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AOGD BULLETIN

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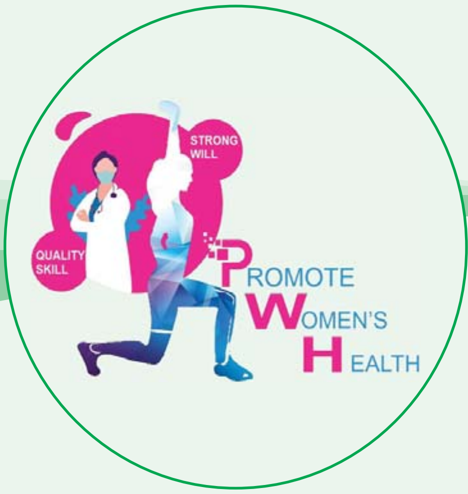

Dedicated Issue:

"Labour: The Evidence-Based Management"

AOGD SECRETARIAT

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Part 1: Invited Articles

Part 2: Original Articles

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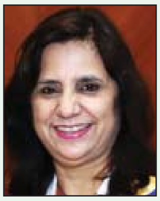

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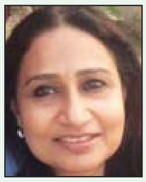

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Foreword

It is a great pleasure to write a Foreword for this excellent publication of the 1st issue of AOGD Bulletin for 2021-22. One wonders with great satisfaction to see the admirable growth and development of AOGD Bulletin during the last few years. The attractive cover, get-up, valued informative and educative contents etc. are evidences of sincere efforts put on by respective Editorial Boards. The esteemed bulletin may earn the distinction of a regular scientific journal as it is now incorporating original peer review articles also. Incidentally, one is reminded of our 1st AOGD Bulletin, of 1978, our humble attempt in the form of a 4-paged folder with typed informative and educative materials for AOGD members.

I learn that the Theme of AOGD for 2021-22 is: **Promote Women's Health by Strong Will and Quality Skill**. It is a timely and appropriate approach towards care of women's health. It should be the foremost duty of each obstetrician and gynaecologist to protect, preserve and promote women's health, with special reference to maternal health.

The 1st AOGD Bulletin released by Safdarjung Hospital team is dedicated to **"Labour: The Evidence- Based Management"**. Evidence based medicine forms the keyword in health care. Care based protocols for labour management will improve the clinical outcome of the mother and the newborn. This issue contains several important articles related to labour and its management. The last decade witnessed a few advances in concept and understanding the dynamics and management of labour. The essence of labour management lies on maternal well-being, fetal well -being and progress of labour. Constant nursing care in labour, upright or lateral position, avoidance of epidural anesthesia, use of partograms and appropriate use of syntocinon -- all help to reduce the requirement of instrumental delivery.

The scientific content of the bulletin is amply rich. The articles, contributed by learned experts, are educative, comprehensive and up-to-date. The dedicated editors must be complimented for their excellent work. It is sincerely hoped that this superb publication will be widely used by AOGD members and others.

Dr S N Mukherjee
Founder Member & Patron
AOGD

From the President's Pen

Warm Greetings to all esteemed AOGD members!

It is an honour and privilege to represent AOGD as its President and with it comes the responsibility of serving the largest society in the country with almost 2500 members. We are fortunate to have with us a galaxy of esteemed patrons, advisers and executive council members to guide us with their wisdom and experience.

The theme this year is **"Promote Women's Health by Strong Will and Quality Skill"**. The focus of the strong will would be on adolescent health and cancer prevention. Quality skill would be provided to all health care workers so that they can provide quality maternity care to all women with special emphasis on training in critical care.

We will continue to provide continuing medical education through webinars and also will keep apprising all members about latest developments through bulletins and our website. Don't forget to open the new updates tab on our website. AOGD as the largest society also has some responsibility of creating database and doing quality research. I request all of you to participate in whatever research is planned by AOGD.

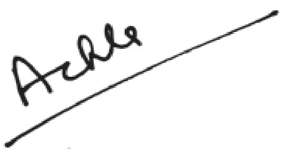
This year we have asked our respected senior members to write a foreword to our bulletin so as to learn from their wisdom. This issue has blessings of our respected Dr SN Mukherjee who is a founder member and patron of AOGD.

