | 25th May, 2024 | 7:00 - 8:30 PM

Chief Guest



Dr. Bhaskar Pal

Guest of Honour



Dr. Ashok Kumar
President AOGD

Chairperson



Dr. Seema Prakash
Chairperson Breast &
Cervical Cancer Prevention &
Awareness Committee

Convener



Dr. Nilanchali Singh

Co-convenors



Dr. Neha Varun



Dr. Anju Singh



Dr. Srishti Prakash

AOGD Office Bearers



Dr. Indu Chawla
Vice President AOGD



Dr. Kamna Datta
Secretary AOGD

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26th May 2024

A CME on “Endoscopy and Ultrasound in Infertility” – Indian Fertility Society
in association with SIG endoscopy, SIG ultrasound & AOGD at Woodapple, Karkardooma



INDIAN FERTILITY SOCIETY
SIG Endoscopy | SIG Ultrasound & AOGD

Sunday, 26th May | 10:30 am to 2.00pm

Venue: Karkardooma, Woodapple

Powered by : KJIVF & Laparoscopy Center

CME on Endoscopy & Ultrasound in Infertility



Dr Prof (Col) Pankaj Talwar, VSM
President IFS



Dr (Prof) Shweta Mittal Gupta
Secretary General IFS



Dr Ashok Kumar
President, AOGD



Dr Indu Chawla
Vice President, AOGD

Mentor SIG Endoscopy

Convenor SIG Endoscopy

Co convenors SIG Endoscopy



Dr Kuldeep Jain
Past President, IFS



Dr Parul Kotadwala



Dr Desh Deepak



Dr Maansi Jain

Mentor SIG Ultrasound

Convenor SIG Ultrasound

Co convenors SIG Ultrasound



Dr Ashok Khurana



Dr Bharti Jain



Dr Ritu Khanna



Dr Laabans kaur

28th May 2024

An awareness programme “Period Friendly: Menstrual Health” by AOGD & ABVIMS in association with Society of Menstrual disorders and hygiene management and Sachhi Saheli at Hotel Jaypee Siddhartha, Delhi

Sachhi Saheli
Association of Obstetricians & Gynaecologists of Delhi
Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, New Delhi
in association with
Society of Menstrual Disorders & Hygiene Management
Sachhi Saheli
on the occasion of
“Menstrual Hygiene Day”
organizes
Awareness Programme
“Period Friendly: Menstrual Health”
Tuesday | 28th May, 2024
Hotel JAYPEE Siddharth, Rajendra Place, New Delhi

Dr. Ashok Kumar President, AOGD
Dr. Indu Chawla Vice President, AOGD
Dr. Kamna Datta Hon. Secretary, AOGD
Dr. Surbhi Singh Founder & President, Sachhi Saheli
Dr. Shehla Jamal Founder & President, SMDHM
Conveners
Dr. Neha Mishra & Dr. Vandana Agarwal

Guests of Honour

- Ms Shreya Chopra**
Miss India 2017
“Beti Bachao Beti Padhao”
Nation Level Debate Speaker
- Mrs Ruchi Jain**
Miss India 2019
“Body Beautiful 2019”
Founder
“Attitude with Gratitude with Ruchi Talk Show”
Motivational speaker,
Parent Coach, Social Activist
- Ms Divya Vasudeva**
“Take It Easy with Divya”
on mental health and happy life.
“Wan News” and Radio & IIF Radio Awards for campaign on Menstruation
“Padayatra”

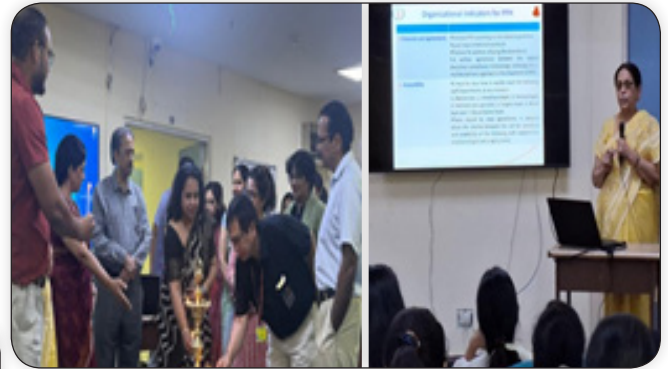


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29th May 2024

“Hands on workshop on PPH”- AOGD, ABVIMS & Dr RML Hospital

Association of Obstetricians & Gynaecologists of Delhi
Hands-on Workshop on PPH
 Organized by
 Atal Bihari Vajpayee Institute of Medical Sciences & Dr. Ram Manohar Lohia Hospital, New Delhi
Awarded 3 ICOG Credit Points
Wednesday | 29th May, 2024 | 12:00 Noon - 5:00 PM
Venue: Vaccination Centre (Near Auditorium), ABVIMS & Dr RML Hospital



30th May 2024

Webinar on “Together for a period friendly world” on occasion of World Menstrual hygiene day Community health & public awareness subcommittee and Adolescent subcommittee, AOGD



Webinar on
TOGETHER FOR A PERIOD FRIENDLY WORLD
 on Occasion of
World Menstrual Hygiene Day
 Organized by
Community Health & Public Awareness Subcommittee & Adolescent Subcommittee, AOGD

Thursday | 30th May, 2024 | 5:00 - 6:00 PM

Guests of Honour



Dr. Ashok Kumar
President AOGD



Dr. Jyoti Sachdeva
State Program Officer
Maternal Health & Family Planning



Dr. Jyoti Bhaskar
Chairperson Adolescent Sub committee of AOGD



Dr. Deepa Gupta
Chairperson Community Health and Public Awareness Subcommittee

Organising Chairpersons

31th May 2024

Monthly clinical meeting organised by BLK-MAX Super Speciality Hospital, Delhi

Online Meeting
 Association of Obstetricians & Gynaecologists of Delhi
 2024-25
AOGD MONTHLY CLINICAL MEETING
 Friday | Date: 31st May, 2024
 Organised by
BLK-MAX Super Specialty Hospital, New Delhi

AGENDA

4:00 - 4:10 PM

President's Address
 Secretary's Report

4:10 - 4:55 PM

1. Twin pregnancy with Complete Hydatidiform mole and co-existing live fetus
Dr Saloni Arora
2. Conservative laparoscopic surgery for adenomyosis
Dr Dinesh Kansal
3. Day care Vaginal surgery for VVF repair
Dr Uma Rani Swain

4:55 - 5:00 PM

Audience Interaction



Dr Ashok Kumar
President



Dr Indu Chawla
Vice President



Dr Kamna Datta
Hon. Secretary

**Online campaign by AOGD to spread awareness during
“May Preeclampsia Awareness Month”**



Association
of
Obstetricians & Gynaecologists of Delhi
2024-25

**MAY
PREECLAMPSIA
AWARENESS MONTH**

Theme (2024) : “Predict, Prevent, Prevail”

Clinical Nugget: WHO revalidates that in populations with low dietary calcium intake, daily calcium supplementation (1.5–2.0 gm oral elemental calcium) is recommended for pregnant women to reduce the risk of pre-eclampsia.

Reference : WHO recommendation: Calcium supplementation during pregnancy for prevention of pre-eclampsia and its complications. Geneva: World Health Organization;2018.



Association
of
Obstetricians & Gynaecologists of Delhi

**WORLD
PREECLAMPSIA
DAY 22nd May**

Theme: “Predict, Prevent, Prevail”

A call to educate and empower women by spreading awareness about this multisystem, life threatening disorder of pregnancy and promoting its prevention and treatment.



Dr Ashok Kumar
President

Dr Indu Chawla
Vice President

Dr Kamna Datta
Hon. Secretary

10

Forthcoming Events

- 4th June – Webinar –FOGSI MTP Committee , No to VAW Committee & AOGD
- 7th June – Symposium on Beyond PCOS at Hotel Le Meridien, Delhi
- 8th June – Medicolegal committee – First module of certificate course at BLK Hospital
- 21st June – International Yoga day Celebration
- 22nd June – Webinar on Caesarian Scar Pregnancy- Endoscopy Subcommittee
- 26th June – Community health and public awareness subcommittee – Jan Jagrukta Program
- 27th June – Oncology subcommittee webinar on Carcinoma Endometrium
- 28th June – Monthly clinical meeting at Apollo Indraprastha Hospital
- 29th June – CME on Tips and Tricks in surgical management of Endometriosis- Endometriosis subcommittee

From the Editors Desk



Chief Editor

Warm greetings from the Editor s Desk

We are overwhelmed with the amazing feedback for the first issue. Grateful from the bottom of our hearts! This month we are focussing on minimal invasive surgery in gynaecology. Laparoscopy has evolved from being a limited surgical procedure used only for diagnosis and tubal ligation to a major surgical tool for a variety of indications in the last few decades along with many changes in indications, procedures, surgical skills and techniques. One big advantage is that it is a safe technique with a shorter recovery time period. An important aspect is the learning curve associated with it, therefore standardisation of skills and competency is essential. The two sub specialities which have seen an increased trend of laparoscopy use are urogynaecology and gynaecology oncology.

Apart from this, recent years have also witnessed an increase in robotic surgery in gynaecology ever since Da Vinci surgical system was approved in 2005. Robotic assisted laparoscopic benign gynaecological procedures like myomectomy, hysterectomy, endometriosis and sacrocolpopexy are well known. The main advantage with robotic endowrist movement is the precision of suturing along with better ergonomics for the surgeon. In this issue we discuss about the skill and practices of laparoscopy along with application of robotic technology in our field.

My heartfelt gratitude to all the authors for putting together an interesting read. We look forward to our readers' feedback to help us bring out a better version each time!

Dr. (Prof) Renuka Malik

Editor

Professor and Senior Consultant, ABVIMS & RML Hospital



Editorial Team: (Left To Right) Dr. Kanika, Dr. Preeti, Dr. Renuka, Dr. Kavita.
(Second Row Left To Right) Dr. Seema, Dr. Niharika

***Thought for the month: Do not dwell in the past,
do not dream of the future, concentrate the mind on the present moment – Buddha***



LEGEND GO LIVE



10-11, AUG, 2024 | 8:00 AM TO 8:00 PM | HYATT REGENCY, NEW DELHI

COME AND WITNESS THE LIVING LEGENDS OPERATE ONCE AGAIN

DR. NIKITA TREHAN

CHIEF ORGANISER - LEGENDS GO LIVE
INTERNATIONALLY ACCLAIMED GYNAE LAPAROSCOPIC SURGEON

- > RECORD FOR THE LARGEST FIBROID REMOVE LAPAROSCOPICALLY OF 6.5 KG
- > RECORD FOR THE OLDEST PATIENT OPERATED IN THE WORLD OF 107 YEAR OLD
- > RECORD FOR THE LARGEST UTERUS REMOVED LAPAROSCOPICALLY OF 9.5 KG

OPERATING FACULTIES



Dr. Nikita Trehan



Dr. Marcello Ceccaroni



Dr. Hafeez Rahman



Dr. Sandesh Kade



Dr. Shailesh Puntambekar



Dr. Yashodan Deka



Dr. Sanjay Patel



Dr. Osama Shwaki



Dr. Jay Mehta

DAY 1 - SATURDAY, AUG 10, 2024

WE HAVE PLANNED A "SURGICAL BONANZA" WHERE MORE THAN 25 SURGERIES WILL BE RELAYED LIVE FROM SUNRISE HOSPITAL TO HOTEL HYATT REGENCY BHIKAJI CAMA PLACE NEW DELHI FROM 08:00 AM TO 08:00 PM.

DAY 2 - SUNDAY, AUG 11, 2024

8.30 AM TO 4.30 PM - "CONFERENCE CME AND SOCRATIC SEMINAR" AT HOTEL HYATT REGENCY NEW DELHI (OVAL BANQUET)

4.30 PM TO 5.00 PM - VALIDECTORY

REGISTRATION FEES DETAILS

REGISTRATION FEES:- RS 9,500/-
 SPOT REGISTRATION :- RS 11,000/-
 ACCOMPANYING PERSON :- SAME AS ABOVE
 FOR PG STUDENTS :- RS 6,000/-
 (LETTER FROM HOD IS COMPULSORY)

PLANNED SURGERIES

ENDOMETRIOSIS OT

- > DEMONSTRATION OF CO2 LASER (BOSTON SCIENTIFIC FOR ENDOMETRIOMA ABLATION.
- > LAPAROSCOPIC SHAVING / DISCORD RESECTION OF RV ENDOMETRIOSIS.
- > LAPAROSCOPIC EXCISION OF BLADDER NODULE
- > LAPAROSCOPIC EXCISION OF DIAPHRAGMATIC NODULE
- > LAPAROSCOPIC EXCISION OF SCIATIC NERVE ENDOMETRIOSIS

ONCO & ADVANCED OT

- > LAPAROSCOPIC EXTRA FACIAL HYSTERECTOMY & PELVIC + PARA-AORTIC LYMPHADENECTOMY
- > LAPAROSCOPIC VVF REPAIR
- > LAPAROSCOPIC PREGNANT ENGERCLAGE
- > LAPAROSCOPIC URETERIC REIMPLANTATION
- > LAPAROSCOPIC ILEAL VAGINOPLASTY
- > LAPAROSCOPIC ADENOMYOMECTOMY "SUNRISE METHOD"

BENIGN SURGERY & HYSTEROSCOPY OT

- > LAPAROSCOPIC MYOMECTOMY
- > LAPAROSCOPIC HYSTERECTOMY " SUNRISE METHOD"
- > LAPAROSCOPIC RECANALIZATION
- > HYSTEROSCOPIC SEPTAL RESECTION
- > HYSTEROSCOPIC SUBENDOMETRIAL STEM CELL INJECTION
- > HYSTEROSCOPIC MYOMECTOMY

SPECIAL DISCOUNT (FOR PG STUDENTS)

FOR REGISTRATION DETAILS PLEASE CONTACT ON:

MR. SANJEEV KHURANA : +91-9213179913
 MR. RAVI PRAKASH : +91-9711437535

Creating Pneumoperitoneum in Endoscopy

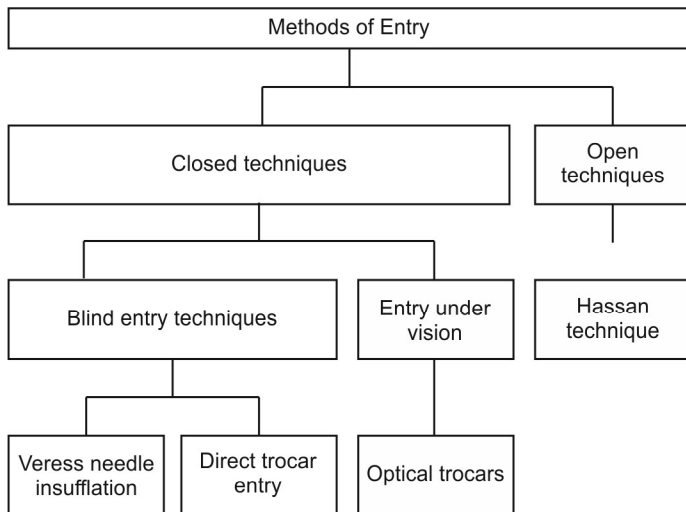
Dr. Mala Srivastava

Senior Consultant, Head of Gynecologic Oncology, Sir Ganga Ram Hospital, New Delhi

INTRODUCTION

The creation of pneumoperitoneum with gases such as carbon dioxide is an essential component of laparoscopic surgery that enables adequate distention & visibility inside the abdominal cavity. The surgeon may choose any method of entry into the abdomen as per the patient's characteristics & his/her own experience & preference (Table 1).

Table 1: Methods of Entry



1. VERESS NEEDLE

This method is the most common method of laparoscopic entry. Process is as follows:

Veress needle used to access abdominal cavity (Fig. 1)

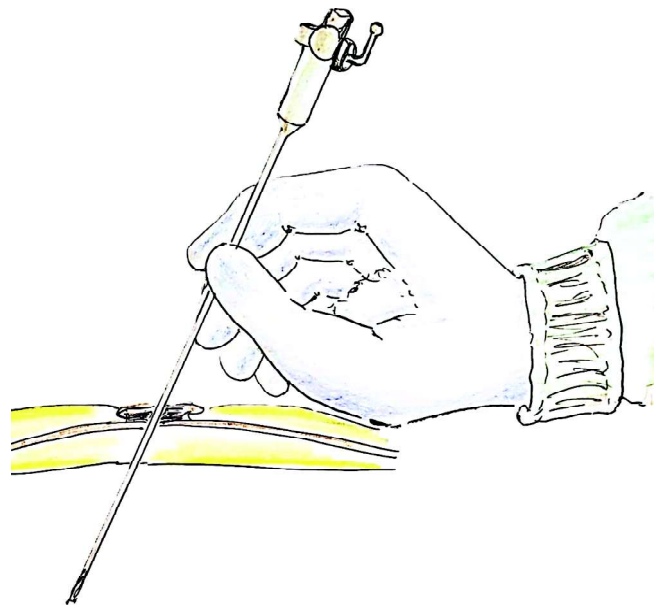
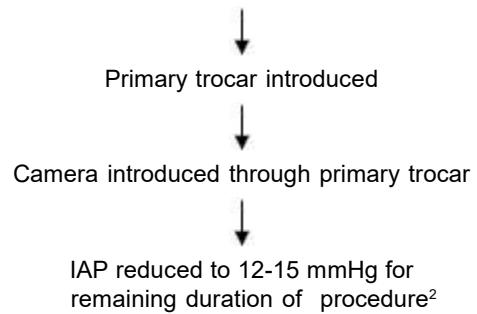
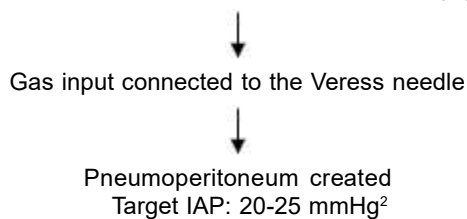


Fig. 1: Insertion of Veress needle through umbilicus

The Veress needle has a small-bore (1.8 to 2.2 mm) hollow sheath with a pointed edge and a spring-loaded inner hollow cannula with a blunt nib. The blunt nib contains a side hole that allows the passage of gas. It recoils to expose the sharp cutting of the outer sheath only when encountering resistance. The blunt tip springs forward once resistance is relieved resulting in an audible "pop" (Fig. 2). Abdominal organs are hence protected. Both disposable and reusable metal Veress needles are available in various lengths (ranging from 8 cm to 20 cm). Longer needles are preferred for obese individuals and shorter ones for thin or pediatric patients.

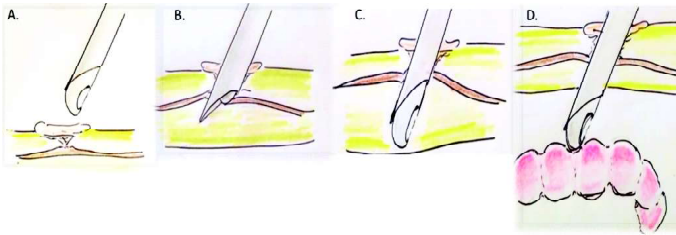


Fig. 2: Spring safety mechanism of the Veress needle: **A.** Blunt nib of inner cannula presents first before entry; **B.** Blunt nib recoils back on encountering resistance from the rectus sheath, exposing cutting edge of outer sheath; **C.** Upon crossing the resistance, the blunt nib springs forward with an audible "click" (similar click heard on piercing the peritoneum); **D.** Any intra-abdominal organs if inadvertently hit are exposed to blunt tip of inner cannula

2. DIRECT TROCAR ENTRY

Direct entry technique involves the use of a trocar instead of a Veress for abdominal entry & gas insufflation. Meta-analysis shows no added benefits in the prevention of major complications when compared to Veress entry.² The process is as follows :

Primary trocar pierced through anterior abdominal wall to access abdominal cavity (Fig. 3)

Gas input connected to the primary cannula

Pneumoperitoneum created
Target IAP: 20-25 mmHg²

Camera introduced through primary trocar

IAP reduced to 12-15 mmHg for remaining duration of procedure



Fig. 3: Direct trocar entry method of creating pneumoperitoneum

3. HASSON TECHNIQUE

Also known as the open technique. Process:

Small incision is made on the skin & subcutaneous tissue

The parietal peritoneum is exposed, lifted & nicked with scalpel/scissors

A finger is inserted through this opening inside the abdominal cavity & perimeter of the incision is checked for any adhesions

A blunt Hassan's trocar is introduced

Gas input connected to trocar

Pneumoperitoneum created

Camera introduced through trocar

Stay sutures placed to maintain the position³ (Fig 4)

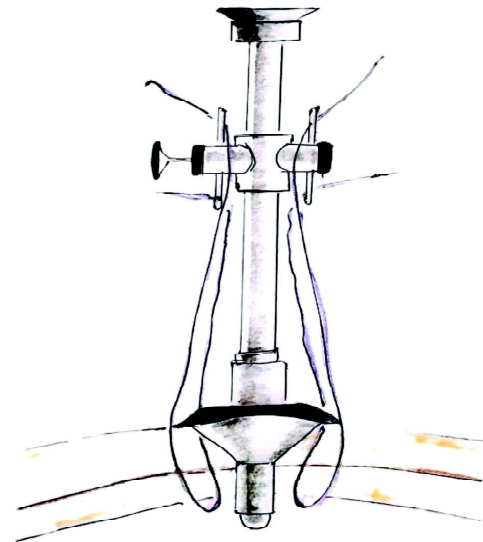


Fig. 4: Hassan cannula being held in place with fascial stay sutures

This technique was developed to avoid inadvertent injury to intra-abdominal organs and for large pelvic pathology at risk of penetration by the Veress needle.⁴ However the safety of the open vs closed techniques continues to be debated and the choice of entry mode should be catered to patient characteristics, surgeon skill & local practice.⁵

4. DIRECT VISUALISATION METHOD

The optical access technique uses transparent tipped trocars in which a 0-degree laparoscope is placed during insertion to enable direct visualisation of layers of the abdominal wall as it is traversed.

Angle of Insertion (Table 2)

The angle of insertion of the Veress needle at the umbilicus should be adjusted according to the patient's body mass index (BMI) as the relation of the umbilicus to the aortic bifurcation varies from thin to obese patients (Fig. 5).⁶

Table 2: Angle of insertion according to BMI

BMI (kg/m ²)	Distance of aortic bifurcation from umbilicus	Angle of insertion
Normal : <25	0.4 cm	45°
Overweight : 25–30	2.4 cm	45°–90°
Obesity BMI : >30	2.9 cm	90°

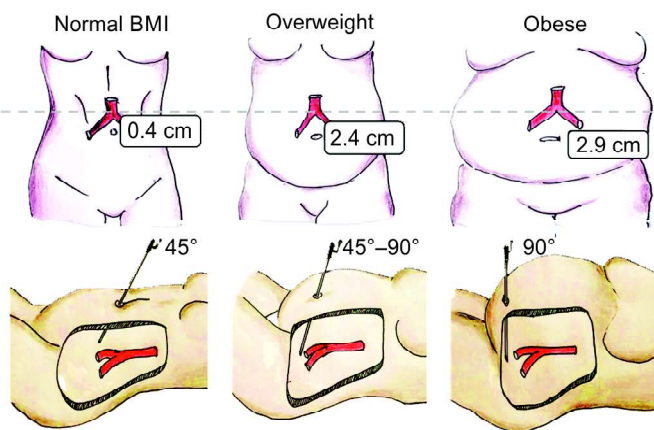


Fig. 5: Variation of distance of aortic bifurcation from umbilicus with BMI requires adjustment of angle of insertion

Indicators of Correct Intra-peritoneal Placement

1. **Initial Intra-abdominal Pressure on Entry <10 mm Hg** is the most reliable sign of correct intra-peritoneal placement.⁷
2. **Hanging drop test:** saline in the translucent hub of the Veress needle is drawn into the peritoneal space by negative pressure.
3. **Saline infusion test:** Injection of 5 ml of normal saline through the Veress needle has free flow means the tip of veress is in the abdominal cavity.
4. **Aspiration test:** The injected saline cannot be aspirated back unless the tip of the Veress needle is incorrectly placed in pre-peritoneal space or in muscle fibre or above. Excessive fluid aspiration may indicate ascites,

cysts, or perforation of the urinary bladder. Faecal matter in aspirate may indicate bowel injury & blood indicates vascular injury.

5. **Needle movement test:** The tip of the Veress should be free & no resistance felt on gentle movement. However, this test is dangerous and should not be done in routine practice.
6. **Audible "Clicks":** Two clicks indicate proper entry at the level of the umbilicus. First click → puncture of rectus sheath (Anterior and posterior rectus fused) Second click → puncture of the peritoneum. In any other area of the abdominal wall, the rectus sheath has anterior & posterior layers so two sounds are heard before peritoneal click.²

CHOICE OF GAS FOR PNEUMOPERITONEUM

The ideal insufflate is colourless, odourless, non-combustible, highly soluble in the blood (which decreases the risk of a gas embolus), rapidly excreted, inexpensive, and has limited systemic effects when absorbed.

1. **Carbon Dioxide:** CO₂ is highly absorbable and diffusible, aiding rapid clearance. It is non-combustible, facilitating concomitant use with electrocoagulation and laser irradiation. When in contact with peritoneal fluid, CO₂ converts to carbonic acid, which can irritate the diaphragm, causing shoulder tip pain and abdominal discomfort. It alters peritoneal fluid pH through the formation of carbonic acid, acting as a mild antiseptic, potentially reducing infection risk.
2. **Nitrous Oxide:** N₂O is less rapidly absorbed in blood compared to CO₂. It offers mild analgesia, making it suitable for diagnostic laparoscopy under local anaesthesia. Its popularity has decreased due to its combustible nature, leading to electrocautery explosions.
3. **Helium:** Helium may serve as an alternative to CO₂ for creating pneumoperitoneum in patients with severe cardiorespiratory disease. Studies suggest that Helium pneumoperitoneum is not associated with significant circulatory depression or oxygen transport abnormalities. However, it is expensive and has lower water solubility, increasing the risk of gas embolism.