The upheaval caused by COVID 19 has been something which has not been seen by any of us in our lifetime. We medical professionals are being looked upon to provide help and guidance. Life goes on, procreation does not stop. We as obstetricians must remember that there is a large population of noncovid pregnant women who need our care. Hence AOGD has a huge responsibility in these testing times and it will be a mammoth challenge to fulfil it. My team at VMMC and Safdarjung Hospital and all the subcommittee chairpersons are the strength of AOGD. Together we will all sail through this crisis by supporting each other and keeping positivity in mind.

In the past two decades, considerable efforts have been made to encourage and support pregnant women to give birth in health facilities, where they ideally receive good-quality intrapartum care from skilled health personnel. An essential component of this care is ensuring that women are adequately monitored during labour. WHO has initiated the development of a "next generation" partograph known as the WHO Labour Care Guide. This design was intended to promote woman-centred care, stimulate practitioners to think critically around labour decision- making and individualize labour monitoring. To commemorate this, our first issue is dedicated to Labour management as it is Labour which redefines a woman in the form of a mother.

I take this opportunity to announce the dates for our **43rd Annual Conference**, 20th - 21st November 2021. We plan to hold the precongress workshops and other scientific events in the preceding week. The event is likely to be in the hybrid mode.

"Everything will be okay in the end. If it's not okay, it's not the end"......... John Lennon



Dr Achla Batra
President, AOGD (2021-2022)

Block your dates for 43rd Annual Conference 2021 to be held on 20th - 21st November, 2021

From the Vice-President's Pen

Dear Friends

It gives me immense pride to write this note for our AOGD Bulletin as the Vice President of AOGD.

AOGD Bulletin has come a long way from its original 'newsletter'. At the turn of this century when the Secretariat was at Safdarjung Hospital, this scientific publication was for the first time presented as a 'bulletin' and now after two decades we are striving to improve the scientific content of this publication by including peer reviewed original research articles. This will be a step in the direction of achieving some basic indexing. I am sure that our Editorial Team headed by the dynamic and hard-working Dr Rekha Bharti will make this mammoth target plausible.

Notwithstanding the most difficult and challenging times we are facing, the Team of AOGD 2021-22 will leave no stone unturned to provide our Fellow members with the latest updates through this Bulletin as well as through the webinars and CMEs.

Stay well and safe

Dr Jyotsna Suri
Vice President, AOGD (2021-2022)

From the Secretary's Desk

Warm greetings to all!

First of all, I would like to express my heartfelt thanks to Dr. Achla Batra for trusting me with responsibility of post of Secretary, AOGD. Her vision has always been a constant guiding light. We are thrilled to have AOGD secretariat finally here at Safdarjung Hospital and as Secretary, it's my promise that I, with support of our great team would not leave any stone unturned to make events at AOGD an enriching experience.

As the theme of this year at AOGD 2021-22 is **"Promote Women's Health by Strong Will and Quality Skill"**, we at Safdarjung Hospital are committed to provide quality care to women with utmost skill and strong will, which is all the more important in this challenging pandemic. Our team at AOGD secretariat is meticulously planning events and academic feasts to promote and propagate a behaviour which should be every woman's right.

In today's world, where conducting a normal delivery is increasingly becoming an art; with rate of caesarean sections on rise, we bring you our first bulletin from VMMC and Safdarjung Hospital on **"Labour: The Evidence based Management"**; just in time before it becomes a forgotten skill. Our editorial team has put forward a fantastic line up which would definitely make up for a good read.

With a virtual world and screens between us being the new normal, we would keep on putting our best efforts to continue the legacy of online learning with webinars and e-CMEs on various platforms. Being restricted to our rooms won't limit the learning process that our minds continuously strive for.

Saving lives is definitely going to be our primary objective in this grim situation but learning and growth will never take a backseat. On that note, I'd like to end; rather I should say start with this great prose by Sir J G Whittier

"**So stick to the fight when you are hardest hit, it's when things seem worst that you must not quit.**"

Dr Monika Gupta
Secretary, AOGD (2021-2022)

From the Editor's Desk

Greetings from the editorial board,

It gives me immense pleasure to present to you the first issue of AOGD bulletin for the year 2021-2022. I am grateful to Dr Achla Batra, President AOGD for entrusting me with this opportunity. Of course this opportunity has come with a huge responsibility of keeping up with the standards set up by my predecessors.

The theme of AOGD for this year is **"Promote Women's Health by Strong Will and Quality Skill".** Keeping in line with this theme we are dedicating our first issue to **"Labour: The Evidence based Management"**. Providing quality care during labour has been identified as the most crucial step in preventing adverse pregnancy outcome. The labour has been redefined and definitions of the duration of various stages of labour have evolved in the recent past. Hence, the recommendations to provide quality care for improving the health and well-being of women and their babies have also changed.

On behalf of the editorial team I thank all the authors for their contribution in covering important aspects of labour management in their articles. WHO recently introduced "WHO Labour Care Guide- the next generation partograph" for **Labour Monitoring and Documentation**. **Intrapartum Foetal Monitoring** is important for delivery of healthy baby; however, the available technology has to be appropriately used to avoid unnecessary interventions. With the change in the duration of normal labour, women are expected to spend more time in labour and it is important to provide adequate pain relief. Although, epidural analgesia is most appropriate for providing **Intrapartum Pain Relief**, it may not be feasible in all settings and there is a need to resort to various pharmacological and non- pharmacological options. **Induction of Labour** is the most frequent obstetric intervention done in approximately one fourth of pregnancies. It is therefore important to know the complications associated with labour induction and their management. Other important topics discussed in this issue are **Prevention and Management of PPH** and **Nonclinical Strategies for Reducing Caesarean Section Rates**.

This year we have introduced two new features to our bulletin, the **foreword by our respected senior members** of the society, and **two original articles**. We are thankful to Dr S N Mukherjee, Founder Member and Patron of our society for giving a kick start to our bulletin by writing the foreword for our first issue.

To acknowledge the hard work put in by the authors and to encourage the readership of our bulletin, a quiz on the articles published in the same month's bulletin will be organised during the monthly AOGD meetings.

Happy Reading!

Rekha

Dr Rekha Bharti
Editor, AOGD (2021-2022)
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Announcement

AOGD members are invited to become members of various Sub-committees.
Please contact respective Chairpersons.
Membership of Maximum two Sub-committees can be taken at a time.

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Labour Management: Newer Perspective

Divya Pandey[1], Shivangi Sharma[2]
[1]Associate Professor, [2]Post graduate Resident, Department of Obstetrics and Gynaecology, VMMC & Safdarjung Hospital, Delhi

More than one third of maternal deaths, half of stillbirths and a quarter of neonatal deaths result from complications during labour and childbirth.[1,2] Majority of these deaths occur in low-resource settings and are largely preventable through timely interventions.[3] Monitoring of labour and childbirth, and early identification and treatment of complications are critical for preventing adverse birth outcomes.

Historical Perspective: The first graphical analysis of labour was given by Emanuel Friedman in 1954 where in sigmoid curve represented normal labour characteristics. The sigmoid shape was explained by a slower rate of cervical dilatation till 3 cm (i.e. latent phase) followed by abrupt acceleration in the rate of dilatation (i.e. active phase) till 9 cm followed by a deceleration phase. Accordingly, the statistical minimum (5th centile) of normal cervical dilatation during active phase was given as 1.2 cm/hr in nullipara and 1.5 cm/hr in multipara respectively.[4] Later in 1972, RH Philpott and Castle came up with the concept of alert line in cervicographs for easing identification of abnormal labours and therefore their timely referral to the tertiary centre.

WHO Partographs: After WHO Safe Motherhood initiative in 1987, different partograph designs were introduced. **WHO Comprehensive Partograph** was introduced in 1994, with a latent phase of 8 hours and active phase of 3-cm. Alert line with a slope of 1 cm/hr was there with an action line, 4 hours to the right and parallel to the alert line. In this partograph, it was however difficult to show the transition from the latent to active phase. Moreover, it was observed that there was increased interference in form of caesarean sections on account of prolonged latent phase. Hence in 2000, **Modified WHO Partograph** was introduced. Here the latent phase representation was dropped and the active phase started from 4 cm. Colour coded zones were added in this and **WHO Simplified partograph** was introduced for easing the use and interpretation. Area to left of the alert line was coloured green representing the normal progress while that to the right of action line was coloured red indicating dangerously slow progress. The area between the alert and action line was coloured amber indicating the need for greater vigilance.