SITES OF ENTRY

Access to the abdominal cavity is achieved by the introduction of the Veress needle/trocar. Various locations over the abdomen may be selected based on patient characteristics and the procedure planned (Fig. 6).

1. Umbilicus

Sharp entry is best done directly through the base of the umbilicus, which is the thinnest portion of the anterior

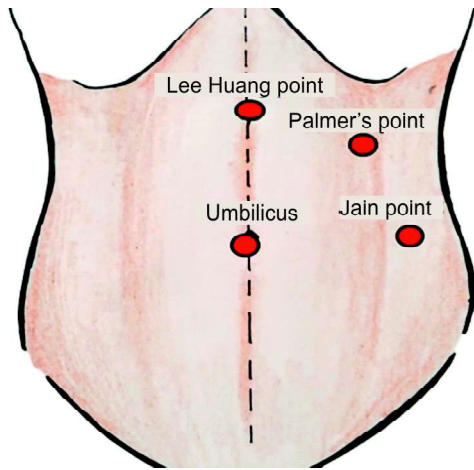


Fig. 6: Various sites for laparoscopic entry.

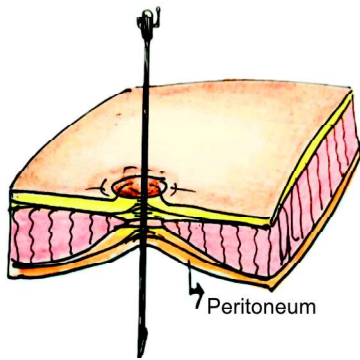


Fig. 7: Umbilicus is the thinnest portion of the anterior abdominal wall & is thus advantageous for laparoscopic entry

abdominal wall (Fig. 7). The retracted umbilical fossa represents the region of abdominal skin where it is fused to the underlying linea alba. Union of the peritoneum to the postnatal umbilical plate occurs at this site.⁸ There is no fat or muscle between the skin and the peritoneum. Alternative sites for insertion should be considered for patients who are suspected of having periumbilical adhesions or after three failed insufflation attempts to establish a pneumoperitoneum.¹

Safety tips while using umbilicus as the site for primary entry:

- Make your skin incision truly in the base of the umbilicus, where the abdominal wall is thinnest.
- Caudal displacement of umbilicus to minimize risk to great vessels
- Adjust the angle of insertion as per the BMI of the patient.⁸

2. Left Upper Quadrant or Palmer's Point: (Table 3)

Palmer's point is located 4–5 cm below the left costal margin (three finger widths) on the mid-clavicular line (i.e. 2 or 3 finger widths off the upper midline) (Fig. 8). It has a nearly zero risk of injury to large vessels. It requires emptying of the

stomach by nasogastric suction.⁹ Veress needle should be introduced perpendicularly to the skin.⁴ If using Veress, "3 pops" are audible: one for the aponeuroses of the internal/external oblique, one for the aponeuroses of the internal oblique/transversus abdominis and one for the peritoneum.⁸

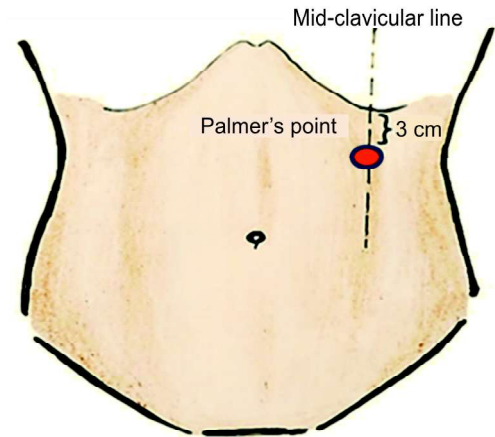


Fig. 8: Location of the Palmer's point.

Table 3: Indications and contraindications of using the Palmer's point

Indications	Contraindications
<ul style="list-style-type: none"> • Previous laparotomy • Extremely obese as the umbilicus is shifted caudally to the aortic bifurcation. • Very thin patients as the great vessels lie 1-2 cm beneath the umbilicus • Large pelvic mass • Early 2nd trimester pregnancy • Failed umbilical cannula insertion 	<ul style="list-style-type: none"> • Previous splenic or gastric surgery • Significant hepatosplenomegaly • Portal hypertension • Gastropancreatic masses

3. Middle Upper Abdomen or Lee-huang Point

The Lee-Huang point lies centrally between the xiphoid process and the umbilicus. It is preferable for women who had previous abdominal surgery or gynecologic malignancy since the first trocar at the Lee-Huang point can overcome and avoid obstacles from adhesions resulting from a previous low-midline incision and an overcrowded operative field caused by a large uterus (Fig. 9). The contraindication includes those who had previous surgery at the supra-umbilical region.

4. Jain Point

The Jain point is demarcated firstly by locating the anterior superior iliac spine (ASIS) followed by drawing a vertical

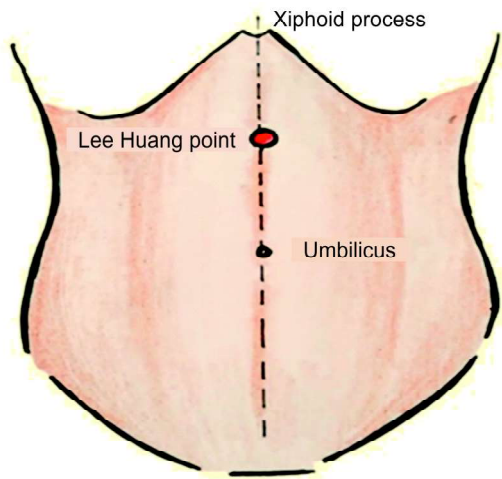


Fig. 9: Location of the Lee-Huang point.

line 2.5 cm medial to the anterior superior iliac spine up to the level of the umbilicus, thereafter a horizontal line is drawn at the upper margin of the umbilicus. The point where these two perpendicular lines meet is the “Jain point,” located 10–13 cm lateral to the umbilicus (depending on the patient’s BMI) (Fig. 10).

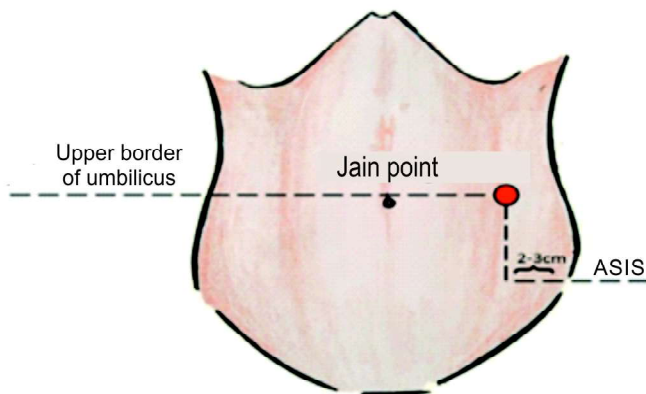


Fig 10: Location of Jain point at the intersection of a horizontal line through upper margin of umbilicus and a vertical line 2-3 cm medial to anterior superior iliac spine

Jain point has an added advantage in that it can be used for even low BMI patients whereas even Palmer’s point cannot be used due to its close proximity to the left kidney.

5. Posterior Vaginal Fornix

This can be considered in patients with significant abdominal adhesions and no history of endometriosis, pelvic inflammatory disease or pelvic surgery.⁴

Physiological Response to Pneumoperitoneum

Abdominal insufflation stretches the peritoneum, increasing vagal tone, which can cause bradyarrhythmias or even asystole. Immediate decompression of intraabdominal pressure (IAP) is necessary if bradycardia occurs. Slower insufflation, lower IAP, adequate hydration and glycopyrrolate premedication can negate this vagal response. Upward displacement of the diaphragm due to increased

IAP reduces pulmonary compliance. These changes may lead to cardiovascular compromise in high-risk patients such as those with heart failure, ischemic heart disease, valvular heart disease, congenital heart disease, or pulmonary hypertension. The different phases of laparoscopic surgery illicit varying physiological responses in the body (Fig. 11)

Complications of Pneumoperitoneum

The overall incidence of major injuries at the time of entry is 1.1/1000. Bowel injuries have occurred in 0.7/1000 laparoscopies and major vascular injuries in 0.4/1000 laparoscopies.

1. **Failed Entry:** A failure of 3 attempts to correctly establish pneumoperitoneum at a particular site is known as failed entry (Table 4).³ Common reasons include:
 - Improper angulation of entry device (Veress/trocar)
 - Inadequate depth of introduction / inadequate length of instrument
 - Adhesions at the site of the incision
 - Obesity

Table 4: Complication rates associated with repeated attempts at entry¹⁰

Complication rates were as follows:	
• At 1 attempt:	0.8% to 16.3%
• At 2 attempts:	16.31% to 37.5%
• At 3 attempts:	44.4% to 64%
• At > 3 attempts:	84.6% to 100%
Complications were extraperitoneal insufflation, omental and bowel injuries, and failed laparoscopy	

2. **Vascular injury:** Most (75%) of vascular injuries occur at the time of entry. The tip of the entry instrument may prick the aortic bifurcation which lies below the umbilicus or vessels in the anterior abdominal wall may inadvertently be breached.²

The vascular injuries occur mostly due to:

- improper technique
- defective instruments such as use of blunt trocars leading to excessive force, loss of protective recoil action over the sharp tip of veress needle
- overshooting optimal depth of insertion of the instrument
- vertical (90 degrees) periumbilical insertion angle in a patient with normal/low BMI in whom the aortic bifurcation lies only 0.4 cm below the umbilicus
- Inferior epigastric arteries can be safeguarded during entry with knowledge of the anatomy and by trans illumination with a laparoscope

Safe zones where ports can be inserted with a low likelihood of injuring the inferior epigastric artery are: (Fig. 12)

- <1 cm from the midline
- >8 cm from the midline

Increased IAP

Lungs

- Diaphragm displacement
- ↑ Airway pressures
- V-Q mismatch
- ↓ Compliance

Heart

- ↑ RAP
- ↑ ASVR
- ↓ CO

Splanchnic

- ↓ splanchnic blood flow
- ↓ hepatic artery and portal venous blood flow

Renal

- ↓ renal blood flow
- ↓ GFR
- oliguria

Vasculature

- ↑ MAP
- ↑ SVR
- IVC compression
- Aortic compression

Hypercarbia

Lungs

- ↑ PAP, ↑ PVR
- Pulmonary vasoconstriction
- Subcutaneous emphysema
- Gas embolism

Heart

- Arrhythmia
- Myocardial depression
- Myocardial ischemia
- Impaired hemoglobin affinity and oxygen transport

Splanchnic

- ↓ hepatic and intestine tissue pH

Renal

- ↑ renal proton excretion

Vasculature

- ↓ SVR

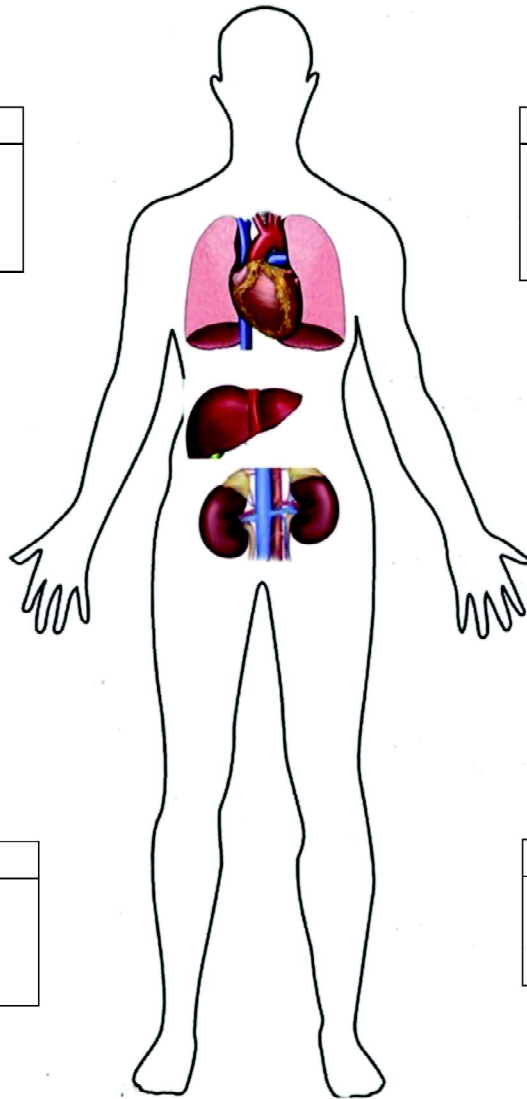


Fig. 11: Physiological changes associated with pneumoperitoneum using CO₂ arise from the primary changes of increased IAP & hypercarbia. Credit : Atkinson, T.M., Giraud, G.D., Togioka, B.M., Jones, D.B., & Cigarroa, J.E. (2017). Cardiovascular and Ventilatory Consequences of Laparoscopic Surgery. *Circulation*, 135, 700–710.

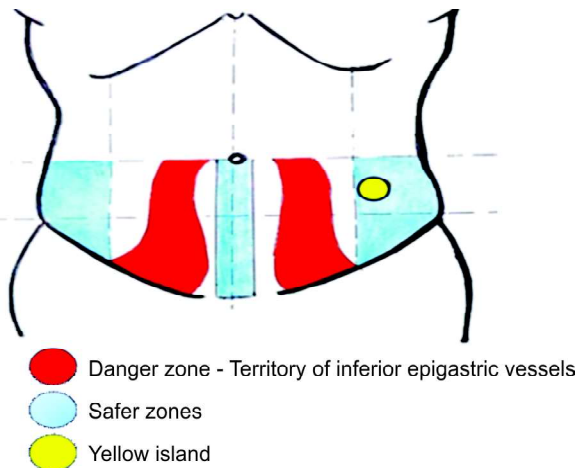


Fig. 12: Depiction of course of major vessels of anterior abdominal wall and safe zones of port insertion

- >2/3 along the line between the midline and the ASIS
- **Yellow Island:** 1/3 of the way from ASIS to the umbilicus

3. **Bowel injury:** Only 35% of bowel injuries are identified during surgery. Signs include bowel content leakage, difficult-to-locate bleeding, bubbling in irrigation fluid, foul gas smell, high insufflation pressure, or local bowel distension (Fig. 13).²

Surgeons should be suspicious of patients with difficult entry. Through-and-through injury occurring during entry may be detected while removing the laparoscope at the end of procedure.²

4. **Bladder injury:** Bladder dome perforation occurs with suprapubic trocars. Risk factors include prior laparotomies causing bladder adhesion, previous cesarean sections, patent urachus, and lower segment myoma. Preoperative bladder drainage is key in reducing bladder injuries.²

5. **Nerve injury:** Placement of trocar sites 2 cm above the level of the anterior superior iliac spine, at any point medially, would avoid any significant nerve injury.²

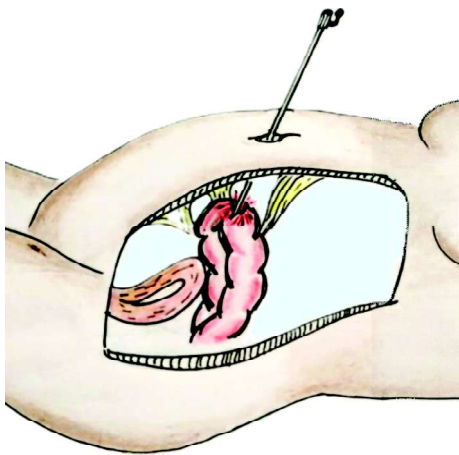


Fig. 13: Bowel injury during laparoscopic entry

6. **Subcutaneous emphysema:**

- Incorrect veress/trocar placement or faulty instruments can cause gas accumulation in the pre-peritoneal space rather than the intraperitoneal (Fig. 14 A,B).
- Gas can spread to the anterior chest wall, neck, and face.
- Predisposing factors for subcutaneous emphysema include:
 - High gas flow
 - High intraabdominal pressures of ≥ 15 mm Hg
 - Multiple entry attempts
 - Prolonged procedures ≥ 3.5 hours
 - Inadequate skin/fascial sealing around the cannulas

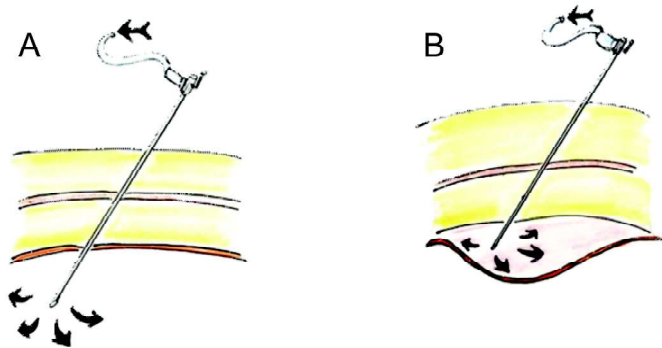


Fig. 14: **A:** Correct placement of veress leading to proper intraperitoneal insufflation; **B:** Inadvertant creation of subcutaneous emphysema due to pre-peritoneal gas insufflation use of more than five cannulas

Pneumoperitoneum in Pregnancy

Pregnant women may undergo emergency surgeries regardless of pregnancy stage. Elective surgeries should be postponed until after childbirth, however if unavoidable, are best done in the second trimester (Table 5).¹¹

Table 5: In women requiring intra-abdominal surgery in pregnancy²

Upto 14 weeks gestation	Veress needle insufflation at the umbilical site may be used (unless contraindicated)
14-24 weeks	Open (Hasson) entry at the umbilicus or Veress entry from Palmer's point
Beyond 24 weeks gestation	Open (Hasson) entry is recommended

CONCLUSION

Understanding pneumoperitoneum creation, instrument operation, and associated physiological responses ensures safe laparoscopic surgeries. Preoperative assessment of abdominal wall mobility, signs of poor healing and past operative procedures suggestive of adhesions should be noted. All instruments should be checked before use, especially the veress needle and primary trocar used in blind insertion.

KEY POINTS

1. Catheterization and nasogastric tube placement minimize bladder and stomach injury risks, though doesn't completely eliminate it.
2. Long and sharply pointed blades should be avoided for skin incisions, especially in thin women.
3. The patient should be horizontal during the insertion of the primary veress/trocar.
4. Routine elevation of the anterior abdominal wall during Veress or trocar insertion doesn't prevent visceral or vessel injury.
5. Use high pressure (20-25 mmHg) during primary trocar insertion to maximize distance from structures, reducing to 15 mmHg or lower post-placement.

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Monthly Clinical Meetings AOGD Calendar 2024-25

Date	Hospital
26th April, 2024	LHMC & Smt. Sucheta Kriplani Hospital
31st May, 2024	B L Kapoor Hospital
28th June, 2024	Apollo Hospital
26th July, 2024	Army Hospital (Research & Referral)
30th August, 2024	AIIMS Delhi
27th September, 2024	ESI, Basaidarapur Delhi
25th October, 2024	DDU Hospital
29th November, 2024	MAMC & LNJP Hospital
27th December, 2024	Sir Gangaram Hospital
31st January, 2025	VMMC & Safdarjung Hospital
28th February, 2025	UCMS & GTB Hospital
28th March, 2025	RML Hospital
25th April, 2025	LHMC & Smt Sucheta Kriplani Hospital

Electrosurgical Sources in Minimal Access Surgery

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INTRODUCTION

Electrosurgery is the most commonly used form of surgical energy in both open and minimally invasive surgery due to its availability, low cost and versatility. Advanced electrosurgical devices have revolutionized laparoscopic surgery with an increasing number of more difficult procedures. Over the years, significant discoveries and advancements have been made in electrosurgical technology, enhancing precision, efficiency, and safety in laparoscopy.

PRINCIPLE OF ELECTROSURGERY

Monopolar Energy

In monopolar electrosurgery, the electric current passes through the patient to complete the cycle. The primary difference between monopolar electrosurgery and the other modalities is that the electrical current in monopolar devices passes through the patient. The tissue impacts produced with monopolar electrosurgery include vaporization (tissue destruction and cutting), fulguration or spray (tissue destruction and little hemostasis), desiccation (cell wall break and cytoplasm boiling), and coagulation (vessel sealing inferable from denaturation and renaturation of proteins).¹

Monopolar electrosurgery produces tissue temperatures of ~100°C, 100–200°C, and >200°C causing effects like desiccation, vaporization, and fulguration respectively, while the other energy devices have limited tissue effects of desiccation and coaptation.²

PRINCIPLES OF MONOPOLAR

Electrosurgery

Current Pathway

The electrical current in monopolar devices passes from the

generator to the active electrode, then via the patient, it exits through a dispersive or neutral electrode pad connected to the generator.

Current Density

The impact of monopolar current over body tissues is recognized with the current density in these tissues. Hence, electric current runs in series from the active electrode it enters through the body tissue to yield an impact, leaving the patient using a neutral return electrode just results in a clinically inconsequential ascent in tissue temperature due to low current density. There can be damage at any part of the circuit where the current density is high.

Waveforms

The waveforms in monopolar electrosurgery are cutting, coagulation and blended current. It is important to realize that these waveforms do not cause a particular tissue effect e.g., the tissue effect is different when the cut waveform is used in either contact or noncontact mode, yielding desiccation or vaporization respectively. Cut waveform is a continuous sinusoidal waveform with high current flowing 100% of the time but relatively low voltage, coagulation waveform is characterized by high voltage and intermittent bursts of dampened waveform where the duty cycle is reduced, and blend waveforms are modifications of the cutting waveform which also consists of intermittent waveforms, but with interrupted duty cycle.

Conventional Bipolar Electrosurgery

In a bipolar electrosurgical circuit, there is no dispersive electrode and the current flows only pass through the tissue between the two electrodes of the bipolar instrument hence low voltage with 100% duty cycle (cut waveform) is used. The conventional bipolar has an advantage over monopolar electrosurgery by its ability to seal larger vessels up to ~5 mm in diameter. Bipolar electrosurgery is frequently

available and relatively inexpensive. Disadvantages of bipolar electrosurgery include more lateral thermal spread that continues until device activation is ceased; no audio signal heard from the generator unit to inform the surgeon when desiccation or coaptation is complete, which increases the risk of injury from the lateral thermal spread as well as tissue charring and tissue adherence to the instrument jaws; and also there is need to use another instrument, such as a laparoscopic scissor, for tissue cutting.³

Principles of Bipolar Energy

Current Pathway

A high-frequency electrical current flows from one electrode to the other electrode through the intervening tissue. The tissue within the forceps completes the circuit. An indifferent electrode is not required as the patient is not part of the circuit.

Current Density

Bipolar energy can have two types of tissue effects, desiccation and coaptation depending upon the current density and pressure applied. As the density of current is not transmitted at a single specific point in the bipolar electrode, thus it is unable to produce a cutting effect. To avoid this hindrance, the progressive bipolar devices have a mechanical cut mechanism in the form of a blade.

Waveform

The waveform applied is similar to that applied during monopolar "coag" mode. It is a high-voltage interrupted duty cycle current. Best permutations and combinations are incorporated into the device to achieve a high vessel sealing capacity (Fig. 1).

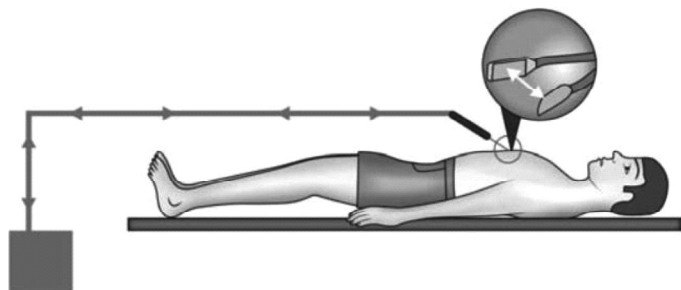


Fig 1: Advanced bipolar vessel sealing devices

Such devices were developed to address the above limitations and they have revolutionized modern laparoscopic surgery with increased uptake of more complex procedures. The jaws of these devices compress, coagulate and seal blood vessels of up to 7 mm. The major advantage is a computer-controlled tissue feedback system. The tissue impedance is monitored with continuous adjustment of the generated voltage and current to maintain the lowest possible power setting to achieve the desired tissue effect, at which time an audio signal alerts the specialist that the terminal point has been achieved. They use less energy compared to

the traditional bipolar devices with less thermal spread and smoke production.⁴ Their output is pulsed to give time for the tissues to cool down during the off phase. These energy sources were the first to be endorsed by the US Food and Drug Administration (FDA) to seal vessels up to 7 mm in width inferable from innovative advances, e.g., tissue impedance observing up to 4000 times each second (LigaSure Fig. 2); temperature-delicate material in the gadget jaws that optimizes tissue temperatures at $\sim 100^{\circ}\text{C}$ (EnSeal); delivery of pulsed energy with nonstop input control to counteract tissue overheating (PK Framework); and jaw outline that advances mechanical pressure to the vascular pedicle (LigaSure, EnSeal).