The above concept of labour progression was challenged by **Zhang et al (2010**). In their multicentric retrospective study at 19 centres of US on 62,415 parturients, authors found that labour may take over 6 hours to progress from 4 to 5 cm and over 3 hours to progress from 5 to 6 cm of dilation. Nulliparas and multiparas appeared to progress at a similar pace before 6 cm. However, after 6 cm labour accelerated much faster in multiparas than in nulliparas. The 95th percentile of the 2nd stage of labour in nulliparas with and without epidural analgesia was 3.6 and 2.8 hours, respectively. They concluded that in a large, contemporary population, the rate of cervical dilation accelerated after 6 cm and progress from 4 to 6 cm was far slower than previously described by Friedman. Allowing labour to continue for a longer period before 6 cm of cervical dilation may reduce the rate of intrapartum and subsequent repeat caesarean deliveries. It was also found that the transition from latent to active phase occurred at 6 cm and the change was gradual rather than abrupt.[5] Their recommendations were adopted by ACOG in 2014 and they defined start of active phase from 6 cm.

Meanwhile, the globe was observing a steep rise in the rate of Caesarean Sections (CS). WHO in 2011 after systematic review and critical appraisal of available classification systems, concluded that Robson Ten Group Classification System (TGCS) is the best to fulfil local as well as international needs to compare, monitor and audit caesarean deliveries at all centres. When applied, this TGCS showed that the major contributor group to CS were group 5 (term pregnancy with cephalic presentation with previous CS) and Group 1 and 2 (nulliparous pregnant women with term gestation, cephalic presentation in spontaneous/induced/not in labour). On further analysis it was found that 50-80% of primary CS were due to indications pertaining to intrapartum management. Thus there was a clear need of proper labour monitoring in order to cut down the rising figures of primary CS.

With all this background**, WHO recommendations for intra partum care for positive childbirth experience** (2018) were introduced. The main emphasis is on the supportive care throughout birth and labour which include respectful maternity care, effective communication and informed consent, emotional support and companionship, pain relief strategies, oral fluid and food intake, mobility in labour and adopting birth position of choice, regular labour monitoring, documentation of events, audit and feedback and maintaining continuity of care in all healthy pregnant women by the use of essential physical resources and motivated competent staff.[6,7,8] Moreover, they **redefined the phases of labour**.

The latent, first stage is a period of time characterized by painful uterine contractions and variable changes of the cervix, including some degree of effacement and **slower** progression of dilatation up to 5 cm for first and subsequent labours. The **active first stage** is a period of time characterized by regular painful uterine contractions, a substantial degree of cervical effacement and more **rapid** cervical dilatation from 5 cm until full dilatation for first and subsequent labours. The **standard duration** of the latent first stage has not yet been established. However, the duration of active first stage (from 5 cm until full cervical dilatation) usually does not extend beyond 12 hours in first labours, and usually does not extend beyond 10 hours in subsequent labours.

Progress of Labour: The use of medical interventions to accelerate labour and birth (such as oxytocin augmentation or caesarean section) before 5 cm threshold, use of amniotomy alone for prevention of delay in labour (latent phase) and use of early amniotomy with early oxytocin augmentation for prevention of delay in labour (latent phase) are not recommended **provided foetal and maternal conditions are reassuring**

A minimum cervical dilatation rate of 1 cm/hour throughout active first stage is unrealistically fast for some women and is therefore not recommended for identification of normal labour progression. A slower than 1 cm/hour cervical dilatation rate alone should not be a routine indication for obstetric intervention.

For effective application of these new definitions and recommendations, there was a need of a new partograph design. Thus WHO in December 2020, introduced **WHO LABOUR CARE GUIDE (LCG)- the next generation partograph.**

Aims of LCG are: (a) guide the monitoring and documentation of the well-being of women, foetus and the progress of labour; (b) guide skilled health personnel to offer supportive care throughout labour to ensure a positive childbirth experience for women; (c) assist skilled health personnel to promptly identify and address emerging labour complications, by providing reference thresholds for labour observations that are intended to trigger reflection and specific action(s) if an abnormal observation is identified; (d) to prevent unnecessary use of interventions in labour; (e) support audit and quality improvement of labour management.

Main Features: As per the LCG, active phase starts at 5 cm. There is addition of a very important part i.e. the second stage of labour monitoring, which was missing in previous partograph designs. There is no action or alert line. It has 7 **sections**, which are adapted from the previous partograph design: (figure 1) **Section 1**: Identifying information and labour characteristics at admission; **Section 2**: Supportive care; **Section 3**: Care of the baby; **Section 4**: Care of the woman; **Section 5**: Labour progress; **Section 6**: Medication; **Section 7**: Shared decision-making. These sections contain a list of labour observations. For every observation, an alert parameter has been defined. If the observation corresponds to any alert parameter, there is need to take action accordingly after a "shared decision making" i.e. decision taken after discussing the current situation with the women in labour or with her companion. Thus, the main emphasis is on **Action Oriented Labour** which includes: **assessing**, **recording** the observation and **checking** the values with alert column values and **deciding** the plan along with the women.