Fig 2: Image showing LigaSure

Harmonic Devices

These devices convert electrical energy into ultrasonic energy (vibrations) in the device which later gets converted to thermal energy at frequencies more than 1MHz. The piezoelectric crystals generate vibrations through the handpiece that oscillate the non-articulating jaw of the instrument. The combination of thermal and mechanical energy produces the effect on the tissues. Desiccation and coagulation are achieved at lower settings and tissue cutting occurs at higher settings. Effects are accomplished at a temperature of 50 to 60°C due to the mechanical effect of vibrations and can seal up to 5 mm of the vessel. As of late the new recent model has been specifically produced for larger vessel fixing and cutting, this gadget has been approved by the FDA to seal vessels up to 7 mm in diameter.⁴ These devices need less instrument manipulation and are inferable from the blend of vessel-fixing and tissue cutting, and generate less smoke (Fig. 3).



Fig 3: Image of Harmonic Scalpel

Clinical Applications

1. **Electrosurgical techniques in infertility:** Electrosurgical devices have been used in the management of polycystic ovary syndrome as the most common cause of anovulatory infertility. Using monopolar electrosurgical devices remains the most common method in ovarian drilling procedures; however, using bipolar devices has been reported to give comparable better clinical outcomes.

Electrocoagulation and electro-excision of endometriosis is another example of electrosurgery in patients suffering from infertility. Some authors have indicated fewer relapses when using bipolar electrocoagulation compared to excision.

2. **Electrosurgical devices in fibroid management:** In laparoscopic myomectomy, the uterine incision can be made with monopolar, bipolar or ultrasonic energy. In hysteroscopic myomectomy, loop electrodes are passed down the resectoscope, and using either monopolar or bipolar current, can slice away fibroid protruding into the endometrial cavity.
3. **Electrosurgery in laparoscopic procedures in endometrial and cervical cancer:** Pulsed bipolar systems can offer advantages in the management of early cervical carcinoma in patients undergoing laparoscopic radical hysterectomy and pelvic lymphadenectomy. Laparoscopic devices including harmonic scalpel and coagulating shears have also been studied in comparison to electrosurgical devices in lymph node dissection and laparoscopic hysterectomy. Holub et al. concluded these devices as more cost-effective alternatives with less thermal injury in lymph node dissection procedures. A randomized trial concluded the superiority of a multifunctional instrument that uses ultrasonic waves and advanced bipolar energy with simultaneous sealing and dissection capabilities in these cases.

Complications

The incidence of electrosurgical complications is 1-5 recognized injuries per 1000 cases. Around basic and advanced energy-based devices are commonly used, there is no well-defined requirement to demonstrate competency in the skills and knowledge required to use them. Electrosurgical injuries may result from the following situations:

1. **Direct coupling:** results from inadvertent contact activation of the generator while the active electrode is in close proximity another metallic instrument (Fig. 4). Another situation of direct coupling can occur if the active electrode is used at a bleeding point along a staple line, which can generate metal-to-metal arcing of around 1,000°C and melting of staples.⁵
2. **Capacitive coupling:** the risk is higher with the utilization of different conductive and insulating materials especially the trocars (Fig. 5). The current flow can

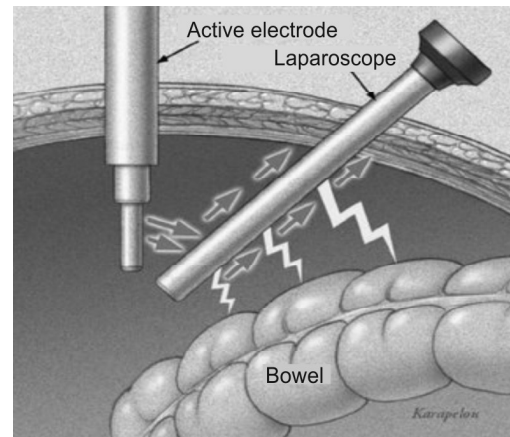


Fig 4: Direct coupling shown in the picture.

accumulate in an insulator and form stored energy.⁶ This capacitor creates an electrostatic field between two conductors such that current through one conductor is transmitted to the second conductor once the net charge exceeds the insulator's capacity.

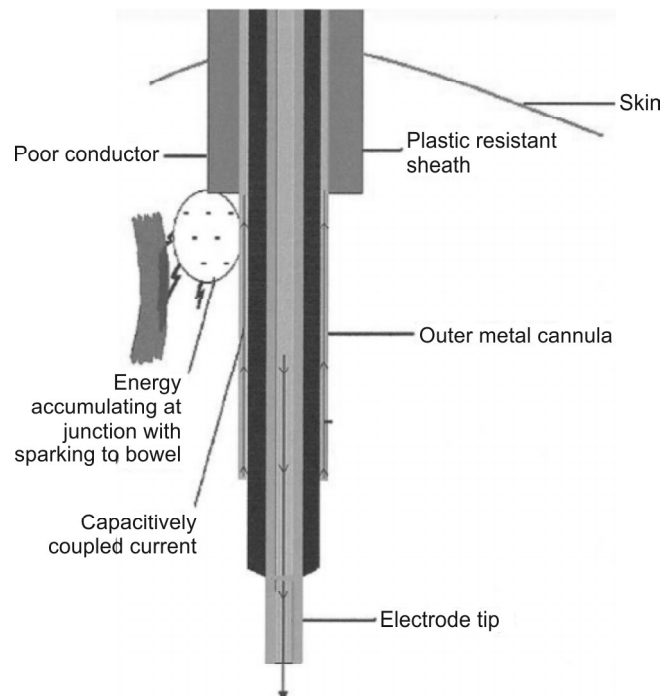


Fig 5: Image depicting capacitive coupling

3. **Insulation defects:** are common in reusable ones more exposed to the damage of the material covering the active electrode. Also, the exposition of these long instruments to high voltage currents of coagulation can create blow holes and break their insulation sheath (Fig. 6).
4. **Alternate Site Burns:** results from improper grounding. Electrical currents choose the pathways of least resistance. Therefore, the stray current could exit the body of the patient through any conductive grounding object that is in contact with the patient as a method of ground Return such as ECG electrodes or tables and operating staff.

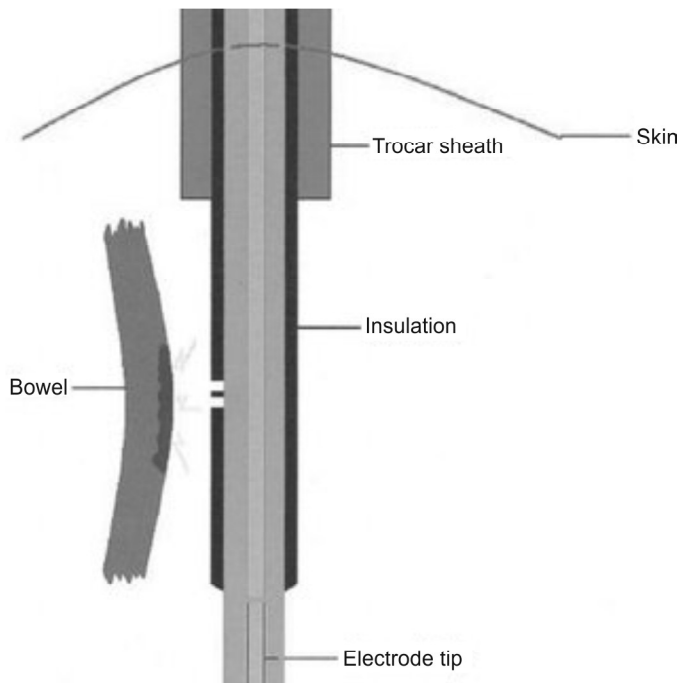


Fig 6: The insulation defect shown in the image

5. **Direct application:** Damage by direct utilization of the electrocautery probe can emerge either from mixed-up focusing on or unintended initiation. The pace of the system will bring about either less or more coagulation and thermal spread.⁷ The tissue impact is directly related to the stay time. Drawn-out enactment will deliver more extensive and more profound tissue harm than the expected sought tissue effect.
6. **Stray current:** A stray current arising from blemished insulation can be dangerous to the surrounding structures. A cautious preoperative and after-use assessment of gear is the best method for distinguishing imperfect insulation. The two noteworthy reasons for insulation failure incorporate the utilization of high-voltage streams and the regular reesterilization of instruments, which can debilitate and break the insulation.⁸

Good Practice in Electrosurgery⁹

- Train the hand-eye coordination sequentially: didactic phase, laboratory experience, observation and /or assistance and preceptorship.
- Learning in depth regarding the biophysical principles of electrosurgery.¹⁰
- Choosing the proper current waveform mode
- Using all metal or all plastic cannula system
- In Monopolar devices
 1. Keeping the lowest power setting.
 2. Application of dispersive pad should be avoided over bony prominences, metal prosthesis, surgical scars, hairy skin or pressure areas.
 3. Using continuous low-voltage waveform(cut) mode.
 4. Using brief and short intermittent activations.

5. Avoiding open activation.
 6. Avoiding activation of electrodes near or in direct contact with another instrument.
- In Bipolar devices
 1. Terminating current at the end of the vapor phase.
 2. Application current in pulsatile fashion.
 3. Paying attention to the tip of the metallic part

Future Directions

Looking ahead, the future of electrocautery devices in laparoscopy is poised for further innovation and refinement.

CONCLUSION

Electrosurgical devices play a vital role in laparoscopic surgery, enabling precise tissue manipulation, hemostasis, and tissue sealing. Over the years, significant advancements have been made in electrocautery technology, enhancing safety, efficiency, and surgical outcomes. Current trends focus on the integration of multiple energy modalities, enhanced safety features, and ergonomic design. Looking ahead, future innovations in energy modalities, intelligent energy delivery, visualization, and personalized surgical solutions hold promise for further improving the practice of laparoscopic surgery and advancing patient care.

KEY POINTS

1. Research continues into novel energy modalities such as radiofrequency ablation, microwave, and cryotherapy for tissue ablation and hemostasis in laparoscopic surgery. These modalities offer the potential for enhanced precision, reduced collateral damage, and improved outcomes in complex procedures.
2. The integration of artificial intelligence and machine learning algorithms holds promise for optimizing energy delivery parameters in real-time based on tissue characteristics and surgical objectives. Intelligent energy delivery systems have the potential to minimize tissue damage, shorten procedure times, and improve overall surgical efficiency.
3. Innovations in imaging technologies, such as augmented reality and fluorescence-guided imaging, can complement electrocautery devices by providing enhanced visualization of anatomical structures and tissue perfusion. Improved visualization aids in precise tissue targeting and reduces the risk of inadvertent injuries during laparoscopic procedures.
4. Advances in precision medicine and patient-specific modeling enable personalized surgical approaches tailored to individual patient anatomy and pathology. Electrocautery devices integrated with patient-specific data and predictive analytics can facilitate customized treatment plans, optimizing outcomes and minimizing complications in laparoscopic surgery.

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AOGD Risk Management Support (ARMS) Group

One of the ways to ensure stress-free work environment and optimal patient care is mutual support among professional colleagues. An advisory group was set up last year so that they can be contacted if any of us is caught in a complex clinical dilemma/dealing with aggressive clients or is apprehensive about how to document or effectively troubleshoot a potential problem. The same group will continue to provide timely advice and is led by

Convener - Dr. Vijay Zutshi - 9818319110

Co-convener - Dr. Aruna Nigam - 9868656051

We invite suggestions from all members regarding functioning of this cell which will guide us forming the SOPs. Please mail to aogd.ucmsgtbh2023@gmail.com

Complications in Laparoscopy and Tips to Avoid them

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INTRODUCTION

Laparoscopic surgery, also called minimally invasive surgery, provides several advantages compared to traditional open surgery, including smaller incisions, quicker recovery times, and lower rates of post-operative complications such as pain and improved cosmetic outcomes. However, despite the overall safety of laparoscopic techniques, there is a risk of unintentional serious injuries to organs like the bowel, bladder, and blood vessels. These injuries occur at a rate of 3–4 per 1000 procedures, with over 50% linked to the initial entry into the abdomen when inserting the primary trocar.¹ Women who have the greatest risk of vascular injury are typically young, slender, and possess well-developed abdominal muscles. In these women, the aorta may be positioned less than 2.5 cm below the skin surface.²

Failure to promptly recognize and address injuries during surgery can lead to higher rates of complications and death. Delayed recognition of such injuries after surgery, rather than during the operation itself, exacerbates the severity of the consequences for patients and increases potential legal responsibility for surgeons. Additionally, minor complications such as postoperative infections, extraperitoneal insufflation, subcutaneous emphysema and hernias at trocar sites are also associated with laparoscopic entry.³ Neurological injuries can also occur.

Risk Factors for Complications in Laparoscopic Surgery

History of prior surgery

Individuals who have undergone surgery for intra-abdominal or pelvic conditions (such as diverticulitis or pelvic inflammatory disease) face an elevated risk of complications related to adhesions.

Surgeon's level of experience

The occurrence of complications may be linked to the surgeon's expertise and the number of procedures performed.

Co-morbidities

Those with compromised cardiopulmonary function may not be suitable candidates for abdominal insufflation, given the physiological changes induced by pneumoperitoneum.

Procedure complexity

Factors such as extensive bowel distention, sizable abdominal or pelvic masses, and surgery for advanced endometriosis can heighten the chances of complications.

TECHNIQUES FOR ABDOMINAL ENTRY

The initial step of laparoscopic surgery, abdominal access, is crucial for the success of the procedure. There are four primary techniques for creating pneumoperitoneum:

- Blind Veress needle (VN),
- Direct trocar insertion (DTI),
- Optical trocar insertion,
- Open laparoscopy (OL).

The Veress Needle Method

This method involves three stages: entering the peritoneal cavity with the needle, insufflating gas, and then inserting a trocar (Fig. 1). Various tests, such as the double click sound, aspiration test, hanging drop of saline test (Fig. 2), "hiss" sound test, and syringe test, are recommended to confirm the correct placement of the needle tip in the peritoneal cavity, although their accuracy is not definitive. An initial insufflation pressure of less than 10 is probably the most



Fig. 1: Image showing Veress needle insertion



Fig. 2: Hanging drop test

accurate test In the Veress needle method.⁴ Abdominal pressure may be briefly increased before inserting the first trocar to 20 mmHg. Studies have shown that transiently raising intra-abdominal pressure during laparoscopic entry does not negatively impact cardiopulmonary function in healthy individuals. (Table 1)

Table 1: Tips and tricks to avoid complications

- Position the operating table horizontally with no Trendelenburg tilt at the start of surgery.
- Ensure proper stabilization of the lower abdominal wall for perpendicular insertion of the Veress needle into the skin, ensuring adequate penetration of the fascia and peritoneum.
- Adjust the angle of insertion based on the patient's BMI, ranging from 45° for non-obese women to 90° for obese women.
- Take care to minimize lateral movement of the needle to avoid potential injury to the bowel or vessels.

In cases of suspected periumbilical adhesions, history of umbilical hernia, or failed insufflation attempts at the umbilicus, left upper quadrant (LUQ, Palmer's) laparoscopic entry may be preferable.

Direct Trocar Entry Technique

This technique streamlines the process by using just one step, unlike the traditional three-step method involving the Veress needle, insufflation, and trocar (Fig. 3). It starts with making a skin incision at or above the umbilicus wide enough for a sharp trocar/cannula system. The abdomen is lifted adequately either manually or with towel clips placed on both sides of the skin incision and the trocar is then inserted directly into the abdominal cavity, aiming towards the pelvic area. This approach, which skips the initial insufflation step, is deemed safe and efficient, reducing the risk of insufflation-related complications like gas embolism.



Fig. 3: Direct trocar entry technique

Open Method

The procedure involves sequentially opening all abdominal folds following skin excision, allowing access to the abdominal cavity in line with its anatomy. One significant benefit of this approach is the absence of life-threatening major vascular injuries. The Hasson technique, generally safe, does not eliminate the risk of intestinal injury, with reported incidences as low as 0.1%.

Disposable Optical Trocars

This is also known as Optical Access Trocars, replace traditional blind sharp trocars with hollow trocars (Fig. 4). These single-use devices feature a zero-degree laparoscope

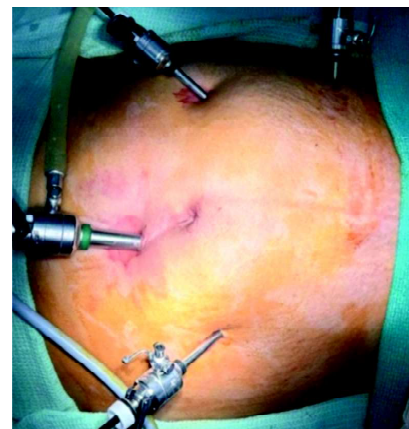


Fig. 4: Image showing primary and accessory ports

loaded into the distal crystal tip, enabling real-time monitoring of tissue layers as the abdominal wall is transacted. The primary advantage of these visual entry cannula trocars is their ability to reduce the size of the entry wound and the force required for insertion. However, it's important to note that while visual entry trocars offer benefits, they are not superior to other trocars in terms of avoiding visceral and vascular injuries.⁵

BOWEL INJURY

Bowel injury ranks as the third leading cause of mortality following a laparoscopic procedure, following anaesthesia and major vascular injury. The incidence of gastrointestinal tract injury ranges from 0.03 to 0.65 percent among patients undergoing laparoscopic surgery. Notably, 41 to 50 percent of inadvertent bowel injuries occur during abdominal access.⁶

Entry-related Bowel Injuries

The injury primarily affect the small bowel, although injuries to the stomach, liver, and colon have been documented with subcostal access techniques. In cases of Veress needle-induced injury, conservative management is feasible due to its small diameter, which typically leaves no defect, allowing the muscular layer to close spontaneously. Conversely, trocar injuries may necessitate laparotomy for repair. In instances of trocar injury, leaving the trocar in place can aid in identifying the injury site. (Table 2)

Table 2: How to avoid bowel injury at the time of entry

- To mitigate the risk of stomach injury, decompression with an orogastric or nasogastric tube before upper abdominal access is advisable.
- During primary trocar insertion, avoiding the Trendelenburg position helps maintain a more perpendicular angle of insertion.
- Utilizing a trocar screwing motion instead of direct pushing provides better control.
- Secondary trocars should be placed under direct vision to minimize the risk of vascular and internal organ injuries.

Dissection Related Bowel Injuries

Injuries to the bowel related to dissection can occur due to electrothermal damage or trauma during the dissection process. Factors that increase the risk of bowel injury include operating on obese or thin patients, prior abdominal and pelvic surgeries (especially those with midline scars), severe endometriosis, and complex pelvic pathologies.

Electrothermal injuries may arise from various sources such as insulation failure, direct coupling, direct application, and capacitive coupling. In cases of electrothermal injuries identified during surgery, the visible thermal damage consistently appears less severe than the actual injury. The lateral thermal spread varies depending on the type of

instrument used: up to 2 to 22 mm for monopolar instruments, 2 to 6 mm for conventional bipolar instruments, 1 to 6 mm for advanced bipolar instruments, and 1 to 4 mm for ultrasonic instruments. (Table 3)

Table 3: Safety precautions in electrothermal injuries

- It is crucial to consider factors such as the patient's surgical history, the complexity of the planned procedure, and recognizing surgical limitations
- Essential for gynaecologists to have a thorough understanding of the biophysics of electrothermal surgery, the functionality of equipment used, and the general effects of electrothermal energy on tissues.
- Patients who fail to show improvement following laparoscopic surgery should raise suspicion of an undetected bowel injury.
- Symptoms typically arise within twelve to thirty-six hours but can also manifest up to five or seven days later.
- To prevent herniation of the small bowel, it's advisable to close ports of 10 mm or larger

URINARY TRACT INJURIES

Urinary tract injuries have been reported in 0.5 percent (ranging from 0.03 to 1.7 percent) of laparoscopic gynaecologic surgeries. Among these injuries, thirty-six percent occur during the initial access, with the remainder happening during subsequent dissections. Bladder injuries are more likely to occur during pelvic procedures, especially in patients with a history of caesarean section, endometriosis, or conditions causing anatomical distortion.

In general, placing a midline suprapubic trocar in a patient with an overdistended bladder can result in bladder injury. Clinical signs of bladder injury include gaseous distention of the urinary drainage bag and bloody urine. If the bladder is punctured with a needle (e.g., Veress) less than 2 mm, repair or drainage is typically not necessary. Larger or irregular defects may require suture closure with absorbable sutures in two layers, using either an open or laparoscopic approach.

Electrothermal devices are responsible for a significant percentage of bladder and ureteral injuries, accounting for 45 percent and 33–48 percent, respectively.

Table 4: Prevention of urinary tract injuries

- To prevent bladder injury at the time of entry, a Foley catheter should be inserted to decompress the bladder, which can also aid in early recognition of this complication
- In complex surgeries or when anatomy is unclear, dissection and mobilization of the ureter (ureterolysis) may be necessary
- Preventive measures for inadvertent ureteral injury include identifying the ureter using anatomical landmarks.
- Preoperative ureteral stenting has a limited role.
- After any laparoscopic procedure involving the vicinity of the ureters, the surgeon should confirm and document the integrity of the ureters before closing.

Ureteral injuries, occurring in fewer than 1 percent of pelvic procedures, can result from pelvic dissection or thermal injury due to excessive use of energy sources adjacent to the ureter.⁷ (Table 4)

VASCULAR INJURIES

Related to Entry

In laparoscopy, major vascular injuries are infrequent occurrences, yet their impact on mortality and morbidity is considerable. These injuries often occur during the insertion of a Veress needle or trocar into the abdominal cavity, with a heightened risk in slim patients. The most commonly affected vessels include the abdominal aorta, iliac arteries, and vena cava. Detection of major vascular injuries may be immediate through the presence of free blood in the abdominal cavity. However, in some cases, vascular injury may not be immediately apparent due to bleeding into the mesentery or retroperitoneum rather than directly into the peritoneal cavity. During initial abdominal access to establish pneumoperitoneum, minor vessels of the abdominal wall, omentum, mesentery, or other organs may sustain damage, particularly in the presence of adhesions.⁸ The damage of abdominal wall vessels, such as the inferior and superficial epigastric arteries and muscular perforating vessels, by secondary trocars is reported in 0.3 to 2.5 percent of laparoscopic procedures. (Table 5)

Table 5: Preventive measures to avoid vascular injuries

- The most secure site for inserting a Veress needle is within the left upper quadrant, known as Palmer's point, which minimizes the risk of vascular injury.
- Introducing a secondary port under direct visual guidance theoretically eliminates the possibility of vascular injury.
- To mitigate the risk of injury, inserting instruments at a 45-degree angle in a flat supine position can be beneficial. In obese patients, where a longer instrument length may be required for entry, adopting a 90-degree entry angle is considered a safer technique.
- To prevent damage to the inferior epigastric artery (IEA), it is crucial to identify the artery's anatomical course under laparoscopic view whenever possible. The IEA originates immediately medial to the round ligament and remains detectable even in obese patients.

Related to Dissection

While vascular injuries are more frequently associated with the process of abdominal access, they can also occur during the dissection phase of laparoscopic surgery. These injuries may result from inadvertent electrocautery away from the intended dissection area, excessive thermal spread, improper staple length, height, or stapling technique, or failure to recognize a significant vascular structure before its division with a nonvascular stapling instrument. Electrosurgical devices account for 10 to 20 percent of major vascular injuries, followed by dissecting instruments or stapling devices.

COMPLICATIONS BECAUSE OF PNEUMOPERITONEUM

Complications associated with the insufflation of gas required to establish pneumoperitoneum encompass subcutaneous emphysema, mediastinal emphysema, pneumothorax, cardiac arrhythmia, hypercarbia (carbon dioxide retention), postoperative pain stemming from retained intra-abdominal gas, and venous injury-induced air embolism. Extended duration of surgery and increased intra-abdominal pressures can also result in venous thrombotic or thromboembolic occurrences.

Factors Contributing to Subcutaneous Emphysema

- Use of an insufflator with high gas flow and pressure settings
- Intra-abdominal pressure exceeding 15 mmHg
- Multiple attempts were made during abdominal entry
- Incorrect placement of the Veress needle or cannula into the peritoneal cavity

Precautions to Avoid Subcutaneous Emphysema

- Decreased intra-abdominal pressure <15 mmHg
- Reduced gas flow and pressure settings
- Tightly fitting cannulas
- Delicate manipulation of trocars during surgery and avoid repeated entries
- Vigilance

CONCLUSION

With experience and growing skills, surgeons can learn to reduce potential complications and avoid conditions that may predispose them to these complications. By learning and reading about other mishaps and by reviewing others' complications, we will improve the care that we provide to the patients. A basic understanding of electric energy is important in avoiding unwanted tissue effects.

KEY POINTS

1. The available evidence did not conclusively demonstrate differences in rates of vascular injury, visceral injury, or failure to enter among direct vision entry, direct trocar entry, and Veress needle entry methods.
2. Thorough evaluation of patients, supported by surgical expertise and a comprehensive understanding of technology and instrumentation, is crucial for safe access and complication prevention during laparoscopic surgery.

3. Surgeons should prioritize the technique they are most experienced with but should also be knowledgeable about alternative methods.
4. Surgeon preference and experience likely play a crucial role in reducing the risk of injury.
5. Introducing a secondary port under direct visual guidance theoretically eliminates the possibility of vascular injury.
6. In complex surgeries or when anatomy is unclear, dissection and mobilization of the ureter (ureterolysis) may be necessary
7. To prevent damage to the inferior epigastric artery (IEA), it is crucial to identify the artery's anatomical course under laparoscopic view whenever possible.