Assessment of Foetal Well Being: Routine CTG is not recommended for the assessment of foetal well-being on labour admission or during labour in healthy pregnant women undergoing spontaneous labour. **Intermittent Auscultation** of FHR with either a hand held Doppler ultrasound device or a Pinard foetal stethoscope is recommended for healthy pregnant women in labour. The **interval should be** every 15–30 minutes in active first stage of labour and every 5 minutes in second stage of labour. Each auscultation should last for at least 1 minute during a uterine contraction and for at least 30 seconds thereafter. Record the baseline as a single counted number in beats per minute and acceleration and deceleration.

Applicability: LCG is essential for the **care of all pregnant women**, **regardless of their risk status**. High-risk women many require additional and specialized monitoring and care. Most important is LCG can be modified as per the need of local centre where it is being used.

When to Initiate LCG: Documentation on the LC should be **initiated** when the woman enters the active phase of the first stage of labour (5 cm or more cervical dilatation), regardless of her parity and membranes status. Once initiated, it will support continuous monitoring throughout the first and second stage of active labour. Record all observations with admission of woman to labour ward. Rest is completed following subsequent assessments throughout labour. For all observations, horizontal time axis and a vertical reference values axis for determination of any deviation from normal

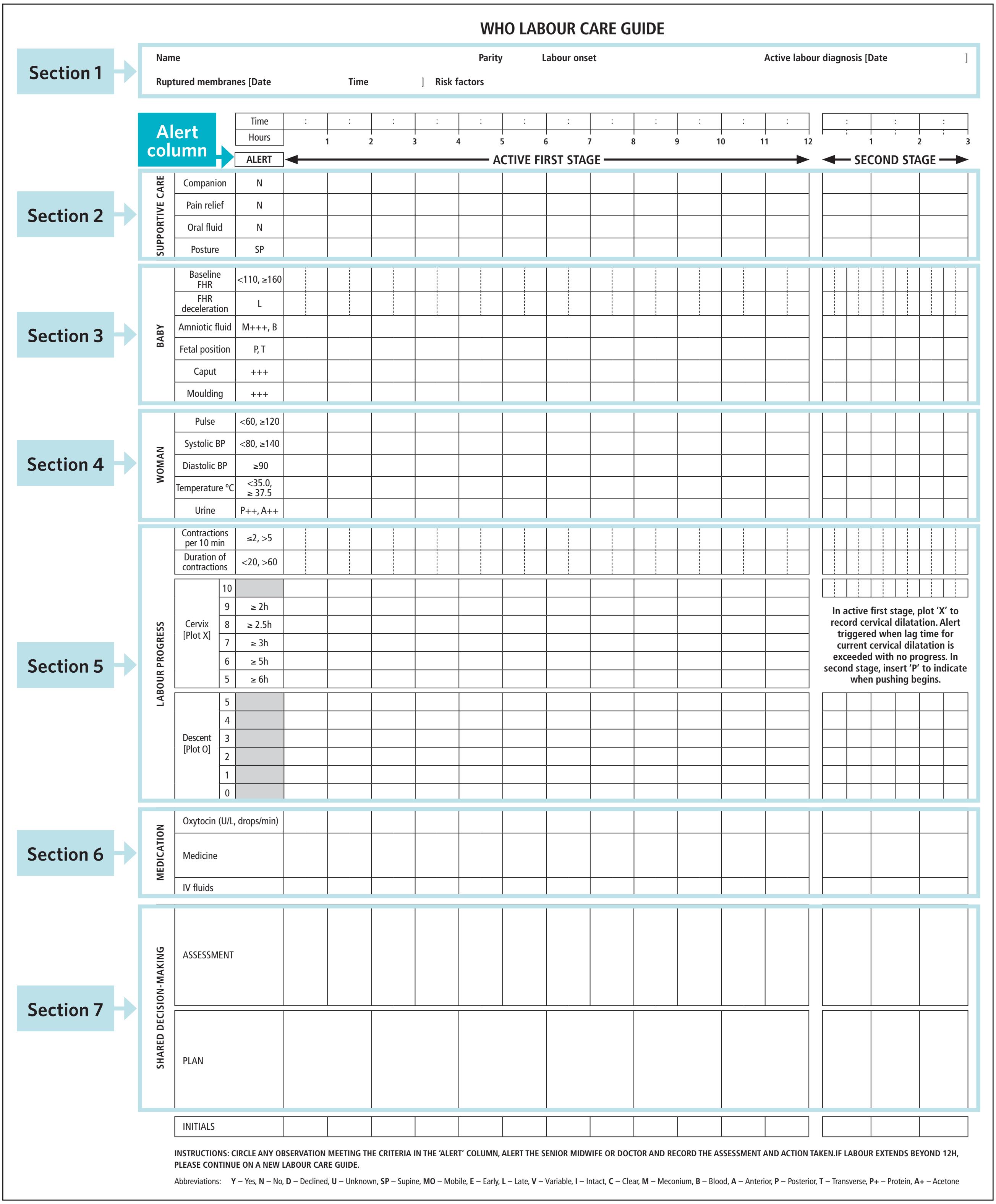

Fig 1: WHO Labour Care Guide (LCG): the next generation partograph

observations (ALERT Thresholds). It also provides a second-stage section to continue the observations made during the first stage of labour.

Section Wise Entry in LCG: Supportive care is provided in form of labour companion and adequate pain relief, both by non-pharmacological and pharmacological methods. Non pharmacological methods include music, aromatherapy, acupuncture and acupressure, breathing and relaxation exercises, whereas in pharmacological methods epidural analgesia is preferred. PCA (patient controlled analgesia) and opioids can also be given depending on demand and availability. For all the low risk women oral fluids and food intake is recommended during labour and mobility should be encouraged in low risk women however supine position should be avoided.

Foetal assessment is done every 30 minutes and baseline heart rate, type of deceleration, colour of liquor, foetal position, presence or absence of caput and moulding is noted and compared with alert parameters.