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Role of Laparohysteroscopy in Mullerian Anomalies

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INTRODUCTION

Congenital Mullerian anomalies are deviations from normal anatomy resulting from embryological maldevelopment of the mullerian ducts. While most Mullerian anomalies are asymptomatic and are associated with average reproductive outcomes, some may be related to pain in the abdomen with adverse reproductive outcomes. The incidence of Müllerian anomalies in the general population is around 5.5% and is much higher in women presenting with infertility (4–8%), recurrent abortions (13.3–16.7%), and both infertility and abortions (24.5%).¹ The commonly reported malformations are septate uterus (54.2–54.9%), followed by arcuate uterus (14.2–15.8%), bicornuate uterus (10.2–10.7%), unicornuate uterus (5.8–8.5%) and hypoplasia/agenesis (3.4–6.5%).² Several imaging modalities like hysterosalpingogram, 2 D & 3D ultrasound, MRI, and hysteroscopy may be used for diagnosis.

Laparohysteroscopy was considered the gold standard but has recently been replaced by 3D ultrasound to diagnose uterine malformations, as the latter has similar diagnostic accuracy and is noninvasive.³ A study performed on 61 cases verified the concordance between three-dimensional ultrasound (3D US) and laparohysteroscopy according to type and classification of uterine abnormality, with a reported sensitivity of 100% and a specificity of 92.3% for the diagnosis of septate uterus.⁴ However, laparohysteroscopy may still be performed in some of these women for other concerns like infertility or chronic pelvic pain. Endometriosis is found to be associated with about 15% and 20% of cases of uterine malformations and bicornuate uterus/didelphys, respectively, which resolves after the correction of the malformation.⁵

The management of women with genital tract malformations needs to be individualized according to their symptoms and desire for future pregnancy.

While Surgical correction is not warranted in asymptomatic patients or those with primary infertility,⁶ it is a valuable intervention in symptomatic patients with uterine anomalies like

- In women with a uterine septum and recurrent pregnancy loss, other potential causes of recurrent pregnancy loss or dysmenorrhea have been ruled out.
- In women with a bicornuate uterus who experience recurrent miscarriages, following the exclusion of other causes of recurrent pregnancy loss, the majority of these Women will experience pregnancy results comparable to those of the general population.
- In women with a non-communicating uterine horn with functional endometrium and pelvic pain. Excision of an obstructed rudimentary blind horn not only relieves symptoms but also removes the danger of pregnancy implantation (and pregnancy difficulties) in the blocked uterine horn, reflux, which has been linked to endometriosis remission.⁶

LAPAROHYSTEROSCOPIC MANAGEMENT OF MULLERIAN ANOMALIES

Hysteroscopic Metroplasty

Hysteroscopic metroplasty or hysteroscopic transcervical division of the uterine septum is the treatment choice for the septate uterus. A variety of hysteroscopic instruments can be used to divide a uterine septum, including microscissors, bipolar electrosurgical needles, or a resectoscope with an operating loop. The procedure can be performed under transabdominal ultrasound or laparoscopic guidance to reduce the risk of uterine perforation and to ensure the adequacy of the procedure. Septal length is measured preoperatively using 3D ultrasound or MRI. Preoperative endometrial suppression is not used routinely but may improve visualization and operative precision. However,

there is insufficient evidence for using gonadotrophin-releasing hormone (GnRH) agonists, danazol, or any other medications to thin the endometrium before the hysteroscopic division of the septum. The procedure is preferably performed in the early follicular phase of the menstrual cycle.

The length of the uterine septum may vary from a small septum of 1 cm to a large septum extending from the fundus to the internal cervical os. A residual septum up to 1.0 cm does not adversely influence the outcome. At the time of surgery, moving the hysteroscope from side to side and visualizing both options from a panoramic view from the level of internal OS (subjective criteria) verifies the completion of resection. There is a risk of intrauterine adhesions after the procedure. Intrauterine postoperative hormone treatment, especially if a preoperative GnRH agonist has been given, is frequently used to enhance endometrial proliferation and reduce adhesion formation, but evidence of its efficacy is lacking.

There is no evidence of the benefit of using IUDs or an intrauterine balloon to reduce the risk of adhesions after hysteroscopic septum resection. Still, there is some evidence that intrauterine auto-cross-linked hyaluronic acid gel can reduce the risk of intrauterine adhesions after septum division. Re-evaluation by second-look hysteroscopy at 1–3 months postoperatively can be offered to evaluate adhesion formation and residual septum. While observational studies suggest that the uterine cavity is healed two months after septal division, there is insufficient evidence to advocate a specific length of time before a woman should conceive after the procedure.⁷

There are no published RCTs assessing the effectiveness and complications of hysteroscopic metroplasty. Observational studies in women with a history of surgery have reported significant improvements in pregnancy outcomes, with a reduction in miscarriage rates leading to increased live birth rates. A systematic review and meta-analysis of controlled studies published in 2014 reported a decreased probability of spontaneous miscarriages (both first and second trimester) in women treated with hysteroscopic resection of septum compared with women who were not treated (RR 0.37, 95% CI 0.25–0.55). There was no difference in conception rates (RR 1.14, 95% CI 0.79–1.65) and preterm delivery rates (RR 0.66, 95% CI 0.29–1.49) among the hysteroscopic resection and control groups.⁵

Although observational studies have found a benefit in removing the septum in women with a history of infertility and miscarriage, most of these studies have a before-after design and are retrospective. Due to the lack of any published randomized controlled studies assessing the efficacy in pregnancy outcomes after hysteroscopic metroplasty, the Cochrane Review had advised against offering hysteroscopic metroplasty in women with recurrent miscarriages as routine practice.⁸ NICE, however, recommends that women with recurrent miscarriage should be offered hysteroscopic metroplasty of a uterine septum.⁶

The Randomized Uterine Septum Transection Trial (TRUST) is currently underway in the Netherlands, Iran, and USA to assess whether hysteroscopic septum resection improves reproductive outcomes in women with a septate uterus and a history of (recurrent) miscarriage, subfertility, or preterm birth and the results are still awaited.⁹

OBSTRUCTED RUDIMENTARY HORN

In patients with unicornuate uterus and pelvic pain, including adolescents, whether a hemiuterus with endometrium is present on the side opposite to the unicornuate uterus can be determined by using 2D, 3D ultrasound, or magnetic resonance imaging (MRI).

The kidneys should also be imaged to look for renal anomalies like single kidney, duplex ureter, and kidney(s) location, as this information can help the surgeon avoid renal or urologic injury during surgery.

Resection of An Obstructed Rudimentary Horn

An obstructed rudimentary noncommunicating uterine horn consistent with the patient's symptoms should be removed laparoscopically.¹⁰ Retrograde menses are frequently linked to obstruction, which can result in endometriosis. After the obstructive abnormality is relieved, endometriosis regresses in most patients. The obstructed hemiuterus may be completely separate from the nonobstructed unicornuate uterus or fused to it. Intraoperative canalization of the cervix and injection of dye will confirm which uterus communicates with the cervix.

A hemihysterectomy is performed to excise a non-fused obstructed hemiuterus by identifying the associated round ligament. With traction and electrocautery, the ligament is transected, the retroperitoneal space is opened, and the ureter or ureters are identified. The hemiuterus is dissected free from the peritoneum, and the most inferior aspect is cauterized and transected. The uterus is then retracted medially, and the utero-ovarian ligament is transected. The associated fallopian tube can be excised or left in place if there is concern that removal will compromise the ovarian blood supply and future ovarian reserve. The hemiuterus is then removed from the abdominal cavity.

For excision of an obstructed hemiuterus that is fused with the patent unicornuate system, the fused hemiuterus is excised from the nonobstructed side, completely removing the endometrial cavity of the obstructed horn and without compromising the nonobstructed side.

Postoperative care and follow-up are routine for laparoscopic surgery. As no procedure is performed to repair the nonobstructed horn of uterine cavity, patients desiring fertility can attempt to conceive immediately after surgery. Most patients experience immediate improvement in pain, and if endometriosis is present, it usually resolves once the obstruction has been removed.

Mayer-Rokitansky -Kuster -Hauser(MRKH) Syndrome

a) Vecchietti or laparoscopic Vecchietti procedure

The traditional Vecchietti procedure has been modified with laparoscopic Vecchietti.

Using an acrylic “olive” pressed up against the vaginal dimple, the treatment creates a neovagina by invagination. This olive is sutured subperitoneal using laparoscopic techniques to a traction device that is positioned on the abdomen. When the olive receives enough traction, it will invaginate between 1.0 and 1.5 cm each day, resulting in a neovagina in around seven to nine days. Active dilation is necessary after the neovagina is formed until regular sexual activity is started.

Vaginal examinations performed on patients up to 12 months following the laparoscopic Vecchietti procedure showed neovaginal mucosae equivalent to the normal vaginal mucosa. Approximately 98% of patients reported functional success. A modification of this technique using blunt vaginoabdominal perforation of the vaginal dimple rather than a sharp abdominovaginal dissection or tunneling of the vesicorectal space has been tried. A new traction device significantly decreased operative time, perioperative complications, and traction time, with a trend toward improved functional results.

b) Davydov colpoptosis

The Davydov colpoptosis uses the patient’s peritoneum to epithelialize the neovagina. It is a three-stage procedure that requires the dissection of space between the urethra, bladder, and rectum, followed by peritoneal mobilization, which is subsequently sutured to the edges of the vaginal vestibulum. It also requires postoperative dilation and is suitable for women who have undergone extensive pelvic surgeries. It is one of the simplest, safest, and quickest methods with many advantages, including good lubrication with resultant satisfactory intercourse, lack of granulation tissue, and absent scar formation. Patients have less bleeding, less postoperative pain, shorter stay, quick recovery, and satisfactory cosmetic outcome, although ascending infections are reported in a few cases.¹⁰

Technique

After confirming the diagnosis of MRKH syndrome, a 2-cm transverse incision is made on the vaginal vestibulum, and a vaginal space is created between the bladder and the rectum. Blunt dissection is done up to the peritoneal margins. Laparoscopically, the strand that connects the bilateral rudimentary uterine horns is lifted, and the peritoneum immediately below is incised transversely. Peritoneal margins are pulled down to the edge of the incised vaginal vestibulum and sutured. Laparoscopic creation of the purse-string suture is done by consecutively transfixing the round ligament, the tubal isthmus, the utero-ovarian ligament, the lateral peritoneal leaf, and the rectal serosa. This procedure

helps to establish the desired length of the neovagina. Compared with the peritoneal approach alone, laparoscopic closure that sutures the top of the neovagina achieves adequate size of the neovagina more efficiently. Finally, the dilator is inserted into the neovagina, which is covered with lidocaine hydrochloride and povidone-iodine cream to cause less pain and help prevent infections.

The dilator is removed 48 hours after surgery and patients are taught how to insert the dilator themselves and after that discharged. They are instructed to insert it approximately 6-8 hours daily for three months postoperatively; thereafter, the dilator may be inserted as needed. Sexual intercourse is allowed after the neovagina is epithelialized almost 3-6 months after the operation

The outcomes are assessed in the form of anatomic and functional success. Anatomic success is defined by achieved neovaginal length of at least 6 cm. In contrast, functional success is the ability to have complete, satisfactory sexual intercourse, which can be assessed by the Female Sexual Function Index [FSFI] questionnaire, which takes into account parameters like desire, arousal, lubrication, orgasm, satisfaction and pain during intercourse. The functional success rate for surgical vaginoplasty is as high as 90%-96%.

OBSTRUCTED HEMI-VAGINA AND IPSILATERAL RENAL AGENESIS (OHVIRA) SYNDROME

Obstructed hemi-vagina and ipsilateral renal agenesis (OHVIRA) syndrome encompasses a variety of clinical presentations, including an obstructing hemi-vagina combined with various Mullerian and renal anomalies such as a uterus didelphys, ipsilateral renal agenesis, dysplastic kidney, pelvic kidney, or ectopic ureter. In addition, there are rare variants of OHVIRA syndrome, such as with a complete septate uterus. The triad of obstructed hemi-vagina, uterus didelphys, and ipsilateral renal anomaly was named Herlyn-Werner-Wunderlich syndrome (HWWS) in 1980.

Most present in adolescence with dysmenorrhea or later due to pelvic pain or dyspareunia. Preoperative diagnosis of OHVIRA syndrome can be made by clinical presentation, 2D or 3D ultrasound scan, MRI, and routine digital rectal examination.

Vaginoscopic management using a “No-touch” technique is an option for adolescent patients whose vagina is immaturely developed.¹ This procedure has several benefits including excellent safety outcomes, improved visualization, decreased post-operative pain due to no vaginal retractors or speculum use, and the ability to leave the hymen intact.

The bladder is distended with normal saline to improve visualization by transabdominal ultrasound during the procedure. A diagnostic hysteroscope is inserted into the vagina cautiously through the hymenal ring. An assistant holds a cotton gauze pad around the hysteroscope and

applies pressure toward the orifice of the vagina to decrease the outflow of the distension media while the operator manipulates the hysteroscope. The vaginal septum is identified by either a bulge protruding from the lateral vaginal wall or a pinpoint-size hole in the vaginal septum. In case of lack of an obvious bulge, it often gets difficult to distinguish the vaginal septum from the vaginal wall. In such cases, a hysteroscopic catheter can be passed through the cervical canal and into the cervical fistula under direct visualization of a hysteroscope and transabdominal ultrasound.

Approximately 50–100 mL of either 5% mannitol or normal saline (depending on whether unipolar or bipolar resectoscope is used) is instilled into the blind vaginal pouch via the cervical fistula. This causes the vaginal septum to bulge into the vagina to differentiate it from the surrounding vaginal wall further. Under ultrasound guidance, an outer sheath unipolar or bipolar resection-hysteroscope fitted with an L-hook electrode is introduced into the vagina, and a longitudinal incision is made at the most prominent bulge of the vaginal septum. The incision is extended cephalad to approximately 3.5 mm below the cervix and caudal to the junction of the oblique septum and the lateral vaginal wall resulting in incision of the entire length of the septum. The cervix previously hidden by the vaginal septum may then be visualized. A 16 Fr Foley catheter was then inserted between the incised halves of the oblique septum, and the balloon was inflated with air under the direct view of hysteroscopy. The exact level of air instilled is determined by the size needed to separate the incised tissue adequately. The Foley catheter is left in place for two days to prevent postoperative adhesions and reformation of the vaginal septum.¹¹

CONCLUSION

Laparohysteroscopy was considered the gold standard for the diagnosis of Mullerian anomalies earlier. However, with the advent of non-invasive techniques, 3D ultrasound and MRI are being used to confirm these anomalies. Laparohysteroscopy should be utilized for Minimally invasive surgery for Mullerian anomalies, i.e., surgical resection of the vagina and uterine septum, excision of obstructed rudimentary horn, and for creating neovagina in MRKH syndrome.

KEY POINTS

1. Nowadays, 3D ultrasound and MRI are most commonly used to confirm the diagnosis of Mullerian anomalies.

2. Laparohysteroscopy is used for making the diagnosis only when it is being performed for any associated complaints like infertility or chronic pelvic pain.
3. Surgical management of congenital Mullerian anomalies should be done only for symptomatic patients.

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Role of Laparoscopy in Pelvic Endometriosis

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INTRODUCTION

Endometriosis is a chronic, inflammatory, hormone-dependent gynecologic condition characterized by the presence of endometrial-like tissue outside the uterine cavity including pelvic peritoneal surfaces, rectovaginal space, ligaments, ovaries, as well as the bowel and bladder. The presentation of endometriosis is highly variable, ranging from superficial peritoneal lesions of different colors to ovarian cysts (endometrioma), deep infiltrating nodules, and extra pelvic lesions. Regarding symptoms, women with endometriosis may experience cyclic or constant severe pelvic pain, which can also occur during and after sexual intercourse (dyspareunia), accompanied by dysuria, dyschezia, dysmenorrhea, and infertility, among others.

Its prevalence is not known, but it is estimated to affect 10% to 15% of women of reproductive age.¹ Conservative, medical and surgical interventions exist for the management of endometriosis. Surgical interventions may be performed robotically, laparoscopically (keyhole), or as an open (laparotomy) procedure. Within high-resource settings, a laparoscopic approach is now considered routine for the diagnosis and removal of endometriosis as it offers several advantages when compared to open procedures including decreased recovery time and cost.

Laparoscopy is considered the gold standard technique for visualizing the endometriotic lesions in the pelvis, and for performing targeted biopsies for histologic correlation. It aims to treat the structural causes of pain, infertility, and other symptoms associated with endometriosis by restoring the normal anatomy by destroying or removing all visible endometriotic lesions, performing adhesiolysis, and repairing damaged organs and other sites. Minimal postoperative adhesion formation is noted clinically with laparoscopic surgery.

Endometriosis can be suspected based on a careful history and physical examination. Unfortunately, peritoneal endometriosis cannot be identified by any imaging modality. Ovarian endometriosis or endometriotic cysts can easily be visualized by transvaginal ultrasound. Transvaginal or endoanal ultrasound can also diagnose the presence of deep infiltrating endometriosis in the anterior compartment (i.e., bladder and its specific location) or posterior compartment (i.e., rectovaginal septum, uterosacral ligaments, torus uterinus, vaginal fornix and bowel involvement) when performed by an experienced operator.

The revised American Society for Reproductive Medicine classification (rASRM) provides a numerical score (Fig. 1 and Table 1) of severity based on visual findings at laparoscopy.² Unfortunately, the value of all staging systems including rASRM is limited by the diversity of the disease and the wide variations in reported symptoms.

Table 1: A scoring system for grading endometriosis.

Stage	Class	Score	Description
I	MINIMAL	1-5	Superficial peritoneal and ovarian implants and filmy adhesions in one or both ovaries.
II	MILD	6-15	Few superficial and a few deep implants in the peritoneum and ovaries, filmy adhesions and small chocolate cysts in the ovaries.
III	MODERATE	16-40	Deep implants in the peritoneum, cysts in the ovaries, dense adhesions in the fallopian tubes and/or partial posterior cul-de-sac obliteration.
IV	SEVERE	>40	Many deep implants in the peritoneum, large chocolate cysts, many dense adhesions and complete cul-de-sac obliteration.



AMERICAN SOCIETY FOR REPRODUCTIVE MEDICINE REVISED CLASSIFICATION OF ENDOMETRIOSIS

Patient's Name _____ Date _____

Stage I (Minimal) - 1.5
 Stage II (Mild) - 6.15
 Stage III (Moderate) - 16.40
 Stage IV (Severe) - > 40
 Total _____

Laparoscopy _____ Laparotomy _____ Photography _____
 Recommended Treatment _____
 Prognosis _____

PERITONEUM	ENDOMETRIOSIS	< 1cm	1-3cm	> 3cm
		Superficial	1	2
	Deep	2	4	6
OVARY	R Superficial	1	2	4
	Deep	4	16	20
	L Superficial	1	2	4
	Deep	4	16	20
POSTERIOR CULDESAC OBLITERATION		Partial		Complete
		4		40
OVARY	ADHESIONS	< 1/3 Enclosure	1/3-2/3 Enclosure	> 2/3 Enclosure
	R Filmy	1	2	4
	Dense	4	8	16
	L Filmy	1	2	4
	Dense	4	8	16
	R Filmy	1	2	4
	Dense	4	8	16
	L Filmy	1	2	4
Dense	4	8	16	
TUBE	R Filmy	1	2	4
	Dense	4	8	16
	L Filmy	1	2	4
	Dense	4	8	16

* If the fimbriated end of the fallopian tube is completely enclosed, change the point assignment to 16.
 Denote appearance of superficial implant types as red [(R), red, red-pink, flamelike, vesicular blobs, clear vesicles], white [(W), opacifications, peritoneal defects, yellow-brown], or black [(B) black, hemosiderin deposits, blue]. Denote percent of total described as R __%, W __%, and B __%. Total should equal 100%.

Fig. 1: An endometriosis classification system developed by ASRM.

Infertility is associated with endometriosis, with studies reporting 30% to 50% of women with endometriosis being subfertile.² With no intervention, 50% of women with mild endometriosis will conceive, only 25% with moderate endometriosis will conceive and only a few with severe disease will conceive.²

SURGICAL MANAGEMENT OF PERITONEAL ENDOMETRIOSIS

Minimal and Mild Disease

Peritoneal endometriosis can present in different forms, from flame-like red lesions to black or yellowish spots to atypical non-pigmented lesions. If the lesions are 5 mm or deeper into the subperitoneal location, it is called deep infiltrating endometriosis (DIE).

Endometrial implants can be surgically resected, coagulated, or vaporized. Various ablative and surgical techniques have been implemented to treat superficial

endometriotic implants. The ablation technique uses Carbon dioxide laser, diathermy and monopolar electrosurgery which is only found to be effective in pain relief in stage 1 and 2 diseases.

Laparoscopic excision of the peritoneal implant is generally considered superior to ablative measures. It includes resection of endometriotic implants using energy sources near visible lesions and dissecting endometriotic tissue away from healthy underlying tissue. It is considered prudent to open the retroperitoneum and directly visualize ureters to avoid blunt or thermal injury to the ureter in cases where endometriotic implants are located in the lateral pelvic wall.

Ovarian Endometrioma

Laparoscopic ovarian cystectomy for ovarian endometrioma (chocolate cyst) is the preferred method as compared to drainage and ablation of the cyst to prevent recurrence and improve associated symptoms (Fig. 2).

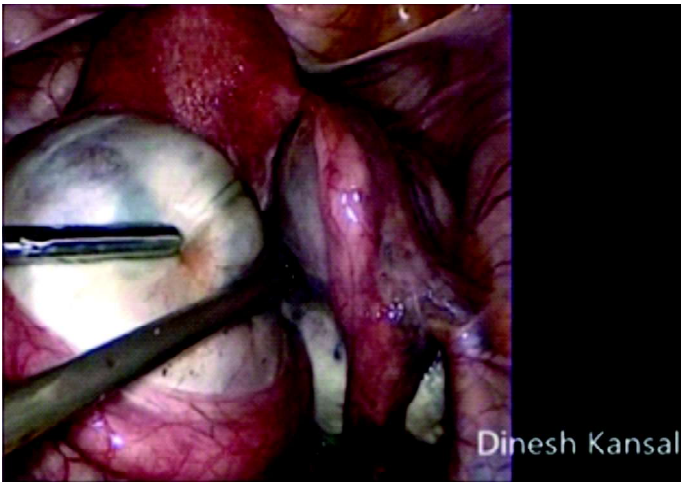


Fig. 2: Kissing Ovaries

Adhesiolysis is done to clear the surgical field and the traditional stripping technique with triple traction method (Fig. 3) is employed to perform ovarian cystectomy. The cyst is aspirated using a single puncture point to avoid damage to functional ovarian tissue. Cyst is everted and incision is given to identify the correct cleavage plane to minimize bleeding and the need for additional cautery thereby preserving ovarian function as much as possible.

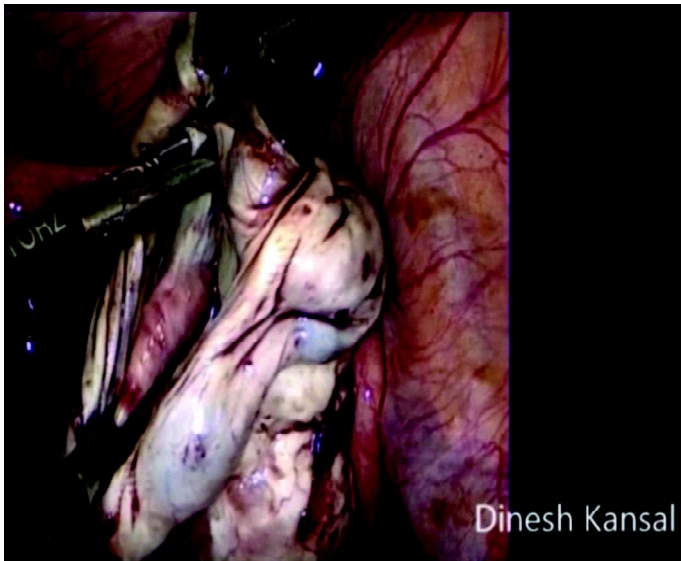


Fig. 3: Ovarian Cystectomy by Triple Traction method

To remove the cyst wall from ovarian parenchyma, it is grasped with atraumatic forceps and gentle traction and counter traction are used to strip the cyst wall. The hilum where the cleavage plane is difficult to identify is the site where mostly bleeding occurs. So bipolar is used to ablate the remaining fragments of cyst residue and to perform hemostasis. In the case of large endometriomas larger than five centimeters, a two-step procedure can be deployed to preserve ovarian function for future fertility as ovarian tissue becomes extremely thinned out in the process. In the first stage, the endometriotic cyst is aspirated using a single puncture at the antimesenteric border of the ovary followed by opening and drainage of the cyst and biopsy of the cyst wall.

The patient is given GnRH agonist for 3 months which helps in decreasing the thickness of the cyst wall with atrophy and reduction in stromal vascularization of cyst. The patient can then be taken for second-stage surgery to perform a complete cystectomy and also preserve maximum ovarian reserve. The edges of the ovarian cortex can be reapproximated using microsurgical techniques to close the defect and thus prevent adhesion formation to the raw surface.

Attempting to attain hemostasis following cystectomy has not been shown to adversely affect ovarian reserve.³ The surgical treatment benefits the patient in alleviating pain and can increase the chances of spontaneous conception without the requirement of invasive fertility treatments if primary surgery is done well.

Deep Infiltrating Endometriosis

Deeply infiltrating disease involves endometriotic invasion of more than 5 mm. This disease can involve the distal third of the ureter, ovary, rectovaginal space, uterosacral ligaments, bladder and bowel. DIE causes dense, cohesive and vascular adhesions between vital structures requiring both sharp and blunt dissection. Complete excision of disease is efficient for alleviating pain caused by DIE. Laparoscopic hydro dissection can be employed by opening the peritoneum at one point and instilling ringer lactate which helps in separating the lesion from the underlying vital structure and provides a buffer from thermal damage.