Maternal vitals are taken every 4 hours and include blood pressure, temperature, pulse rate and urine for protein and ketones.

Number and duration and contraction should be monitored every 30 minutes in first stage and every 5 minutes in second stage. Any abnormal or alert finding needs to be verified for next 10 minutes and any alert parameter warrants action.

After assessing maternal and foetal well-being, internal examination, is done under aseptic technique to examine the cervix. In the active first stage of labour, "X" is plotted in the cell that matches the time and the cervical dilatation. In the second stage "P" is used to indicate when pushing begins. Vaginal examination should be done every 4 hours unless otherwise indicated.

Descent is assessed abdominally and "O" is plotted in the cell that matches the time and the level of descent. 5/5, 4/5, 3/5, 2/5, 1/5 and 0/5 are used to describe the foetal station. It should be done before vaginal examination and is repeated 4 hourly. Based on the findings and after informing the women, plan should be made by shared decision making.

In case of duration of active phase exceeding 12 hours, another LCG can be added.

Active Phase Arrest: Based on LCG, active phase arrest can be defined as cervical dilation ≥5 cm with ruptured membranes with no cervical **change as per LCG** despite adequate contractions or ≥6 hours of oxytocin administration but not adequate contractions and no cervical change.

Before diagnosing **Second stage arrest,** if materno-foetal conditions permit, allow at least 2 hours of pushing in multiparous women and at least 3 hours of pushing in nulliparous women.

Strategies of LCG implementation in labour wards: The implementation of new labour care guide involves Critical Review, Adaptation and Training of the residents and staff nurses for its usage. Team work is of paramount importance for its target universal implementation and handling of the guide in between shifts. Monitoring and evaluation should also be undertaken by regular evaluation of indicators like neonatal outcomes or caesarean rates.[7,8,9]

Key Points

The emphasis must be given on respectful maternal care and supportive intrapartum care, so as to give a positive experience to the labouring women. The duration of latent phase is not defined and expectant management in latent phase till maternal-foetal status reassuring. The active phase starts from 5 cm. Labour care guide i.e. the next generation partograph can replace WHO partograph after modifications as per local settings after appropriate research.