Butterfly peritonectomy procedure can be adopted for cases of peritoneal involvement which showed a reduced rate of recurrence in patients, reduced pelvic pain, and fertility preservation where applicable, along with effective safeguarding of the peripheral organs including lateral pelvic vessels, the ureter, the hypogastric nerve, and the rectum.⁴

DIE can cause extrinsic compression of the ureter in most cases involving the adventitia and connective tissue, which needs close dissection of the tissue around the ureter for tracing its entire course along with effective ureterolysis. There is extensive fibrosis around these lesions that surround the ureter. The retroperitoneum is opened up and dissection of the ureter is done starting from the pelvic brim where the retroperitoneal spaces are typically maintained. The ureter is mobilized, followed by the excision of fibrotic endometriotic tissue.

The intrinsic ureteric disease leads to fibrosis of the muscular and, a few times, the mucosa. Left-sided ureteric endometriosis is more prevalent, which may be attributed to the theory of menstrual reflux and anatomical differences between the right and left hemipelvis. A double J stenting for 6 weeks should be considered in cases of hydronephrosis or urinary obstruction or where significant stenosis has been identified. The other options considered are ureterolysis, ureteral resection with end-to-end anastomosis or ureteroneocystostomy, and ureteronephrectomy in cases of complete loss of renal function, which can be considered.^{5,6}

Complications can occur with extensive ureterolysis in patients with DIE, with a reported ureteral fistulae rate of 5%. Ureteric injury can be caused by ischemia, direct trauma or direct electro-surgical injury from the lateral spread of energy.

About one-third of women with endometriosis have DIE in the pouch of Douglas involving the vagina, rectum, cervix and rectovaginal septum. DIE mostly affects the posterior compartment, particularly uterosacral ligaments (Fig. 4). It can extend laterally to cardinals causing extrinsic ureteric compression. Uterosacral lesions can be seen in up to 83% of cases.⁷ Careful excision of endometriotic nodules at the level uterosacral is done. The ureterolysis is done by dissecting medial ureters to lateralize them until the level of insertion of uterosacral in the uterus. One should be careful to avoid damage to hypogastric nerves which are present close to the uterosacral ligament at its posterolateral insertion to the uterus.⁸



Fig. 4: DIE at base of Uterosacral ligaments

The dissection should be limited and should not cross beyond the deep uterine vein, because it is the location where the hypogastric nerve joins the inferior hypogastric plexus. The complications associated with damage of this nerve complex during radical excision of uterosacral endometriosis can cause bladder voiding problems requiring intermittent self-catheterization.⁹ There is a higher risk of nerve injury and subsequent functional bowel and bladder disorders in cases of bilateral uterosacral disease. In such instances, a conservative approach may be considered to preserve organ function.

Endometriosis involving the bowel is seen in 3–37% of patients, commonly involving the rectum, rectosigmoid junction, or sigmoid colon in approximately 90% of cases.¹⁰ It can manifest as pelvic pain radiating to the rectum as the most common presenting complaint. Conservative excision of bowel nodules in the form of shaving or mucosal skinning involves dissecting out endometriotic nodules from the bowel without breaching the lumen and suturing mucosa to maintain bowel integrity and prevent postoperative complications. Discoid resection of the bowel can be done in cases where the bowel lesion is 2–3 cm. In discoid excision, there is removal of disease with complete resection of the anterior rectal wall and subsequent laparoscopic repair in 1–2 layers or by using a transanal circular stapler.¹¹

In a few cases, radical excision is unavoidable, specifically in cases where the nodule is larger than 3 cm, where there is sigmoid involvement, more than 50% of the circumferential disease or concurrent bowel stenosis, and in multicentric disease.⁹ Studies have demonstrated that complete excision of bowel lesions, including segmental resection, is associated with significant improvement in pain symptoms and subsequent quality of life.^{12,13} Surgical excision of bowel and rectovaginal endometriosis can be associated with major complications such as bowel perforation and peritonitis.

Postoperative digestive symptoms may persist or newer symptoms may arise following a bowel resection, though the pain improves in these cases. In a study by Roman *et al.*, constipation was found to occur more frequently following colorectal resection.¹⁴ Adopting a nerve-sparing resection technique has been shown to minimize the occurrence of abnormal bowel movements.¹⁵ Care should be taken to preserve pelvic autonomic nerve function and maintain rectal, bladder, and sexual function.

Adenomyosis is a form of deep infiltrating endometriosis causing severe dysmenorrhea, menorrhagia, and infertility. Mild forms can be treated by medical management and MIRENA insertion to relieve pain and heavy periods. Severe and focal forms of adenomyosis (adenomyoma) need adenomyomectomy which is a conservative approach and can provide significant improvement in symptoms (Fig. 5). It can be done laparoscopically or by using Robot robot-assisted technique. This has to be accompanied by medical management to prevent relapse.

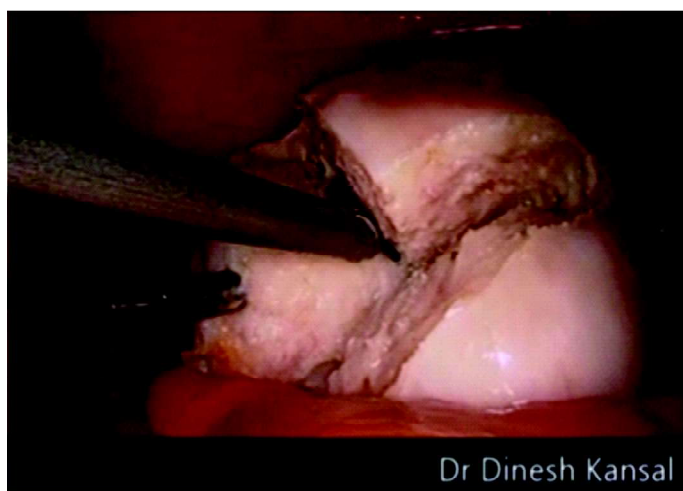


Fig. 5: Laparoscopic Adenomyomectomy

Presacral neurectomy is used to treat chronic intractable midline dysmenorrhea not responding to medical management. Partial or complete neurectomy can be done by minimally invasive technique in selected patients (Fig. 6, 7). However owing to its lack of efficacy and adverse events in the form of constipation and urinary incontinence, this procedure is refuted as a standard treatment of dysmenorrhea

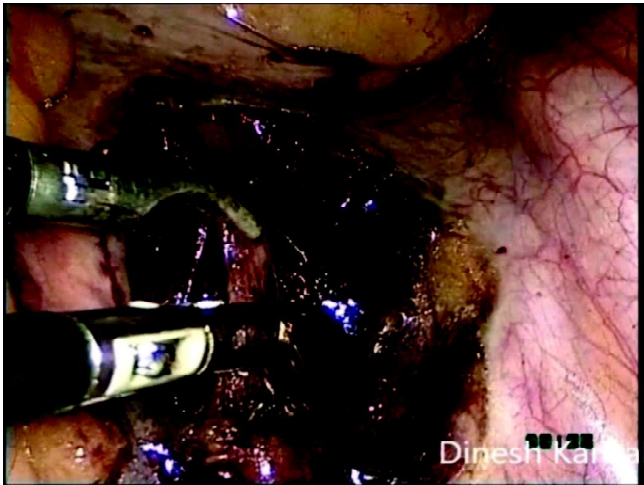


Fig. 6: Presacral Neurectomy

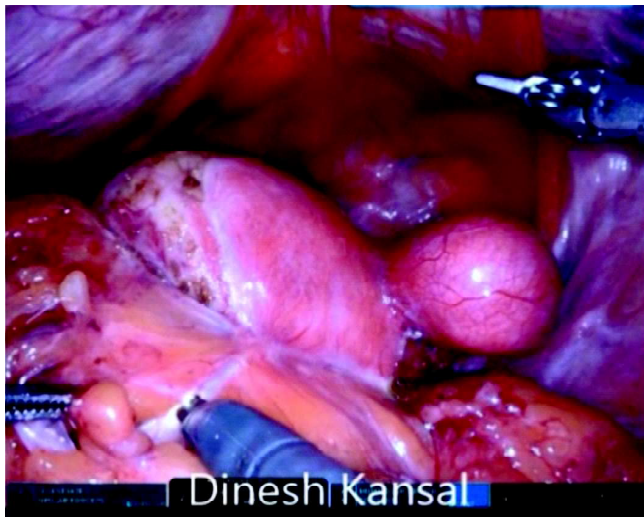


Fig. 7: Robotic Adhesiolysis

CONCLUSION

Endometriosis is a disease process that can lead to debilitating pain and infertility. Laparoscopy remains the gold standard for diagnosis and the primary means of treatment of the disease. Successful resection of all visible lesions may effectively treat endometriosis-related infertility and pelvic pain.

KEY POINTS

1. Minimally invasive surgery provides significant advantages, with lower rates of surgical complications such as surgical trauma, infection, postoperative pain, and hospital stay.
2. Peri and postoperative medical treatment in conjunction with surgery remains a mainstay of treatment.
3. Advances in laparoscopic and robotic surgery and management of severe endometriosis by multidisciplinary tertiary centers have resulted in fewer postoperative complications, and have led to optimization of patient care.

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Laparoscopy Procedures in Pelvic Organ Prolapse

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INTRODUCTION

Pelvic organ prolapse (POP) - defined by ICS as: *The descent of one or more of the anterior vaginal wall, posterior vaginal wall, the uterus (cervix), or the apex of the vagina (vaginal vault or cuff scar after hysterectomy). The presence of any such sign should be correlated with relevant POP symptoms. Most commonly, this correlation would occur at the level of the hymen or beyond.*¹

The incidence of uterine prolapse is 7.6% in North India, 20% in East India, and 3.4% in South India, specifically Karnataka. Globally, the World Health Organisation estimates that reproductive ill health accounts for 33% of the total disease burden in women, and the global prevalence of uterine prolapse ranges from 2 to 20% among women under 45 years old. Approximately 50% of all parous women present with some degree of uterine prolapse, whereas only 10 - 20% have symptoms of uterine prolapse. Prolapse is a highly prevalent condition, although always it may not be symptomatic.²

Approximately 200,000 inpatient surgical operations for prolapse each year are reported in the Americas.³ At 80 to 85 years, 11 to 19 percent of females will need surgery, and the incidence of the need for surgery increases with rising age.⁴ POP is known to hamper quality of life by either interfering with daily activities or sexual function. Indications of a surgical procedure for patients with POP (including congenital prolapse) are discussed below.

CANDIDATES FOR SURGICAL TREATMENT

- Patient declined/ not benefited from conservative management
- An unsuccessful previous prolapse surgery
- Symptomatic prolapse

Approximately 40 percent of ladies have stage 2 or more prominent prolapse on pelvic examination, and rest vast majority are asymptomatic.⁵ Data propose that the course of prolapse is dynamic until menopause.⁶ Even with the fact that patients above the age of 80 or more have a higher surgical risk, the POP repair can be securely performed. The need for repeat surgery and chances of complications from surgery are higher in the younger age group.⁷

GENERAL APPROACH TO THE CHOICE OF PROCEDURE

The choice of surgery for POP takes into consideration a variety of factors. (Fig. 1)

RECONSTRUCTIVE VERSUS OBLITERATIVE PROCEDURES

How we choose what procedure depends upon the medical status and coital activity of the patient. (Table 1)

The majority of patients with symptomatic pelvic organ prolapse are managed with reconstructive methods. Obliterative methods are for those who have major comorbidities thereby limiting the potential for a major surgical procedure or those who are not willing to retain future sexual functions.⁹ Reconstructive procedures for pelvic organ prolapse include correcting multiple anatomic sites of prolapse (apical, anterior, and/or posterior). Repair of each defect and the best method to perform a combined reconstruction must be selected when planning an overall surgical approach.

Uterus-sparing surgeries correct apical prolapse by connecting the lower part of the uterus or cervix to the support structure. A shorter operative length and minimal blood loss are preferred.¹⁰ There has been a debate about the uterus-

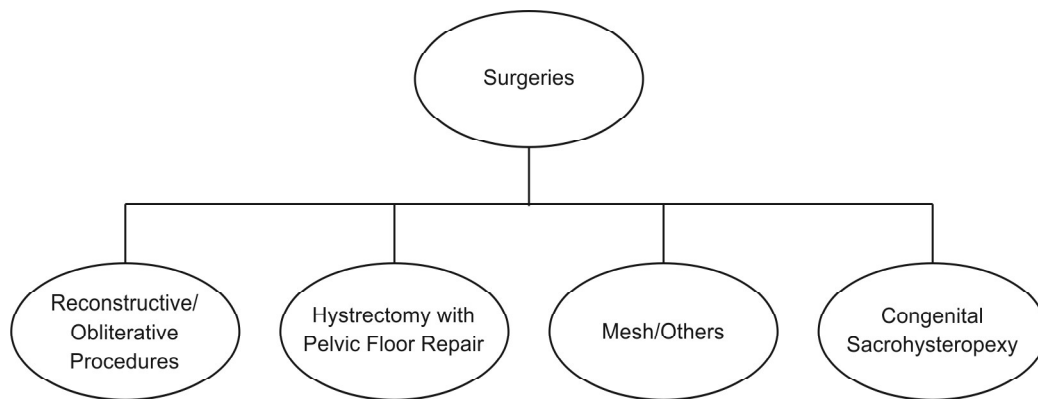


Fig. 1: Types of prolapse surgeries

Table 1: The two broad categories of prolapse surgeries.

Reconstructive surgeries	Obliterative surgeries
<p>Surgical correction of the prolapsed vagina thereby restoring the normal anatomy.</p> <p>Vaginal or abdominal approach can be performed.</p>	<p>Correction of prolapse by removal and/or closure of all or a portion of the vaginal canal (ie, colpocleisis or colectomy) to reduce the pelvic viscera back into the pelvis.⁸</p> <p>Only vaginal approach</p> <p>Advantages</p> <ul style="list-style-type: none"> • short operative duration, • low risk of perioperative morbidity • low risk of prolapse recurrence. <p>Disadvantages</p> <ul style="list-style-type: none"> • elimination of potential vaginal intercourse. • if the uterus or cervix are left in situ, there is also an inability to evaluate the cervix or uterus via a vaginal route (eg, cervical cytology or endometrial biopsy).

sparing methods are secondary to methods that incorporate hysterectomy. These techniques offer the potential for preserving future fertility. There is data to suggest possible intrapartum complication and postpartum recurrence of prolapse following these procedures.²

In the case of the posterior prolapse, observational studies showed that the sacral colpopexy with posterior mesh placement, but without posterior colporrhaphy, had widely variable results. In two prospective studies, the rate of recurrence of posterior prolapse ranges from 8 percent in the first year to 57 percent at the end of the second year.¹¹ Mesh utilization is standard in sacral colpopexy. This has been presented to diminish the chance of repeat prolapse, but this approach is disputable. The choice of approach depends on factors such as surgeon expertise, patient anatomy, and the extent of pelvic organ prolapse.

Sacrocolpopexy

The historical background of sacrocolpopexy dates back to the early 20th century when gynaecologists began exploring surgical interventions for pelvic organ prolapse. In 1950, Palmer et al. introduced the abdominal sacrocolpopexy procedure, which involved the use of synthetic mesh to suspend the prolapsed vaginal vault from the sacrum. Since then, sacrocolpopexy has undergone significant

advancements in surgical techniques, materials used, and outcomes.

Sacrocolpopexy is an effective surgical option for the management of pelvic organ prolapse, offering durable support and symptom relief for appropriately selected patients. Advances in surgical techniques and materials have improved outcomes and expanded the applicability of sacrocolpopexy.

Indications

- women with symptomatic pelvic organ prolapse, particularly when conservative treatments such as pelvic floor exercises or pessary management have failed to provide relief
- significant vaginal vault prolapse
- uterine prolapse
- recurrent prolapse following previous surgical repair

During sacrocolpopexy, meticulous dissection is carried out to expose the sacral promontory, and the mesh is securely affixed to this bony landmark, then anchored to the anterior or posterior vaginal wall. (Fig. 2a-c) Numerous studies have demonstrated favorable outcomes following sacrocolpopexy in terms of anatomical correction, symptom improvement, and patient satisfaction.¹² Long-term follow-up studies have

STEPS OF SACROCOLPOPEXY

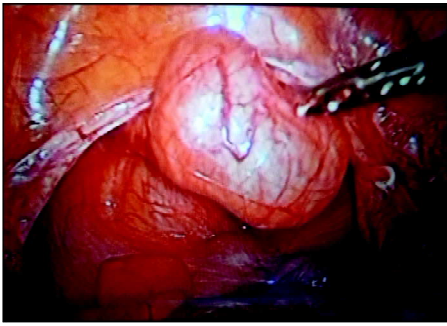


Fig. 2a: Dissection of vaginal vault to put down the UV fold anteriorly and rectum posteriorly

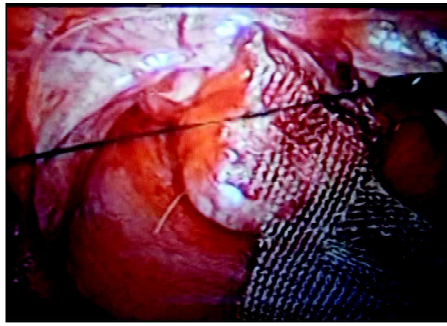


Fig. 2b: Fixing up the mesh on the vault with PDS suture

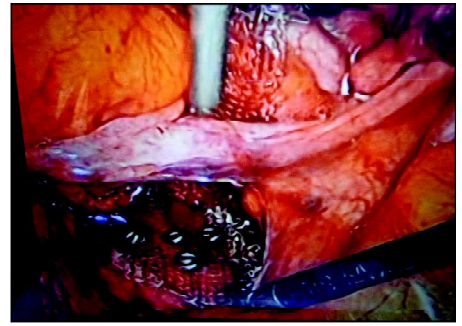


Fig. 2c: Fixing up the mesh on sacral promontory with metal trackers

reported low rates of prolapse recurrence and durable support of pelvic organs. Additionally, sacrocolpopexy has been associated with improvements in urinary, bowel, and sexual function in some patients. Despite its efficacy, sacrocolpopexy is not without risks and complications. Potential complications include mesh erosion, infection, urinary retention, and injury to surrounding structures such as the bladder or bowel.¹³ Careful patient selection, meticulous surgical technique, and postoperative monitoring are essential for minimizing complications and optimizing outcomes.

Pectopexy

Pectopexy, a relatively novel surgical technique, has emerged as an alternative approach for addressing anterior pelvic

organ prolapse. The concept of pectopexy originated from the anatomical understanding of the pelvic floor ligaments, particularly the Cooper's ligaments, which provide support to the anterior vaginal wall. Pectopexy represents a modification of traditional sacrocolpopexy, aiming to restore pelvic organ support while minimizing the invasiveness of the procedure. Pectopexy involves anchoring the anterior vaginal wall to the pectineal ligament, a structure located along the superior pubic ramus. During surgery, the vaginal wall is dissected, and a synthetic mesh is securely attached to the pectineal ligament, providing durable support to the anterior compartment. During pectopexy, dissection is carried out to expose Cooper's ligaments, and sutures or synthetic mesh are used to attach the vaginal apex or cervix to these ligaments, providing robust support (Fig 3a-e).¹⁴

STEPS OF PECTOPEXY

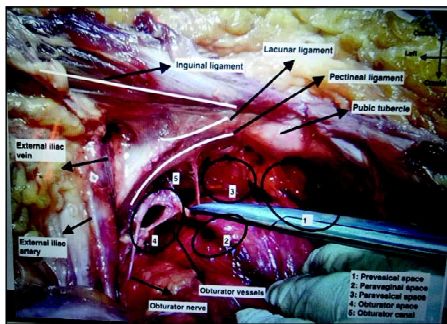


Fig. 3a: Anatomy of pelvic floor

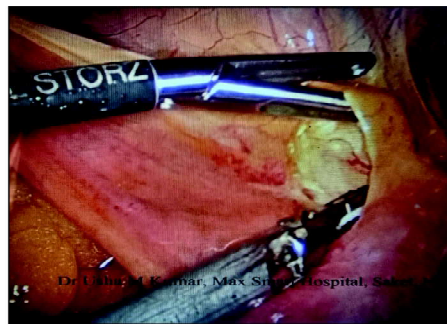


Fig. 3b: Dissection of UV fold

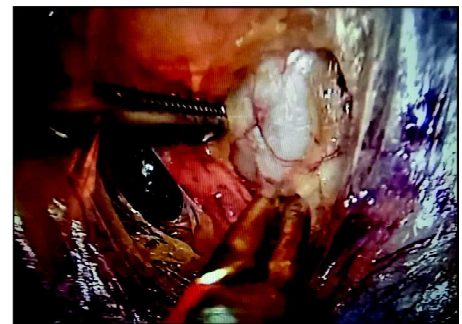


Fig. 3c: Exposure of pectineal ligaments on both sides

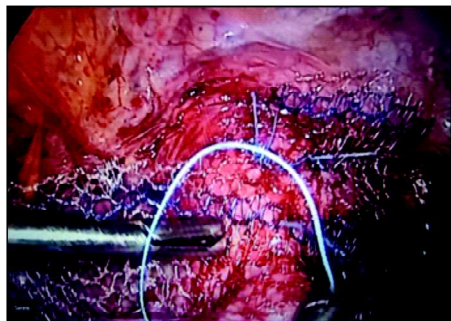


Fig. 3d: Fixing up the mesh on anterior vaginal wall with PDS

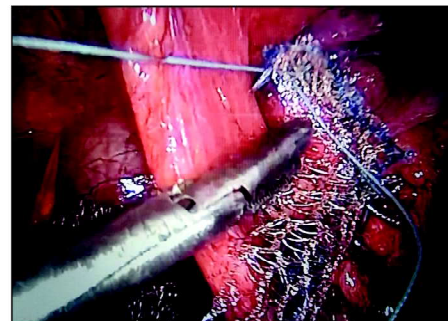


Fig. 3e: Fixing up the mesh on pectineal ligaments with PDS

Indications

- Symptomatic anterior pelvic organ prolapse, particularly those with cystocele or urethrocele
- Refractory to conservative management.

It may be considered as an alternative to traditional sacrocolpopexy or anterior colporrhaphy in select cases, offering potential advantages such as reduced risk of mesh-related complications and shorter recovery times. Long-term studies are warranted to further elucidate the efficacy and durability of this technique.

The pectopexy offers several potential advantages over traditional sacrocolpopexy or anterior colporrhaphy. By utilizing the pectineal ligament as an anchoring point, pectopexy avoids the need for sacral dissection and mesh fixation to the sacrum, potentially reducing the risk of nerve injury and mesh-related complications.¹⁵

Sacrohysteropexy

It is a surgical procedure designed to treat uterine prolapse by suspending the uterus to the sacral promontory, thereby restoring normal pelvic anatomy and function. This innovative technique has gained popularity as an alternative to traditional approaches like hysterectomy due to its preservation of fertility and reduced risk of complications. It offers a viable alternative to hysterectomy with comparable efficacy and improved preservation of fertility and sexual function.

The procedure involves the placement of synthetic mesh or graft material to create a supportive sling between the uterus and the sacral promontory, providing durable support. The mesh is meticulously secured to the uterine cervix or corpus and then anchored to the sacral promontory using sutures or surgical staples. Careful attention is paid to ensure adequate tension on the sling to provide optimal support without compromising uterine blood supply or causing undue discomfort. (Fig. 4a-g)

STEPS OF SACROHYSTEROPEXY

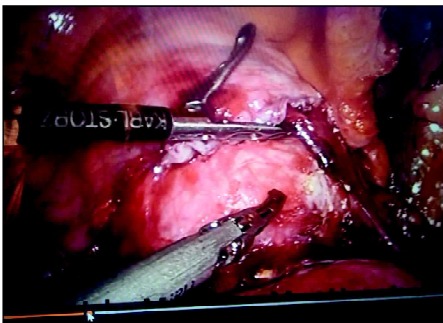


Fig. 4a: Dissection of UV fold

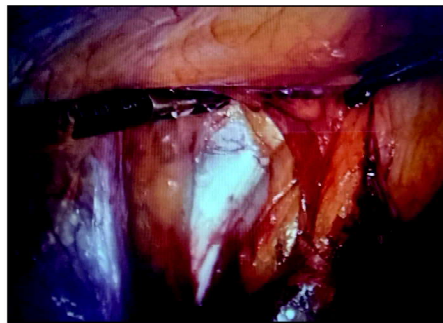


Fig. 4b: Dissection of both side pectineal ligaments



Fig. 4c: Completing TLH first

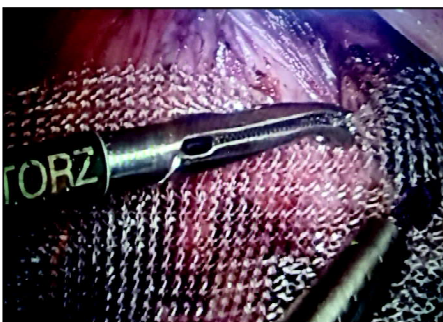


Fig. 4d: Fixing up prolene mesh with absorbable trackers



Fig. 4e: Fixing the mesh on pectineal ligament with metal trackers

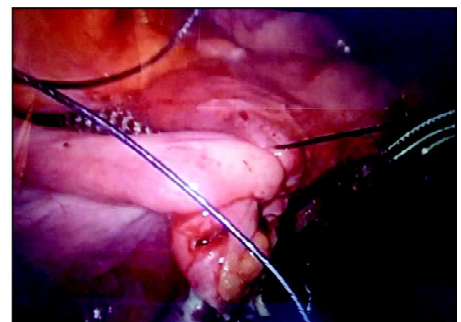


Fig. 4f: Closing the peritoneum with vicryl to cover the mesh

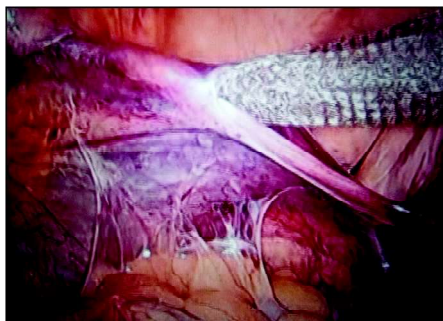


Fig. 4g: Lateral suspension of vaginal vault-taking the prolene mesh out through round ligaments of both sides

Sacrohysteropexy is indicated for women with symptomatic uterine prolapse who desire preservation of their uterus and fertility. It is particularly suitable for those with mild to moderate prolapse and no significant uterine pathology. Patients with contraindications to hysterectomy or those who wish to avoid the hormonal changes associated with surgical menopause may also benefit from this procedure. Additionally, sacrohysteropexy can be considered in women planning future pregnancies, as it allows for the retention of reproductive function.