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Block your dates for 43rd Annual Conference 2021 to be held on 20th - 21st November, 2021

Calendar of Virtual Monthly Clinical Meetings 2021-22

28th May, 2021	B L Kapoor Hospital
25th June, 2021	All India Institute of Medical Sciences
30th July, 2021	Sitaram Bhartia Hospital
27th August, 2021	Army Hospital (Research & Referral)
24th September, 2021	Deen Dayal Upadhyay Hospital
29th October, 2021	PGIMSR & ESI Hospital
21st - 23rd November, 2021	43rd Annual Conference
26th November, 2021	MAMC & Lok Nayak Jai Prakash Narayan Hospital
31st December, 2021	Sir Ganga Ram Hospital
28th January, 2022	ABVIMS & Dr Ram Manohar Lohia Hospital
25th February, 2022	UCMS & Guru Tek Bahadur Hospital
25th March, 2022	VMMC & Safdarjung Hospital
29th April, 2022	LHMC & Smt. Sucheta Kriplani Hospital
27th May, 2022	Apollo Hospital

- Monthly Clinical Meeting Scheduled on 30th April, 2021 was postponed due to challenges brought on by the surge in COVID 19 cases.
- To encourage the participation of AOGD members in the Monthly AOGD Meetings, from the next monthly meeting we have planned to conduct a quiz based on the articles published in the same month's bulletin. First two winners will be awarded attractive prizes

Intrapartum Foetal Monitoring: The Art of Interpretation

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The goal of intrapartum foetal surveillance is to detect potential foetal decompensation and to allow timely and effective intervention to prevent perinatal/neonatal morbidity or mortality. Foetal heart rate (FHR) characteristics can be assessed, and the fact that changes in foetal heart rate precede brain injury constitutes the rationale for FH monitoring. Timely response to abnormal foetal heart patterns might be effective in preventing brain injury.[1] Foetal heart rate monitoring can be used to see if foetus is well oxygenated. Obstetric conditions like hypertensive disorders, IUGR, preterm birth predisposes foetus to poor outcome but account for small proportion of asphyxial injury. In a study of term pregnancies with foetal asphyxia, 63% had no known risk factors.[2]

During the contractions of normal labour there is a decrease in uteroplacental blood flow and a subsequent increase in foetal pCO_2 and a decrease in pO_2 and pH. In the healthy foetus, these values do not fall outside critical thresholds, and the foetus does not display any changes in heart rate characteristics. However, in the foetus with compromised gas exchange, there may be an increase in pCO_2 and a decrease in pO_2 and pH which exceed critical thresholds and the foetus may display changes in heart characteristics.[1] Thus, FHR monitoring can be used to determine if a foetus is well oxygenated. As the FHR is sensitive to hypoxaemia (reduced systemic pO2) and hypoxia (reduced oxygen in the tissues), but lacks specificity for the development of acidosis (increased acid H^+ within the tissues), the clinically important end point of hypoxia, FHR monitoring even with secondary tests would result in an increase in the operative delivery of nonacidotic babies.[3]

Intermittent auscultation (IA) - Intermittent auscultation of the foetal heart rate is still used in low resource setting in women at low risk of complications in established first stage of labour. Intermittent auscultation should be carried out immediately after a contraction for at least 1 minute, at least every 15 minutes, and recorded as a single rate. Palpate the maternal pulse hourly, or more often if there are any concerns, to differentiate between the maternal and foetal heartbeats.[4] If there is a rising baseline FHR or decelerations are suspected on intermittent auscultation, intermittent auscultation should be carried out more frequently, for example after 3 consecutive contractions initially. If a rising baseline or decelerations are confirmed, further actions should include: continuous CTG monitoring.[4]

SOGC recommends intermittent auscultation in healthy women and recommend against foetal heart admission tracing.

Electronic foetal heart monitoring (EFM) - The evidence for the benefits of continuous CTG monitoring, as compared with intermittent auscultation, in both low and high-risk women is scientifically inconclusive Meta-analysis of data on EFM has led to two significant observations. First, EFM compared with IA has not been shown to improve long-term foetal or neonatal outcomes as measured by a decrease in morbidity or mortality.[1] Continuous EFM during labour is associated with a reduction in neonatal seizures but with no significant differences in long-term sequelae, including cerebral palsy, infant mortality, and other standard measures of neonatal well-being. Secondly, EFM is associated with an increase in interventions, including Caesarean section, vaginal operative delivery, and the use of anaesthesia.[1] In spite of the lack of evidence regarding benefit, this procedure has become standard of care in many countries.