Several studies have demonstrated the favorable outcomes of sacrohysteropexy in terms of symptom improvement, anatomical correction, and patient satisfaction. Long-term follow-up data indicate durable support of the uterus with low rates of recurrence and mesh-related complications.¹⁶ Compared to hysterectomy, sacrohysteropexy is associated with shorter operative times, reduced blood loss, and faster recovery. Furthermore, the preservation of the uterus preserves sexual function and may have psychosocial benefits for patients. Overall, sacrohysteropexy offers a safe and effective treatment option for uterine prolapse, with high patient acceptance and minimal morbidity.

Uterosacral Ligament Suspension (ULS)

It is a surgical procedure commonly employed in the management of pelvic organ prolapse, particularly uterine prolapse, involving the suspension of the uterine cervix or vaginal apex to the uterosacral ligaments. During ULS, the uterosacral ligaments are identified and dissected bilaterally, and sutures or synthetic mesh are used to suspend the cervix or vaginal apex to these ligaments providing durable support. Indications for ULS include symptomatic uterine or vaginal vault prolapse, recurrent pelvic organ prolapse following prior surgery, or as an adjunct to other pelvic reconstructive procedures. Clinical studies have demonstrated favorable outcomes following ULS, including improvements in pelvic organ support, reduction in prolapse symptoms, and a high patient satisfaction rate.¹⁷

CONCLUSION

POP presents as daily discomfort, which can impair with sexual function and quality of life. First, it is important to choose the right surgical candidate and thereafter appropriate surgical procedure. Careful patient selection, meticulous surgical technique, and postoperative monitoring are essential for minimizing complications and optimizing outcomes.

KEY POINTS

1. Majority of patients with symptomatic pelvic organ prolapse are managed with reconstructive methods.

2. Obliterative methods are for those with comorbidities limiting surgery or those who are not willing to retain future sexual functions.
3. For the uterus-sparing strategies, a shorter operative length and less blood loss are the preferences.
4. Pectopexy represents a modification of traditional sacrocolpopexy, aiming to restore pelvic organ support while minimizing the invasiveness of the procedure.
5. Sacrohysteropexy is indicated for women with symptomatic uterine prolapse who desire preservation of their uterus and fertility. It is particularly suitable for those with mild to moderate prolapse and no significant uterine pathology.

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Ergonomics in Laparoscopic Surgery

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INTRODUCTION

The field of minimally invasive surgery has expanded by leaps and bounds over the past two decades. The benefits of laparoscopic surgery to patients in comparison with open surgery include a smaller incision, reduced postoperative morbidity, pain, shorter hospitalization, and a rapid return to normal activities. However, laparoscopic surgery is more demanding for the surgeons. It is different from open surgery in terms of equipment, instrumentation, and psychomotor skills.¹

WHAT IS ERGONOMICS?

The term ergonomics is derived from the two Greek words “ergon,” meaning work, and “nomos,” meaning natural laws or arrangements. Ergonomics is the scientific study of people at work, equipment design, workplace layout, training, and productivity. This term was defined for the first time in 1949.¹ It is a field of science applied to work environments to minimize the risk of injury.² Ergonomics is a combination of knowledge of anatomy, physiology, psychology, and engineering, combined in a systematic approach. In simple words, it is the science of best suiting the worker to his or her job and making the setting and surroundings favorable for the surgeon to operate with maximum productivity.

ERGONOMIC FACTORS AND CHALLENGES DURING LAPAROSCOPY

Ergonomic considerations in laparoscopic surgery are different than open surgery, as it is more demanding, both physically and mentally. The important areas of consideration are as follows:

1. **Laparoscopic vision**, which is mostly 2D, because commonly two cameras are used compared to 3D vision in open surgery, causes more eye strain, wrist strain, and mental exhaustion for the operating surgeon.

2. **Static body posture** leads to musculoskeletal disorders including fatigue and strain, nerve compression, and paresthesia.
3. **The lack of haptic feedback** and inefficient designs in laparoscopic instruments, coupled with limited degrees of freedom, increase physical and mental strain.³ Laparoscopic devices have largely been designed as one-size-fits-all; however, female surgeons have reported increased physical strain from the use of handheld instruments, which is understandable as women have smaller hands than their male counterparts. According to a study conducted by Wong et al,⁴ women experience significantly more physical complaints and they concluded that female surgeons have significantly greater physical complaints in laparoscopic surgery.

Available literature shows that ergonomics in the operating room is rarely taught as a part of a formal surgical curriculum.⁵ It is vital that we are aware of the common postural errors and the ergonomic setting of the operating room including monitor, table, step, and pedal placement to decrease work-related injury and remote physical longevity.

GOOD ERGONOMIC CONCEPTS IN OPERATING THEATRE

The surgeon’s mental and physical reserve during laparoscopic surgery is significantly reduced compared to open surgery.⁶

The factors considered for proper ergonomics in operating theater are:

1. Proper Posture of the surgeon
2. Operative table height
3. Position of the visual display / monitor
4. Foot pedal location
5. Port placement
6. Factors related to laparoscopy instruments
7. Type of visual monitor

8. Cable cord management
9. Operating Theatre lighting

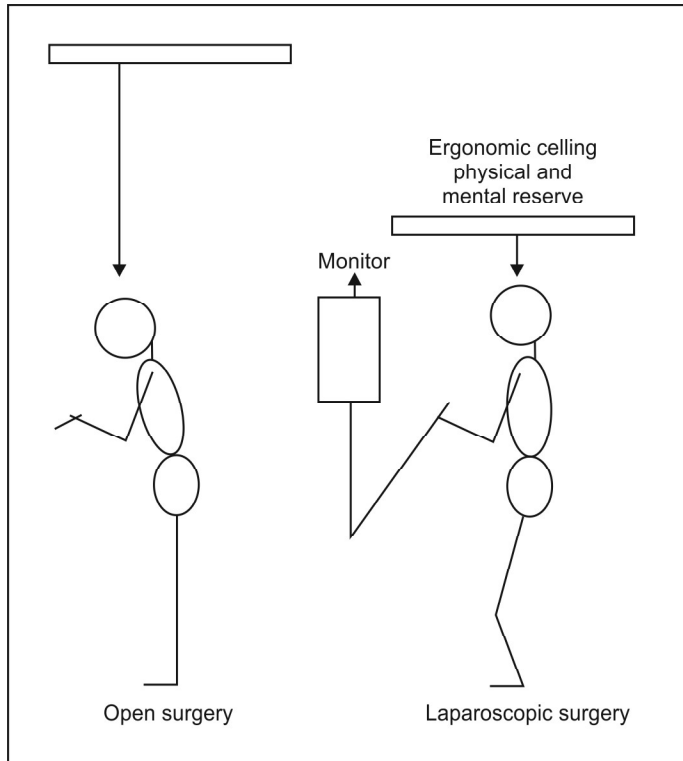


Fig. 1: Showing the comparison of surgeon's posture in open and laparoscopic surgery.

1. Surgeons' Body Posture

- A proper posture during surgery is essential for comfort, efficiency of movement, and the absence of any risk of musculoskeletal injuries to the operator. (Fig. 1)
- The ideal posture for the laparoscopic surgeon is a relaxed position with the arms slightly abducted, retroverted, and rotated inward at the shoulder level and the elbow bent at a 90–120° angle with the neck slightly flexed with a downward eye gaze.
- The operating table with clamps on the side for attachments can obstruct the surgeons/assistants from standing in the desired position. These should be organized so that they are at least obstructive position and removed if unnecessary.

2. Operative Table Height

- The operating table must be adapted to the surgeon's height and position. A high operating table causes the muscles to apply considerably more contraction force to raise and hold the shoulders as well as the elbows. Maintaining that position for a long period quickly leads to shoulder and spinal muscle fatigue.
- Hence, the height of the table should be adjusted so that the angle at the elbow joint is between 90 and 120° or, in simple terms, at or slightly below elbow level.

- As laparoscopic instruments are longer and the table is also tilted much more than open surgery, this may require the table to be lowered considerably. If this ideal position is not achieved, then the body unconsciously compensates for it by raising one side which causes shoulder and neck strain, especially in prolonged surgeries.
- The height of the operating table should be adjusted between 64 and 77 cm above floor level since this discomfort and operative difficulty are lowest when instruments are positioned at elbow height. The surgeon might have to stand on a footrest or elevated platform if it is not possible to lower the table.⁷

3. Position of Monitor/Screen

- The visual information from the surgical scenario is provided by a monitor or screen, which should be adjusted prior to the surgery to avoid undesirable postures for a long period.
- In the horizontal plane, the monitor should be straight ahead of the surgeon and it should be in line with the forearm–instrument motor axis. Straight line principle: the surgeon, operative field, and the monitor should be in a straight line for maximum efficiency.
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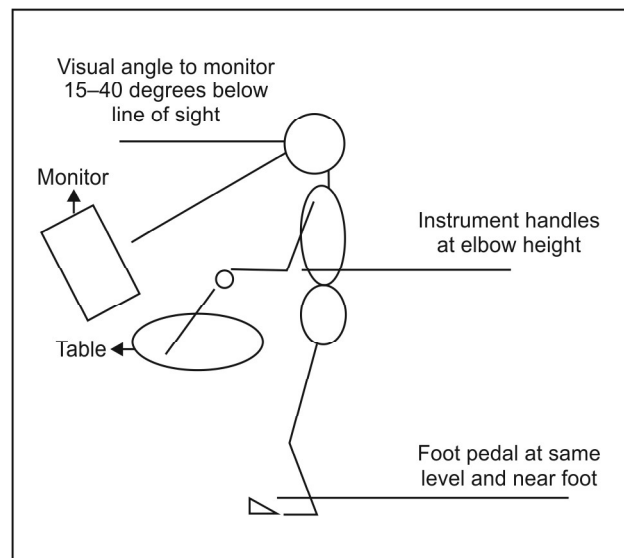


Fig. 2: Key elements of the ergonomic laparoscopic surgeon

- Ergonomically, the best view for laparoscopy is with the screen image at or within 25 optimal degrees below the horizontal plane of the eye. The most comfortable viewing direction is approximately 15° downwards. The viewing distance is highly dependent on the size of the monitor. It should be far enough to avoid extensive accommodation of the eyes and extraocular muscle

contraction. And at the same time, it should be close enough to avoid staring and loss of detail. (Fig. 2)

- For the assistant in laparoscopic surgery, standing on the contralateral side, another monitor is placed at the patient's feet end to avoid neck and back strain.

4. Foot Pedals

- They are commonly used during laparoscopic surgery to activate instruments such as electrocauterization, ultrasonic shears, bipolar devices, or other tissue welding/dividing instruments.
- They are often poorly positioned demanding awkward and unnatural postures of surgeons. The main problems are the lack of visual control, the uncoordinated position of the surgeon, and the use of too many pedals during laparoscopic surgery.
- A possible solution is their replacement with hand controls when possible.
- Pedals should be placed near the foot and aligned in the same direction as the instruments, toward the target organ and facing the laparoscopic monitor. This enables the surgeon to activate the pedal without twisting his/her spine or leg.
- A pedal with a built in footrest is preferable.⁷ If there are two pedals for different devices, the surgeon must be careful not to confuse them in the darkness.

5. Port Placement

To understand the ergonomics behind port placements, one must understand the angles of manipulation, azimuth, and elevation (Fig. 3).

- **MANIPULATION ANGLE** is the angle between two working instruments (active and assisting). The ideal manipulation angle is between 45–60°. A smaller or larger angle is associated with increased maneuvering difficulty and poorer performance. An acute angle will cause clashing and fighting between instruments, while a large wide angle will result in the need to abduct the arms more, leading to straining of the shoulder muscles. The 90° manipulation angle has the greatest muscle workload by the deltoid and trapezius muscles of the extracorporeal and intracorporeal limbs as well as the extracorporeal dominant arm flexor and extensor groups of muscle. It is recommended to have a manipulation angle of 45 to 75° and equal azimuth angles. Manipulation angles below 45° and or above 75° are associated with increased difficulty and performance degradation.
- **AZIMUTH ANGLE** is the angle between the instrument and the optical axis of the endoscope. The ideal azimuth angle for maximum and easy productivity ranges from 30–45°. Equal azimuth angle is associated with better task efficiency than unequal azimuth angles.
- **ELEVATION ANGLE** is the angle between the instrument and the horizontal plane. It has a direct

correlation with the manipulation and elevation angles. They should be equal for maximum efficiency. For example, with a manipulation angle of 60°, the corresponding optimal elevation angle with the shortest execution time and optimal performance is also 60°.

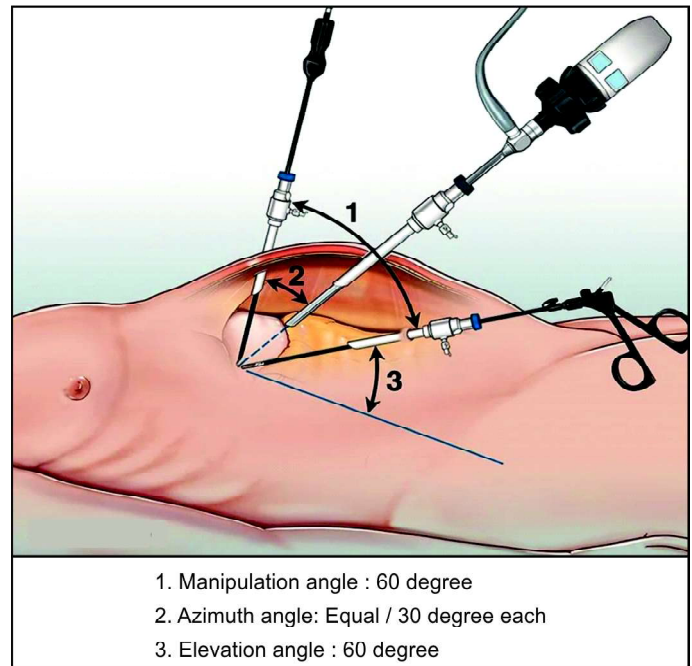


Fig. 3: Manipulation, Elevation, and Azimuth angle.

Triangulation

- There is no uniform consensus regarding port placements for advanced laparoscopic surgeries. Port placement is currently dictated by the surgeon's preference based on individual experience. The trocars are placed in a triangular fashion to facilitate smooth instrument manipulation and for adequate visualization. This is termed as triangulation.
- The target organ should be 15 to 20 cm from the center port used for placing the optical trocar. Generally, the two remaining trocars are placed in the same 15 to 20 cm arc at 5 to 7 cm on either side of the optical trocars.
- The instruments hence work at an angle of 60 to 90° with the target tissue, avoiding the problems of long handles due to too far or too near port placements and the problem of abdominal wall interference.

Sectorization

When an optical trocar is placed as one of the lateral port trocars, it is called sectorization. It is usually done during appendectomy when a 10 mm trocar is placed in the sub-umbilical region. Two other trocars are placed laterally, below these trocars. Beginners should avoid sectoring of instruments as it requires an in-depth understanding and experience of the laparoscopic view and a different hand-eye coordination.

6. Ergonomics of Laparoscopy Instruments

- Laparoscopic instruments are constrained to work via small ports of size, 3 to 10 mm. This results in internal mechanical linkages which are more complex. They decrease the efficient transmission of force from the surgeon's hand to the instrument tip.
 - The performance of laparoscopic surgeries and the position of the surgeon's arms, hands, and fingers are highly dependent on the design of the instruments used, especially on the shape of the handle and the tool length.
 - The non-ergonomic designs of handles which are not adapted to the shape and size of the surgeon's hand may lead to discomfort, paresthesia of the digital nerves as well as muscle fatigue.
 - Surgical instruments should be, designed such that they enable surgeons to minimize wrist flexion, rotation, and ulnar deviation, keeping both arms at the sides of the body, and avoiding pressure points on the hands and fingers.
 - The design of instrument handle should be according to the task to be performed, a pistol type handle for tasks that require force and a precision type handle for tasks that require precision.⁹ Axial handle rather than ring handle provide more comfort to the wrist.
7. **High-resolution camera screen:** The trend is moving toward 4K ultra-high-def (UHD) camera screens, even in smaller screens. It provides four times the image quality in high-definition. One of the values of 4K is that when intraoperative images are magnified, they are less likely to appear pixelated. Some monitors feature capabilities such as High-Dynamic Range (HDR) that offer richer colors than traditional digital monitors, helping surgeons delineate tissue boundaries and visualize blood vessels and lesions with more precision and clarity. A good monitor resolution goes a long way in reducing eyestrain, unnecessary movements, and mental fatigue of surgeons. A screen size of 26-32 inches is generally suitable. Larger screens do not provide any extra advantage.
 8. **Preventing cable entanglement:** Surgical monitors are placed in the thick of a whirlwind of activity in the operation theatre. To prevent slips and trips on cords, cable management is required to keep them out of high-traffic areas.
 9. **Ambient Room Lighting:** The OR should have the provision to be dimmed during laparoscopic surgery to avoid glare and visual discomfort to the surgeon and the operating team members. However, it should not be too dark for the assistants, scrub nurses and circulating nurses to pass instruments or hamper movement inside the OR.

Laparoendoscopic Single-Site Surgery (LESS)

LESS is physically demanding, requiring higher levels of strong muscular activity of the back and arm muscles.

However, it provides better comfortable wrist movement compared to traditional laparoscopy.

Role of Robotic Surgery

With the advancement of minimally invasive surgeries, Robotic platforms such as the Da Vinci system have come up as a potential solution to the limited ergonomics in laparoscopic surgery. Physical and cognitive ergonomics are significantly less challenging with robotic assistance as compared to conventional laparoscopic surgery mainly due to its 7° of freedom. It allows the placement of ports in a shorter arc without instrument interference.

Some ergonomic tips for Gynecology laparoscopic surgery

- Ipsilateral ports are more ergonomic than contralateral ports. If available, the assistant should be on the contralateral side.
- The operating table height should be below the waist of the operating surgeon.
- The buttocks of the patient if lithotomy is required, should be below the edge of the table by 4-6 inches to ease instrument position.
- **Monitor image position:** The monitor image should be 15-40 degrees below the eye's horizontal plane. This position reduces neck strain.
- **Laparoscopic instruments:** Use instruments with axial handles instead of ring handles.
- **Manipulation angle:** Use a manipulation angle of 45-60 degrees.
- **Instrument length:** Use instruments with a shorter shaft than standard laparoscopic length.
- **Body position:** Maintain a neutral body position. Avoid flexing or extending the spine. Shift your weight occasionally from one foot to the other.
- **Hand reach:** Limit hand reach to a maximum of 16-18 inches. Keep your hands between your waist and the middle of your chest. Position the angle of your elbows between 90° and 120°.
- **Pedal placement:** Place foot pedals near the foot and align them in the same direction as the instruments. Avoid using foot pedals, which can require awkward postures. Use hand controls instead.
- A 3-D screen with high high-definition display reduces eye strain and provides ease of movement.
- Ergonomics of endoscopic suturing includes 80 degrees to 100 degrees needle insertion angle; holding angle >90 degrees, and gripping point at the middle and proximal third of the shaft of the needle.

CONCLUSION

Laparoscopic surgery requires more physical and mental effort on the part of the surgeon and mandates very close

attention to the proper arrangement of the operating room workspace as well as the proper choice and use of instruments. Embracing ourselves with the knowledge of ergonomics will substantially improve our work performance as well as longevity. We should all endeavor to stay updated and practice better ergonomic integration so that we can enjoy working at our optimal best.

KEY POINTS

1. Laparoscopic surgery predisposes surgeons to musculoskeletal problems which can be prevented by proper ergonomics.
2. Correct placement of instruments, light source and monitor etc can prevent laparoscopic surgery-associated musculoskeletal pain and injury.
3. The knowledge of ergonomics is mandatory for laparoscopic surgeons and all operative staff.

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 **Walter Bushnell**

Critical Review of Indications - Robotic versus Laparoscopic Surgery!

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INTRODUCTION

Since the 19th century, surgical innovations are constantly occurring. The innovations include new ways to make surgery safer and less invasive with new surgical techniques and more advanced instruments. The current focus is on minimally invasive and maximally precise and personalized surgery and the development of robotics has revolutionized gynecological surgery. Gynecological surgery is indicated for several benign conditions like uterine fibroids, ovarian tumors, abnormal uterine bleeding, endometriosis, chronic pelvic pain, genito-urinary fistulas, prolapse, and tubal reconstruction, as well as malignancies.

Gynecological surgery can be done by several routes. It can be open surgery (laparotomy), vaginal surgery, or minimally invasive surgery (laparoscopy). There are several innovations in minimally invasive surgery including Robotic surgery (DaVinci surgical system, which has been around since FDA approval in 2000), SILS (single incision laparoscopic surgery), and v-NOTES (vaginal natural orifice transluminal surgery). In the last few years, several robotic systems, other than DaVinci surgery by Intuitive Surgical, have become available. These are SSI Mantra (by SS Innovations), HUGO-RAS (by Medtronic), and Versius (by CMR Surgical), to name a few.

The surgical robot is an advancement in minimally invasive approach with a hybrid technique that shares characteristics of both open and laparoscopic surgery – mimics the natural movement of the human hand with small incision surgery. There is 3D HD imaging and magnification with fully articulated instruments (360 degrees) with a range

of movement more than even the human hand which enhances the surgeon's ability to perform fine motor skills like intricate dissections and suturing. At the surgeon console, there is a 3D stereoscopic viewer with hand controls (masters) with individual clutch, foot switch (instrument swap), cautery foot pedals, camera pedal/master clutch, and ergonomic controls. The surgeon can control three instruments, a camera and cautery at any given time. There has been rapid adoption of robot-assisted laparoscopic procedures in gynaecology by surgeons of all skill levels.

In this article, we will review the comparative pros and cons of laparoscopic vs robotic surgery and the current status of robotic surgery. Since robotic technology is an additional skill set acquired, surgeons performing robotic surgery must also be credentialed for privileges to perform laparoscopic and open surgery.

Whenever starting a new technique, the fundamental principle of “Primum non Nocere” (first do no harm) has to be followed.

Before performing robotic surgery the following prerequisites need to be fulfilled:

- Adequate informed consent - indications for surgery, risks and benefits associated with the robotic technique compared with alternative approaches and other therapeutic options
- Surgeons should describe their experience with robotic-assisted surgery or any new technology when counseling patients regarding these procedures.

- Surgeons should be skilled at abdominal and laparoscopic approaches for a specific procedure before undertaking robotic approaches.

Indications for Laparoscopic versus Robotic Surgery

Robotic-assisted laparoscopic surgery has been around for over two decades. The available evidence demonstrates the feasibility and safety of robotic-assisted laparoscopic surgery. Robotic-assisted laparoscopic surgery was developed to overcome the difficulties encountered with conventional laparoscopic technology, but evaluation in randomized controlled trials comparing it with conventional laparoscopy is limited.¹ Two hundred eighty-five citations about robotic laparoscopic surgery for benign gynaecologic disease were reviewed in a 2012 Cochrane Review, however, only two of these were randomized controlled trials.²

Common surgeries carried out include –

Hysterectomy

Hysterectomy is the most common gynaecologic surgical procedure performed. The feasibility and safety of the robotic-assisted laparoscopic hysterectomy as well as laparoscopic hysterectomy has been demonstrated in multiple retrospective case series. In all the studies, there were no conversions to laparotomy, intraoperative and postoperative complications were similar in robotic-assisted or conventional laparoscopic hysterectomy. Besides case series, there have been several published retrospective studies that directly compare conventional laparoscopic hysterectomy with robotic-assisted laparoscopic hysterectomy. The largest published retrospective cohort study compared 100 patients scheduled for conventional laparoscopic hysterectomy before the acquisition of a robotic surgical system vs 100 patients scheduled for robotic-assisted laparoscopic hysterectomy after acquisition.³ The mean operating time (skin-to-skin) for conventional laparoscopic hysterectomy was 27 minutes longer than for the robotic-assisted approach when comparing all subjects. Blood loss, length of stay, and postoperative complications were not significantly different. Robotic-assisted hysterectomy is useful for very obese women and those with previous multiple surgeries, as obesity is a limiting factor for complex laparoscopic surgeries.

Myomectomy

Minimally invasive management of leiomyomas is one of the more challenging procedures in gynecology, considering the difficulties encountered in hysterotomy, enucleation, multilayer closure, and extraction of the myomas.⁴ Advincula et al¹ performed a retrospective case-matched analysis of 58 patients who underwent robotic-assisted laparoscopic myomectomy vs myomectomy via laparotomy. Patients with robotic-assisted laparoscopic myomectomy had decreased estimated blood loss (195 vs 365 mL), length of stay (1.48 vs 3.62 days), and decreased complications when compared with the laparotomy group.

Bedient et al⁵ performed a retrospective review of 81 patients who underwent robotic-assisted or conventional laparoscopic myomectomies. Patients undergoing conventional laparoscopic myomectomy had a significantly larger mean uterine size, a larger mean size of the largest myoma, and a greater number of myomas. When adjusted for uterine and myoma volume and number, no significant differences were noted between robotic-assisted vs conventional laparoscopic groups for mean operating time (141 vs 166 minutes), mean blood loss (100 vs 250 mL), intraoperative or postoperative complications (2% vs 20% and 11% vs 17%, respectively), hospital stay more than 2 days (12% vs 23%), readmissions, or symptom resolution. The authors concluded that short-term surgical outcomes were similar between conventional laparoscopic and robotic-assisted laparoscopic myomectomy. Another review comparing laparoscopic and robotic-assisted myomectomy showed that the robotic approach may be favored for cases of higher complexity and multiple fibroids.⁶

Comparing laparoscopic and robotic techniques performed by expert high-volume teams has shown that Robotic-assisted laparoscopic myomectomy is associated with decreased blood loss and hospital length of stay when compared with both conventional laparoscopic myomectomy and open abdominal myomectomy. No data is currently available directly comparing the risk of uterine rupture in pregnancy after conventional laparoscopic vs robotic-assisted laparoscopic myomectomy.

Sacrocolpopexy

Pelvic organ prolapse is a prevalent condition where a minimally invasive approach is preferred. Several comparative studies have been carried out comparing open sacro-colpopexy (SCP), laparoscopic SCP and Robotic assisted SCP. Elliott et al⁷ reported a significantly shorter length of stay in the robotic-assisted laparoscopic group (1.0 vs 3.3 days) that corresponded with a 10% cost savings. Tan-Kim et al⁸ compared robotic-assisted laparoscopic with conventional laparoscopic SCP in a retrospective cohort study of 104 patients and noted a longer total operative time in their early robotic-assisted laparoscopic experience vs conventional laparoscopic SCP (281 vs 206 minutes). Length of stay, blood loss, complications, and objective cure did not differ between the 2 procedures.

Operative time has been shown to decrease quite rapidly with increased robotic-assisted laparoscopic volume. In a retrospective review of 80 patients undergoing robotic-assisted SCP, Akl et al⁹ reported a 25% decrease in total time after the completion of the first 10 cases.

Adnexal Surgery

Studies comparing robotic-assisted laparoscopic with conventional laparoscopic adnexal surgery are few. A study by Magrina¹⁰ demonstrated that the operative time was higher for the robotic group (77 vs 62 minutes). Blood loss, complication rates, and hospital stays were similar, with no

blood transfusions or conversions. In endometriosis, in a retrospective cohort study by Nezhat et al¹¹, the operative time was longer for the robotic-assisted laparoscopy compared with conventional laparoscopy (191 vs 159 minutes). There were no significant differences in blood loss, hospitalization, or intraoperative and postoperative complications. Differences in outcomes for endometriosis have not been compared. However, the degree of magnification and precision with the robotic system makes more complete excision feasible and safer.

Tubal Reanastomosis

Surgery has an important role in tubal recanalization following sterilization.¹² A case-control study by Rodgers et al¹³ compared 26 robotic-assisted tubal reanastomosis cases with 41 reanastomoses performed by outpatient minilaparotomy. Surgical times were significantly longer for the robot compared with open surgery. Hospitalization time, pregnancy (61% robotic vs 79% minilaparotomy), and ectopic pregnancy rates were not significantly different. Complications, however, occurred less frequently in the robotic group, and the return to normal activity was shorter in this group by 1 week. A prospective cohort study by Dharia Patel et al¹⁴ compared 18 robotic-assisted tubal reanastomosis cases taking longer than 10 open microsurgical tubal reanastomosis. Hospital stay and time to recovery were significantly shorter for the robotic-assisted laparoscopic reanastomosis.

Oncology

The DaVinci surgical system was approved for use in gynaecological malignancies in 2005, the ergonomics and immediate post-surgical outcomes were favourable for use. However, it is the long-term oncological outcomes (cancer recurrence, disease-free interval, and overall survival) that are the main determining factors for uptake. The LACC (Laparoscopic Approach to Cervical Cancer) trial in cervical cancer showed inferior outcomes with minimally invasive surgery, however, it did not distinguish between lap and robotic cases, and until the RACC (Robotic Approach to Cervical Cancer) trial results were published, open surgery is the mainstay for invasive cervical cancer. Fertility-sparing surgery (trachelectomy) may be performed robotically.

In endometrial cancer, there is the role of fluorometric sentinel lymph node mapping during robot-assisted surgery for endometrial cancer,¹⁵ using indocyanine green. Minimally invasive surgery for endometrial cancer is supported by current evidence, and for obese and elderly patients, robotic surgery has a definite place. Early-stage ovarian cancer can undergo staging surgery using surgical robotics, but it is not feasible for advanced ovarian cancer or multi-quadrant disease. For vulvar cancer, robotics has an emerging role in inguinal lymphadenectomy in reducing post-operative morbidity and wound healing using small incisions.

The advantages, limitations, and unique complications of Robotic-assisted surgery are listed in tables. (Tables I, II and III)

Table I: Advantages of robotic surgery

<ul style="list-style-type: none"> • Superior visualization with automatic white balancing, calibration, and focus. • Mechanical improvements with a fulcrum effect. • Wristed movements with seven degrees of freedom. • Stabilization of instruments within the surgical field with minimal tremor. • Improved ergonomics for the operating surgeon. • Less blood loss with precision surgery. • Shorter recovery with a quicker return to work. • Minimal post-operative pain. • Lower conversion to open surgery in complex cases.

Table II: Limitations of Robotic Surgery

<ul style="list-style-type: none"> • Additional surgical training. • Increased costs and operating room time during the learning curve. • Bulkiness of the devices. • Instrumentation cost. • Per instrument usage (lives) is predetermined and limited. • Lack of haptics (tactile feedback).
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Table III: Unique complications of robot-assisted surgery

<ul style="list-style-type: none"> • Mechanical breakdown of the robot equipment. • Use of excessive pressure on various tissues due to lack of tactile feedback. • Erroneous activation of a control. • Erratic movement or positioning of a robotic arm. • Loss of a needle from direct vision during zooming in on various structures.
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CONCLUSION

The goal of robot-assisted laparoscopic surgery is to help surgeons improve patient care by converting procedures that would have otherwise been performed by laparotomy into minimally invasive procedures. Robot-assisted laparoscopic surgery has all of the advantages of minimally invasive surgery, including less postoperative pain, smaller and possibly more cosmetically appealing incisions, shorter hospital stays, shorter recovery time, and faster return to work.

For benign gynaecologic disease, there is no high-quality evidence that robot-assisted laparoscopy is superior to laparotomy or conventional laparoscopy.¹⁶ All 3 techniques are comparable for benign gynaecologic surgery in terms of perioperative outcomes, intraoperative complications, length of hospital stay, and rate of conversion to open surgery.

However, published reports demonstrate that robotic-assisted laparoscopic surgery has similar or longer operating times and higher associated costs. Robotic surgery is more useful in complex cases – obesity, pelvic adhesions, large masses, previous surgery, malignancy, etc.

Additional research comparing conventional laparoscopic and robotic-assisted laparoscopic surgery is needed to help characterize the advantages and disadvantages of robotic-assisted surgery and to identify patients who would benefit from robotic-assisted laparoscopy over other methods.

KEY POINTS

1. Robotic-assisted laparoscopic surgery mimics the natural movements of the human hand with small incision surgery with 360-degree articulation of instruments enhances surgeons' ability to perform intricate dissections and suturing.
2. Robotic-assisted laparoscopic surgery is useful for very obese patients and a female with multiple surgeries.
3. Short-term surgical outcomes are similar in conventional and robotic-assisted laparoscopic myomectomy but robotic-assisted is more favourable for complex and multiple fibroid cases.
4. The degree of magnification and precision with the robotic system makes more safe and complete excision in endometriosis.
5. Blood loss, length of stay, and post-operative complications are similar in both, in most of the benign conditions.

KEYWORDS

Minimal Invasive surgery, Laparoscopic surgery, Robotic-assisted laparoscopy

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Robotics: The Current Status

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INTRODUCTION

In modern times, surgery has grown as a technology-driven specialty. The paradigm shift in minimally invasive surgery, evolving from open procedures and progressing to laparoscopy and ultimately entering the era of robotic assistance. This dramatic evolution is further likely to be fueled by even greater advances in the next few years. The term 'robot' was first used in 1920 by the author Karel Čapek in his play "Rossum's Universal Robots", and stems from the Czech word 'Robota' meaning "forced work".¹ The history of robotics in surgery dates back to 1980, the year from which surgeons began to comprehend the advantages of robot surgical systems. As per 2021 data, there were 6000 Da Vinci systems operable worldwide.²

PROS AND CONS OF ROBOTIC SURGERY

- The major advantages of this novel technology are reduced analgesic use, faster recovery, less post-operative pain, enhanced cosmesis, and reduced wound complications against open procedures.
- Robotics has presently widened its applicability, advancing from simple to complex procedures, and aiding to manipulate in narrow spaces or at non-ergonomic angles for conventional laparoscopy.³
- It has the added benefit of three-dimensional magnification (using binocular endoscopic vision with 10-15x magnification) and tools with 7f that can duplicate hand movements with high accuracy. By detailed visualization of surgical planes, the robot has an edge over traditional laparoscopic surgery.
- Robot-assisted surgery uses The Endowrist system of the robot (imitating a human hand) whereas conventional laparoscopy uses instruments with fixed tips.
- The robotic technology eliminates physiological tremors, providing the surgeons with much better control and

decreasing the risk of iatrogenic injury, hence facilitating a lot more efficient, calmer, and safer surgery.

- Few studies with stringent clinical trial criteria claim that robot-assisted surgery appears comparable to traditional surgery in terms of feasibility and outcomes but lags in terms of longer operating time and expense of the equipment.
- With shorter learning curves, even among the non-laparoscopic surgeons, and the ability to provide overall improved outcomes, robotic surgery is here to stay and flourish.
- The major drawback of significant overhead costs, will mostly be countered by increased market competition, thus broadening the access to technology.⁴

APPLICATION OF ROBOTIC SURGERY IN GYNECOLOGY

In gynecology, robotic surgery was adopted in 2006. Since then, the introduction of the Da Vinci Surgical System has been one of the most remarkable breakthroughs in how surgeries will be done in the future. It comprises of three components: A surgeon's console, a patient-side cart with four robotic arms manipulated by the surgeon (one to control the camera and three to manipulate instruments), and a high-definition 3D vision system. Articulating surgical instruments are mounted on the robotic arms, which are introduced into the body through a cannula. Globally, the largest proportion of robotic surgery occurs in general surgery and gynecology. It has its application in both benign and selected malignant cases.

ROLE IN BENIGN SURGERY

Application in benign surgeries ranges from hysterectomy, endometriosis, ovarian cystectomy, myomectomy, and sacrocolpopexy tubal reanastomosis. Some other less common surgeries are cervical cerclage, vesicovaginal repair, rectovaginopexy, and burch colposuspension.

Myomectomy

In myomectomy (Fertility enhancing surgery) the endowrist movement of the robotic arm allows better and more precise suturing than conventional straight stick laparoscopy. Also, the ease of suturing manifests itself on the myoma bed, especially when multiple fibroids are taken out.

Hysterectomy

Robotics provide special advantages in performing complex hysterectomies like III-IV endometriosis, previous multiple laparotomies, cases with severe adhesions, and where uteri were larger in size and weight. Robotic surgery for hysterectomy is being popularized for a shorter hospital stay, in fact same-day discharge is increasingly comfortable for both patient and doctor.

Endometriosis

The endometriosis surgery poses the real challenge. The chronic inflammation, dense adhesions, anatomical distortion of adnexal structures, and poor reproductive outcomes make the surgery very peculiar and difficult for the surgeon, pressuring him/ her to do a complete and thorough job. The quality of life of women with endometriosis is drastically hampered due to chronic pelvic pain, severe dysmenorrhea, subfertility, heavy menstrual bleeding, and abdominal bloating are often debilitating and demand utmost care during surgery to restore anatomy and function to near normal, while all endometriotic implants are removed. Endometriosis is the most suited surgery by robotic assistance. There is a proven role of robotic surgery in deep infiltrating endometriosis and includes procedures like segmental bowel resection, removal of nodules from the rectovaginal septum with or without rectal shaving, and partial bladder resection.⁵

Sacrocolpopexy

Sacrocolpopexy by robotic technique has the advantage of easier intracorporeal suturing and also decreased intraoperative time.

Tubal Reanastomosis

In tubal reanastomosis surgery, robotic surgery has the advantage of delicate manipulation of tubes and good visualization of anatomical layers for precise suturing.

ROLE IN ONCOLOGY SURGERY

In gynaecologic oncology, robotic hysterectomy is commonly performed for endometrial cancer and also for cervical cancer, and sometimes for restaging in early ovarian cancer.

Endometrial Cancer

Due to added comorbidity in patients with endometrial cancer like diabetes, obesity, pulmonary problems, and hypertension, robotic surgery is very much more feasible than other conventional options available. The firefly mode available in DaVinci Xi is a boon for performing sentinel lymph node biopsy. It requires injection of indocyanine dye at 3 o'clock and 9 o'clock positions in the cervix. Using the firefly mode intraoperatively, the sentinel lymph node will glow green in color thus guiding the surgeon further.

Cervical Cancer

Robot-assisted radical hysterectomy for cervical cancer has gained good acceptance in recent times, provided they are performed in specialized centers by appropriately trained surgeons. According to Surveillance Epidemiology and End Results (SEER), the indication strictly includes tumor size $</- 2$ cm. With higher staging, the risk of recurrence and mortality increases with minimally invasive surgery. Robot-assisted sentinel lymph node, pelvic, and retroperitoneal lymph node dissection can also be performed with ease. The injection of indocyanine green dye into the cervix and then its visualization using fluorescence imaging provided in the robot facilitates the process.

Ovarian Cancer

Robotic surgery currently has a limited role in ovarian cancer, because of the extensive nature of the disease. With robots currently available, it is usually difficult to approach the upper abdomen. For this, the ports need to be placed very high up in the abdomen, making it difficult to reach the deep pelvis. The single docking approach is currently followed due to simplicity and reproducibility. However, enhancing the ease and potential to accomplish actual four-quadrant surgery will need to be emphasized in future robotic surgical system designs.

Vulvar Cancer

Vulvar cancer staging often includes inguinal lymph node dissection. Sentinel lymph node (SLN) mapping and resection have been studied in vulvar cancer to decrease the high rate of morbidity related to a complete inguinofemoral lymph node dissection.⁶ The development of a robotic-assisted platform, the da Vinci Firefly, allows for intraoperative evaluation of the lymphatic channels and SLN mapping after injection of the primary tumor with ICG.⁷ Inguinal lymphadenectomy done minimally invasive is known as robotic VEIL – Video Endoscopic Inguinal Lymphadenectomy. The complete potential in gynecology has to be still explored and the robotic growth in this field is still exponential.

CONCLUSION

Short of being perfect, robotic surgery is a boon for patients and surgeons and is here to stay. The future directions for surgical robots include- compact and inexpensive, tactile feedback to the operator, snake-like flexible mechanics for single port access surgery (SPA) and NOTES (natural orifice Transluminal Endoscopic Surgery), telesurgery, applications of augmented reality, automation of surgical tasks (ranging from no autonomy, robot assistance, task autonomy, conditional, high to full autonomy), Cyber-physical system coupled with robots. Stable controlling tele-operation with haptic perception (bilateral control) is being studied by many investigators.⁷

KEY POINTS

1. The major advantages of this novel technology are- reduced analgesic use, less post-operative pain, reduced wound complications, three-dimensional magnification, and elimination of physiological tremors.
2. Application in benign surgeries ranges from hysterectomy, endometriosis, ovarian cystectomy, myomectomy, sacrocolpopexy, tubal reanastomosis.

3. As novel systems enter the scenario, training schemes need to be strengthened to incorporate robotic surgery into their curricula using an authentic approach. Evidence-based practice must be followed, to ensure the primary focus on positive patient outcomes.

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1. Complete Hydatidiform Mole with a Healthy Co-twin

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ABSTRACT

Gestational trophoblastic disease as an abnormal gynecological condition displays a characteristic gross appearance of multiple vesicles in the placenta. The coincidence of a hydatidiform mole with a term fetus is one of the sporadic occurrences encountered in clinical obstetrics. A 37-year-old primigravida woman was referred to BLK MAX fetal medicine unit at 21 weeks 5 days gestation for a routine scan. This was an IVF-conceived pregnancy with a history of two embryo transfers. A previous scan done elsewhere was labelled as suspicion of partial molar pregnancy with a healthy live fetus. On the scan done at our fetal medicine unit, fetal growth was appropriate as per gestation with normal amniotic fluid and no gross structural abnormality was seen. A well-delineated intertwin membrane was seen with an abnormal-looking placenta along the posterior upper segment. As the patient opted against antenatal investigation, routine ultrasound scans were performed. At 30 weeks 5 days gestation, a patient came with a complaint of painless and causeless bleeding per vaginum. Ultrasound findings were suggestive of a short cervix with signs of early labour. Fetal growth was normal as per gestation. This was followed by an emergency caesarean section. The patient delivered a healthy live male baby along with the molar tissue. The histopathological study confirmed the diagnosis of a complete hydatidiform mole. The patient was followed through a period of 2 years, during which the patient was diagnosed with stage III;8 GTN and received 6 cycles of Chemotherapy. A complete mole can coexist with a normal, healthy fetus who can be carried to term, with regular fetal and maternal monitoring

KEYWORDS

Twins; complete hydatidiform mole; coexisting live fetus; complete hydatidiform mole with healthy co-twin.

INTRODUCTION

Gestational Trophoblastic Disease includes a spectrum of inter-related tumors including benign forms namely complete and partial hydatidiform mole. In contrast, invasive mole, choriocarcinoma, placental site trophoblastic tumor (PSTT) and epithelioid trophoblastic tumor (ETT) have varying propensities for local invasion and metastases.

The incidence of a molar pregnancy along with a normal live fetus is an unusual presentation making it more disturbing to the mother and the treating gynaecologist. The correct diagnosis is not usually made before the end of the first trimester or the beginning of the second trimester, and generally complete Hydatidiform mole is confirmed later than a partial molar pregnancy in 71% of cases.² Patient usually presents with bleeding per vaginum, hyperemesis gravidarum, pre-eclampsia, hyperthyroidism and large for date uterus. Hydatidiform mole has been associated with various complications, an increased risk of persistence and the development of metastatic disease chiefly gestational trophoblastic neoplasia. Even though singleton molar pregnancies are advised for termination, twin gestation with hydatidiform mole can continue if there are no complications or genetic anomalies associated.²

CASE REPORT

A 37-year-old primigravida woman was referred to BLK MAX fetal medicine unit at 21 weeks 5 days gestation for a routine scan. This was an IVF-conceived pregnancy with a history of two embryo transfers. A nuchal scan and anomaly scan done elsewhere have mentioned a healthy live fetus along with abnormal placental mass and labelled as suspicion of partial mole.

On the scan done at our fetal medicine unit- fetal growth was appropriate as per gestation with normal amniotic fluid and no gross structural abnormality were seen. Two separate placentae with a well-delineated intertwin membrane was seen. The Placenta along the antero-left lateral wall seems to be normal in size and morphology. Other abnormal-looking

placenta appearing as solid-cystic intrauterine mass was seen along the posterior upper segment towards the maternal right. Colour Doppler showed increased vascularity within the placental mass displaying high velocity with low impedance flow.

As the patient opted against antenatal investigation, routine ultrasound scans were performed. On following the patient, fetal growth and amniotic fluid were found to be normal as per gestation. Doppler findings showed no significant abnormality. Maternal blood pressures were within normal range. Abnormal-looking placental mass showed no significant interval change.

At 30 weeks 5 days gestation, a patient came with a complaint of painless and causeless bleeding per vaginum. Ultrasound findings were suggestive of a short cervix with signs of early labour. Fetal growth was normal as per gestation at 35th centile for gestation. Abnormal placental mass was similar in morphology and size as seen in the previous scans. This was followed by an emergency caesarean section on the same day. The progression was uneventful and the patient delivered a healthy live male baby of 1.4 kg along with the molar tissue. A placental biopsy was then done in our hospital and the sample was sent to the BLK Max lab. The histopathological study confirmed the diagnosis of a complete hydatidiform mole associated with a normal fetus. Moreover, no significant numerical abnormality was reported in the Chromosomal analysis studied on the product of the conceptus sample.

Regular postnatal follow-up was done with the patient for a period of two years, to evaluate maternal and fetal complications. Beta HCG levels on the day of delivery were reported as 57771 mIU/ml, which were monitored every 4 months and it showed a declining trend. Post-delivery Chest x-ray was reported with Cotton wool opacities in bilateral lung fields, following which a CT thorax was done, which was reported with multiple nodules in both lungs, suggesting a high possibility of Metastatic etiology. This necessitates the need for a PET CT scan, which revealed extensive metabolically active lesions in bilateral lungs with metabolically active mediastinal and hilar lymph nodes confirming the metastatic nature of the disease. Thus, the patient was diagnosed with stage III;8 GTN, following which 6 cycles of Chemotherapy were completed. Beta HCG levels were monitored every 4 months which are within normal since January'24. Recently done Beta HCG levels in May'24 were less than 0.6 mIU/ml. The baby was admitted to NICU post-delivery for 12 days given preterm birth and is healthy now.

DISCUSSION

The coincidence of a hydatidiform mole with a term fetus is one of the infrequent occurrences encountered in clinical obstetrics,¹ at a rate of 1 in 22,000–100,000 pregnancies.^{7,8}

A live fetus coexisting with a complete mole in a twin pregnancy is also known as sad fetus syndrome because the coexisting fetus is usually chromosomally normal and has



Fig. 1: Thin echogenic intertwin membrane

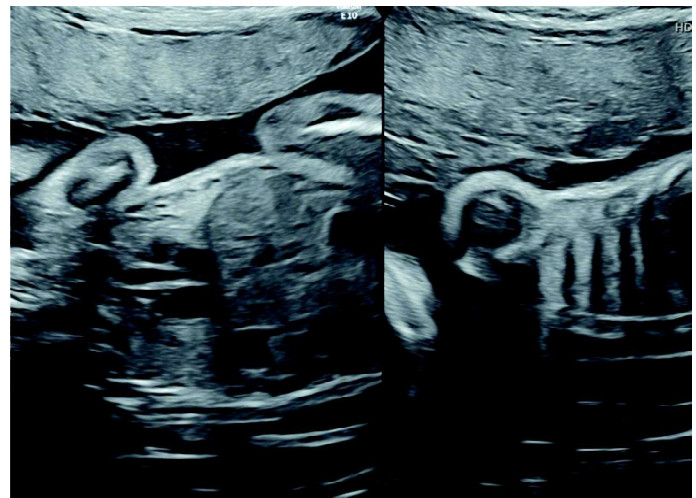


Fig. 2: Normal placenta along antero-left lateral wall with the live fetus.

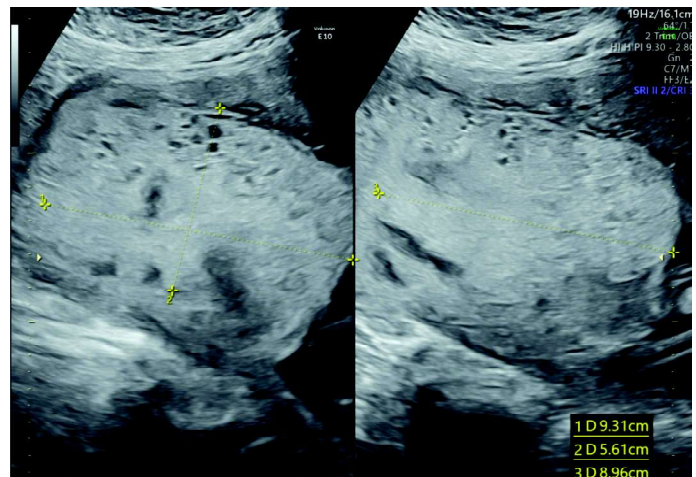


Fig. 3: Abnormal placental mass along posterior upper segment suggesting complete molar tissue

the potential to survive,⁵ however molar pregnancy with live co-twin is associated with significant risk to both mother and the fetus. Maternal risks include abnormal bleeding, pre-eclampsia, eclampsia, hyperthyroidism and abruption.³ Fetal complications include congenital anomalies, preterm delivery, intrauterine growth restriction, and intrauterine fetal death.³

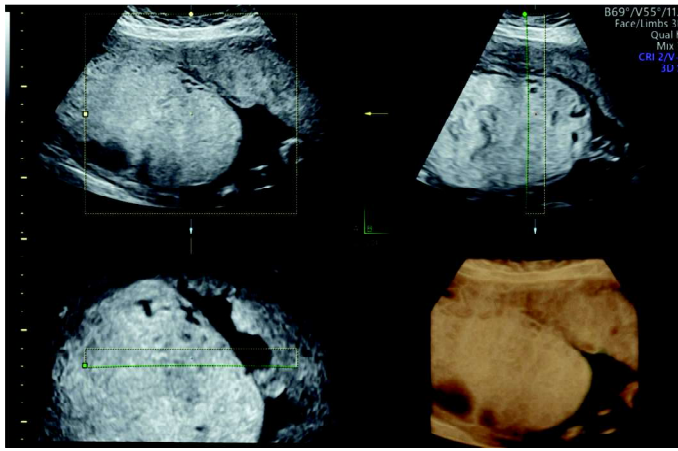


Fig. 4: 3D image of complete H.mole

“Vaginal bleeding is the most common clinical complication of complete H. mole and is due to the superficial placentation and the premature entry of maternal blood in the intervillous space”.⁶

Following uterine evacuation about 20% of patients with a CHM develop gestational trophoblastic neoplasia (GTN) and 2% may also develop a choriocarcinoma.⁷

Peng HH et al (2014)¹² reported a similar case presenting at 20 weeks of gestation. A healthy infant and the molar tissue was delivered at 37 weeks of gestation. The author concluded that molar pregnancy can continue until term if the live fetus is assured with normal anatomy and maternal complications are under control. **Sebire NJ et al (2002)**⁹ assessed 77 similar twin pregnancies, with complete hydatidiform mole (CHM), to ascertain the complications in continuing the pregnancy, versus termination. It was reported that there is a high risk of spontaneous miscarriage, but a study was reported with 40% live births, without significantly increasing the risk of Gestational trophoblastic disease.

Treatment of Gestational trophoblastic neoplasm is generally by chemotherapy. In the 2000 FIGO staging and classification, a risk score of 6 and below is classified as low risk and above 6 is considered high risk. Low-risk GTN are treated with single agent, methotrexate or actinomycin D protocols and High-risk patients are treated with EMA-CO (etoposide, methotrexate, actinomycin D, cyclophosphamide, vincristine).

CONCLUSION

Twin gestation with a complete Hydatidiform mole and a healthy live fetus can be carried to term, with regular fetal and maternal monitoring. Post-delivery extensive maternal follow-up is always needed.

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2. Laparoscopic Adenomyomectomy

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ABSTRACT

Adenomyosis is a benign infiltration of endometrial glands into the myometrium. It can cause a series of symptoms including dysmenorrhoea, menorrhagia, chronic pelvic pain, pressure symptoms and subfertility, often becoming a severe debilitating condition. Adenomyomectomy gives a predictable remission in symptoms especially dysmenorrhea and menorrhagia, while allowing for uterine conservation. A minimally invasive approach in the form of laparoscopic and robotic surgery, is the preferred and established approach for adenomyomectomy. The addition of adjuvant treatment with MIRENA/ OCPs / DIENOGEST/ GnRha helps to maintain long-term remission.

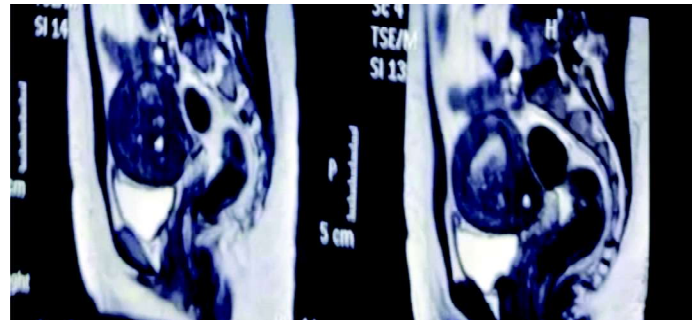
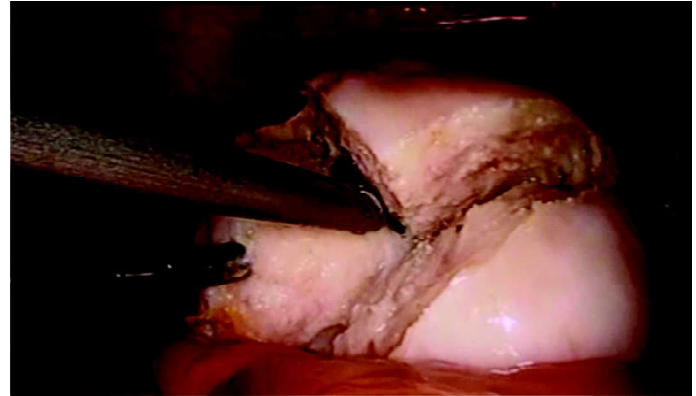
Here we discuss the case of a 37-year-old, multiparous woman with severe dysmenorrhoea, menorrhagia and anaemia secondary to an adenomyoma, who was successfully managed by performing a laparoscopic adenomyomectomy.

INTRODUCTION

Adenomyosis is a benign infiltration of endometrial glands into the myometrium leading to the thickening of the uterine wall. It can cause a series of symptoms including dysmenorrhoea, menorrhagia, anemia, chronic pelvic pain, pressure symptoms and infertility/subfertility. Often it can become a severe debilitating condition compromising the quality of life of the patient. Laparoscopic adenomyomectomy is a uterus conservation surgery. This cytoreductive surgery should be done only at centers with surgical expertise.

CASE HISTORY

A 37-year-old woman presented at BLK MAX Superspeciality Hospital, Delhi with complaints of menorrhagia, severe dysmenorrhoea and heaviness in the lower abdomen for the past 4 years. Her Hb was 7 gm/dL. She received IV FCM injection to build up her Hb to 10 gm/dL. She had taken Dienogest off & on and did not want to take it further. She had two live issues.



As she was young, the patient wished to preserve her uterus. MRI was done that showed an asymmetrically enlarged uterus with adenomyoma in the right anterior fundal area, about 5 cm in diameter. It was displacing the endometrium postero-medially. Imaging findings included myometrial cysts, hyperechogenic islands, echogenic

Sub endometrial fan-shaped shadowings, and irregularly thickened interrupted Junctional Zone. These findings helped us differentiate it from a uterine fibroid. The patient was counselled that surgery aimed to give relief from symptoms and not cure the condition. The patient was also told that future follow-up was essential.

She underwent a Laparoscopic adenomyomectomy. Concurrently bilateral uterine artery ligation at origin was performed to reduce chances of future recurrence. An inverted T-shaped incision was taken to a depth of 4.5 cm. Adenomyoma was resected in multiple pieces to leave 5 to 7 mm of myometrial thickness at serosal and endometrial levels. Around 4 cm of adenomyometrial tissue was excised.

The specimen was retrieved via morcellation. Dead space was obliterated using Vicryl and barbed sutures. Intraoperative blood loss was minimal. Mirena LNG-IUS was inserted at the same time.

The postoperative period was uneventful and the patient was discharged on post-operative day 2. The patient has been very satisfied and almost pain-free for the past 6 months since surgery.

DISCUSSION

Adenomyomectomy gives a predictable remission in symptoms, especially dysmenorrhea and menorrhagia. Surgery needs to be followed by adjuvant treatment with MIRENA/ OCPs / DIENOGEST/ GnRha to maintain remission. Osada procedure can be done in large diffuse adenomyosis using the triple flap method.

Robotic adenomyomectomy has been popular in cases of posterior adenomyoma with endometriotic pelvic adhesions. It ensures precise dissection and ideal suturing of the uterine incisions.

The pain scores improve considerably after the surgery. Various studies have shown significant fertility

enhancement. Nevertheless, the patients are cautioned about the risk of uterine rupture during pregnancy. Hence close antenatal monitoring for myometrial integrity is mandatory. Premature delivery is carried out at 32 weeks gestation by caesarean section and the newborn is managed in the nursery.

To conclude, laparoscopic surgery of focal adenomyosis has become the standard surgical management in a highly symptomatic patient who wishes for uterine preservation.

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3. Vaginal VVF Repair - A Day Care Procedure

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ABSTRACT

Vesicovaginal fistula (VVF) is an abnormal opening between the bladder and the vagina resulting in urinary incontinence and is one of the most distressing complications of gynaecologic and obstetric procedures.¹ VVF may be due to congenital or acquired (most commonly) causes with the latter being divided into obstetric, surgical, radiation, malignant, and miscellaneous causes. The most common cause of VVF is obstructed labour.² The classical presentation sign is continuous incontinence after a recent pelvic operation commonly between the 5th to 14th day of primary procedure.³ Once diagnosed the patient is managed conservatively initially with an indwelling catheter for 2-4 weeks.⁴ Surgery should be postponed to 3-6 months to allow healing of any inflammation and edema.^{5,6}

KEYWORDS

VVF - vesicovaginal fistula, CT KUB - computed tomography kidney ureter and bladder

INTRODUCTION

Vaginal is always preferred as the best minimally invasive route for any possible pelvic procedure on less otherwise contraindicated. Like any other surgery, a surgeon's will and skill are of utmost importance especially when post-op complications are being dealt with.

In our case, the selection criteria and the surgeon's skill were good enough to successfully manage VVF-like complications as a day care procedure.

CASE REPORT

Our patient was a 35-year-old female who developed VVF on the 5th day post-op of her primary procedure. She had undergone an elective Caesarean Hysterectomy for placenta accreta in which she had a very turbulent post-op period with prolonged surgery, massive haemorrhage, multiple blood transfusion under a ventilator for 5 days and was in ICU for 10 days. The patient developed VVF on the 5th day of surgery while still in ICU. She consulted us after 3 months of the said procedure but deferred her surgery for VVF for more than 3 years, only because of her last horrifying surgical experience.

We took up the case for surgery after 3 years of its onset only when she showed keen interest due to her multiple episodes of UTI along with high-grade fever. She was treated adequately for UTI with twice sterile urine culture reports, USG and CT KUB both confirming VVF.

We Proceed with the Case as Follows

GA as Anaesthesia

Keeping all options open regarding the route of approach for the final effective repair. It also provides better relaxation for surgeons to operate.

EUA

Fistula was present at the vault towards the right of the midline, 6-8 mm in size with a clean edge, and can descend up to -2 level of the vagina. The vagina was healthy and adequately capacious and pliable.

No 8 paediatric Foley's catheter was introduced through the fistula from vagina to the bladder and diagnostic cystoscopy was performed to confirm the number and site of the fistula and its relation to ureteric orifices mainly the distance. It was < 1cm fistulous placed tract supratrigonal and around 3-4 cm away from both ureteric orifices. The catheter helped us as a guide during our dissection surrounding the fistula and also the fistula could be dragged down significantly for a comfortable surgery.

The fistula was stabilised with alley forceps, applied to both of its angles. Circumferential incision was given over the vaginal tissue surrounding the fistula. Around 1-1.5 cm length of the vaginal flap was raised by sharp dissection away from the defect. This mobilised vaginal flap was then

fixed to the surrounding skin in four quadrants to make the bladder easily visible and accessible for repair.

We did not stitch the fistula opening directly rather we inverted the dissected bladder wall inside its lumen. The raw area of the bladder surface was approximated vertically in 3 layers with continuous suturing keeping Foley's catheter at the centre. The fistula got inverted fully into the bladder. The interposition flap was raised from inside the vaginal wall and was laid over the bladder stitch line again horizontally and finally, the vagina was closed in 2 layers. We closed the vaginal mucosa with baseball suturing with the intention of better healing with raw area approximation. As the case was under GA and a minimally invasive one, our patient was discharged 12 hrs following this procedure. Patient was sent home with oral antibiotics, urinary antiseptics, local lubricant and anti-cholinergic. She was counselled on the importance of continuous bladder drainage and any new symptoms like haematuria, outflow tract dysfunction, urine leakage or fever. The indwelling catheter was kept only for 10 days. Patient had an uneventful recovery. And now follow up for 3 months with repeated urine culture reports.

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Journal Scan

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Retained Surgical Instrument in Minimally Invasive Surgery

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The Journal of Obstetrics and Gynecology of India, 2020.

AIM

The aim of this article is to elucidate the extent of retained surgical instruments (RSI) in minimally invasive surgery (MIS). It's a false conception that MIS is safer with regard to risk of retention of instruments in body cavities.

CASE SUMMARY

The patient had undergone a total laparoscopy hysterectomy with bilateral salpingoophorectomy for fibroid uterus and endometriosis. After the surgery, as it was assumed that the claws of the instruments were intact, these were not opened and examined for any missing claws.

Six hours after the completion of surgery, while cleaning instruments, part of a claw of harmonic scalpel was found missing. An abdomen and pelvis X-ray were done that showed a small radio-opaque foreign body of approximately size 1 cm in the pelvis. After obtaining informed consent, an exploratory laparoscopy was performed. The abdominal cavity was entered through the same ports, and a search for

the foreign body under the guidance of C-arm was done. The foreign body was identified and removed through the same ports and was identified as the claw of a harmonic scalpel. The patient made an uneventful recovery after the procedure.

CONCLUSION

The vigilant surgeons and nursing staff can decrease the incidence of RSI. The role of radiology in taking high-quality and complete intra-operative films was crucial in this case.

EDITORS' COMMENT

The case has been published to emphasize and make surgeons aware of the fact that though laparoscopy is a safer surgery in terms of patient satisfaction and complications, care has to be taken in laparoscopic surgery similar to open surgeries to avoid retaining parts of surgical instruments. The tip of instruments as well as gauze and needle should be properly checked post-surgery to prevent devastating complications, repeat surgeries and medical negligence cases.

Indication Criteria of Hysteroscopic Surgery for Secondary Infertility Due to Symptomatic Cesarean Scar Defect Based on Clinical Outcomes: A Retrospective Cohort Study

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J Minim Invasive Gynecol. 2023 Jul;30(7):576-581

AIM

Hysteroscopic surgery criteria for patients with caesarean scar defect (CSD) are unclear. Therefore, this study aimed to explore the indication of hysteroscopic surgery for secondary infertility owing to CSD.

STUDY DESIGN

Retrospective cohort study conducted at a single centre. In this study, 70 patients with symptomatic CSD with secondary infertility who underwent hysteroscopic surgery under laparoscopy between July 2014 and February 2022 were included.

INTERVENTIONS

It included clinical data, including basic patient information, preoperative residual myometrial thickness (RMT), and postoperative pregnancy status from medical records. Patients were divided into postoperative pregnancy and nonpregnancy groups.

A receiver operating characteristic curve was drawn, and the optimal cut-off value was calculated based on the area under the curve to predict pregnancy after hysteroscopic surgery.

RESULTS

There were no complications in any of the cases. Among the 70 patients, 49 patients (70%) became pregnant after hysteroscopic surgery. There was no significant difference in patient characteristics between the pregnancy and nonpregnancy groups. In the receiver operating characteristic curve analysis for patients aged <38 years, the value of the area under the curve was 0.77 (sensitivity, 0.83; specificity, 0.78) when optimal the cutoff of RMT was 2.2 mm. There was a significant difference in preoperative RMT between the pregnancy and nonpregnancy groups (3.3 mm and 1.7 mm, respectively) in patients aged <38 years.

CONCLUSION

For RMT \leq 2.2 mm, hysteroscopic surgery was reasonable for secondary infertility owing to symptomatic CSD, particularly in patients aged <38 years.

EDITORS' COMMENT

Though the study indicated a small sample size due to less occurrence of caesarean scar defect, it highlighted a very important indicator of hysteroscopy and successful conception in patients with CSD who are diagnosed with secondary infertility. Residual myometrial thickness if it's more than 2.2 mm hysteroscopic surgery should be done. In this group, more pregnancies are reported, while those with reduced myometrial thickness are found to have fewer conceptions.

Update of Robotic Surgery in Benign Gynecological Pathology: Systematic Review

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Medicina (Kaunas). Published online 2022 Apr 17

AIM

The objective of this study was to provide an update on Robotic Surgery (RS) in benign gynecological conditions by reporting the scientific recommendations and high-value scientific literature available to the date.

MATERIALS AND METHODS

A systematic review of the literature was performed. Prospective randomized clinical trials (RCT) and large retrospective trials were included in the present review.

RESULTS

Twenty-two studies were included for the review: eight studies regarding robotic myomectomy, five studies on robotic hysterectomy, five studies about RS in endometriosis treatment, and four studies on robotic pelvic organ prolapse (POP) treatment. Overall, 12 RCTs and 10 retrospective studies were included in the analysis. In total 269,728 patients were enrolled, 1721 in the myomectomy group, 265,100 in the hysterectomy group, 1527 in the endometriosis surgical treatment group, and 1380 patients received treatment for POP.

CONCLUSIONS

Currently, a minimally invasive approach is suggested in benign gynecological pathologies. According to the available evidence, RS has comparable clinical outcomes compared to laparoscopy (LPS). RS allowed a growing number of patients to gain access to MIS and benefit from a minimally invasive treatment, due to a flattened learning curve and enhanced dexterity and visualization.

EDITORS' COMMENT

Robotic surgery is a newer minimally invasive surgery with more advantages for surgeons as well as patients. It has been widely used worldwide in gynecological malignancies in the current scenario. This article is presented to highlight the role of robotic surgery in benign gynecological pathologies as well. The outcomes are comparable to laparoscopic surgery with more ease for the surgeon. Emergency cerclage in pregnancies threatened by extreme premature birth due to cervical insufficiency is associated with significantly higher survival, pregnancy prolongation and reduction in delivery at <28 weeks of gestation, compared to expectant management. Survival rate was similar in singleton as well as twin pregnancies, implying that emergency cerclage should be considered in both.

KEY POINTS

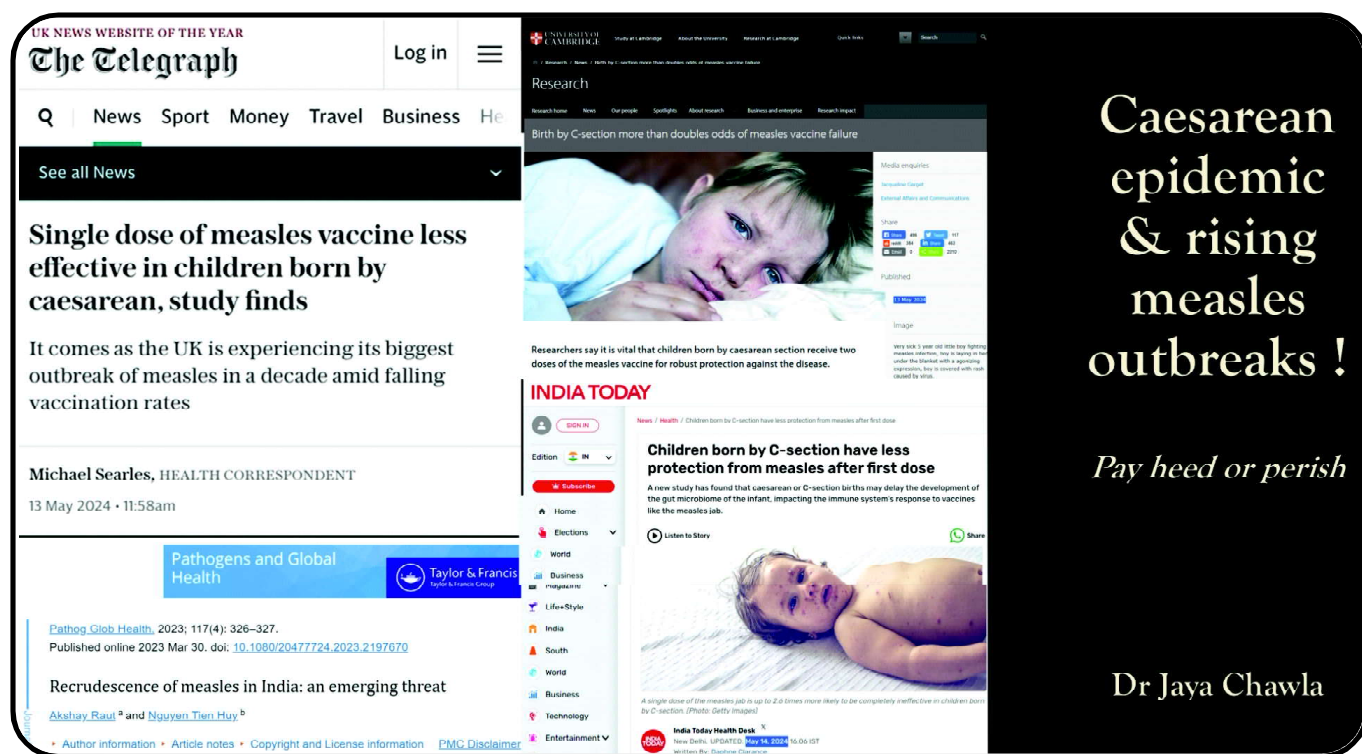
1. This systematic review aims to assess the outcome of emergency cerclage in both singleton and twin pregnancies and compare it with expectant management.
2. It has included all reported studies on emergency cerclages with ≥ 5 participants and concluded that placement of encirclage significantly improves survival rate and leads to prolongation of pregnancy in both singleton as well as twins.
3. The mean gestational age at delivery is 30 weeks, independent of dilatation and gestational age at diagnosis, after the placement of cerclage.
4. This study provided relevant data which can be used in the counselling of couples.

News Flash

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The rising rates of caesarean section are no longer even a matter of debate. One of the major reasons these are justified is reduced maternal and perinatal jeopardy. WHO estimates the rates of C-sec in East Asia to rise to a whopping 63%. The summary text of the first and until now only published meta-analysis of the implications of Caesarean births in low and middle-income countries tends to relinquish this idea, "Caesarean sections are a disproportionate threat to the lives of women and babies in LMICs."

Further, research from *Nature* cites that the abdominal route of birth is associated with primary vaccination failure for childhood measles (OR 2.56). The reason for this is that a vaginal birth exposes the baby to the microbiome of the mother

in a manner that is less effective in caesarean births. Notably, at present GOI immunization schedule suggests that the measles vaccine is offered as a combination of, MMR, first at 9 months and then second at 18-24 months. Analysing the NFHS-5 data, our vaccine coverage stands at 87% for the first dose and a measly 30% for the second.

India reported the world's highest number of measles outbreaks in 2022. The epidemic of caesareans is doing little to achieve the WHO goal of measles elimination by 2023. To conclude, the caesarean boom is showing signs of devastation worse than hitherto understood. It is time to pay heed or perish.

Foods we eat are covered in plastics that may be causing a rise in premature births, study says

Grist



Chemicals used in plastic food packaging linked to 10% of preterm births in 2018

Feb 8, 2024 The resulting costs to society could be as high as \$8 billion.



Pregnancy faces jeopardy at the hands of plastics !

Watch out !



Fast and ultra-processed foods risky for pregnant women: Research

The study in Environmental International warns pregnant individuals against consuming ultraprocessed foods due to potential exposure, linking it to adverse fetal health outcomes. Emphasizes legislative action and mindful food choices.

Written By: Rafael Palacios
New Date
Updated on: February 09, 2024 10:40:27

Full length article
First trimester plasma PER- AND Polyfluoroalkyl Substances (PFAS) and blood pressure trajectories across the second and third trimesters of pregnancy

Jordan A. Burdeau^{1,2}, Briana J.K. Stephenson¹, Izzuddin M. Aris¹, Emma V. Preston¹, Mar France Hivert^{1,3}, Emily Oken¹, Shruthi Mahalingiah¹, Jorge E. Chavarro^{1,4}, Antonia M. Calafat¹, Sheryl L. Rifas-Shiman¹, Ami R. Zota¹, Tamarra James-Todd^{1,5}



February 2024 issue of the Lancet and the CNN had something in common. The link was news and research stating an association between exposure to plastic toxins such as phthalates and the risk of preterm birth. The unversed phthalates are found in food packaging plastics, processed foods including restaurant and cafeteria foods and also in personal care products such as shampoos, perfumes, nail paints, moisturisers and hair sprays etc. No wonder phthalates are known as "everywhere chemicals". Out of the list above the largest association has been found with food packaging phthalates also known as DEHP or di(2-ethylhexyl) phthalate.

While scientific studies limit themselves to associations between a specific phthalate and the outcome of preterm birth, our lifestyles more obviously do not. The risk

theoretically at least then gets compounded. When we consider professional migration, super busy moms-to-be and nano-nuclear households, the picture appears grimmer.

Another news article and its corresponding journal counterpart talk of first-trimester serum levels of per-fluorooctane sulfonate (PFOS) and second and third-trimester rise in blood pressure. Now this tongue-twisting chemical where is it found you might want to ask? The answer is, "All roads lead to Rome." This chemical too is found in disposable food packaging besides, non-stick cookware. Not just its contribution to maternal mortality, the long-term cardiovascular aftermath of HDP is worrisome.

It's just the tip of the iceberg. Prevention seems less uphill a task than cure in this instance.

Snitch Snatchers

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- Who discovered the benefits of Co2 gas for insufflation
A. Zollikofer B. Hopkin
C. Bertram Bernheim D. Kurt Semm
- L-Hook is what type of instrument
A. Ligasure surgical B. bipolar surgical
instrument instrument
C. monopolar surgical D. harmonic surgical
instrument instrument
- The following length of veeres needle is not available
A. 10 cm B. 8 cm
C. 6 cm D. 12 cm
- What is the most common complication of laparoscopic surgery?
A. Haemorrhage B. Infection
C. Bowel injury D. Adhesion formation
- What is the typical diameter of a laparoscopic trocar?
A. 5 mm B. 10 mm
C. 15 mm D. 20 mm
- Which of the following is a potential complication of laparoscopic surgery in pregnancy?
A. Miscarriage B. Preterm labor
C. Fetal injury D. All of the above
- The angle between the instrument and the body of the patient is called?
A. manipulation angle B. elevation angle
C. azimuth angle D. co axial alignment
- What category of instruments does a Maryland belong to
A. Suturing B. Cutting
C. Dissecting D. Grasping
- PALMERS point is described as
A. The right lower B. The left upper
quadrant insertion quadrant insertion
C. The right upper D. The left lower
quadrant insertion quadrant insertion
- The term used for the process of removing the specimen from the body in laparoscopy is called
A. evisceration B. extraction
C. incision D. resection

Answer Key to Quiz 1 May 2024

- 20 Percent
- 1 in 86
- 10 percent
- Lisinopril
- Preeclampsia
- Multifetal gestation
- Fertilisation of 2 Ova in the same cycle
- Fetal cretinism
- Cyclophosphomide
- Fetal cyanide toxicity



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