Continuous CTG monitoring should be considered in all situations where there is a high risk of foetal hypoxia/acidosis, whether due to maternal health conditions (such as vaginal haemorrhage and maternal pyrexia), abnormal foetal growth during pregnancy, epidural analgesia, meconium-stained liquor, or the possibility of excessive uterine activity, as occurs with induced or augmented labour. Continuous CTG is also recommended when abnormalities are detected during intermittent foetal auscultation or if there is delay in first or second stage of labour, and also in hypertension.[4]

Prolonged monitoring in maternal supine recumbent position should be avoided. The lateral recumbent, half-sitting, and upright positions are preferable alternatives. In many countries throughout the world paper speed of 1 cm/min is used. Inadvertent use of paper scales to which the staff is unaccustomed may lead to erroneous interpretations of CTG features. For example, at 3 cm/min variability appears reduced to a clinician familiar with the 1 cm/min scale, while it may appear exaggerated in the opposite situation.[5]

Reviewing and interpreting the cardiotocography trace - 4 features of foetal heart rate have to be assessed to review CTG trace. These are Baseline rate, variability, accelerations, and decelerations.

1. **Baseline** - The baseline must be for a minimum of 2 minutes in any 10-minute segment.
   - *Normal FHR baseline*: 110–160 beats per minute. Preterm foetuses tend to have values toward the upper end of this range and post-term foetuses towards the lower end.[5]
   - *Tachycardia*: FHR baseline is greater than 160 beats per minute. Maternal pyrexia is the most frequent cause of foetal tachycardia, and it may be of extrauterine or intrauterine infection. Epidural analgesia may also cause a rise in maternal temperature resulting in foetal tachycardia. In the initial stages of a nonacute foetal hypoxemia, catecholamine secretion may also result in tachycardia. Other less frequent causes are the administration of beta-agonist drugs like terbutaline, parasympathetic blockers like atropine, and foetal arrhythmias such as supraventricular tachycardia.[6]
   - *Bradycardia*: FHR baseline is less than 110 beats per minute. Values between 100 and 110 bpm may occur in normal foetuses, especially in postdate pregnancies. Although a baseline foetal heart rate between 100 and 109 beats/minute is a non-reassuring feature, continue usual care if there is normal baseline variability and no variable or late decelerations with it.[4]
2. **Variability -** Variability refers to the fluctuations in the baseline FHR. It is determined by choosing one minute of a 10-minute section of the FH tracing with at least 2 cycles/minute (normal is 2 to 4 cycles/ minute) that is free from accelerations and decelerations, and measuring the difference between the lowest and highest rate.[1] Normal or reassuring: 5 to 25 beats/minute.

   In order to exhibit a normal FHR variability the foetus requires an intact cerebral cortex, midbrain, vagus nerve, and cardiac conductive tissues. Even in the presence of decelerations or bradycardia a foetus that exhibits normal baseline FHR variability has a very low risk of acidaemia, immediate death, or asphyxial brain injury.[3]

   Reduced variability– is defined as bandwidth amplitude below 5 bpm for more than 50 minutes in baseline segments [7], or for more than 3 minutes during decelerations.[8]

   Causes of reduced variability - Reduced variability can occur due to central nervous system hypoxia/ acidosis and resulting decreased sympathetic and parasympathetic activity, but it can also be due to previous cerebral injury, infection, administration of central nervous system depressants or parasympathetic blockers. During deep sleep, variability is usually in the lower range of normality, but the bandwidth amplitude is seldom under 5 bpm. Following an initially normal CTG, reduced variability due to hypoxia is very unlikely to occur during labour without preceding or concomitant decelerations and a rise in the baseline.[6] In a recent systematic review minimal or undetectable FHR variability was the most consistent predictor of new-born acidaemia.[9]

   Increased variability (saltatory pattern)- is defined as bandwidth value exceeding 25 bpm lasting more than 30 minutes. According to NICE guidelines, variability of > 25 beats/minute for 15 to 25 minutes is a non-reassuring feature.[4]

   The pathophysiology of this pattern is incompletely understood, but it may be seen linked with recurrent decelerations, when hypoxia/acidosis evolves very rapidly. It is presumed to be caused by foetal autonomic instability/hyperactive autonomic system.[6]

   The clinical significance and interpretation of FHR variability has been reviewed and summarised as follows.[10]

- If the FHR variability is normal there is a limited role for foetal acid base analysis.
- Unless foetal asphyxia can be reliably excluded, intermittent or sustained reductions in FHR variability may signal the onset of decompensation in the presence of intrapartum FHR decelerations.
- A foetus with a previously normal FHR variability will not switch to reduced or absent variability during labour without the input of asphyxial FHR decelerations[3]

3. **Accelerations** –Abrupt (onset to peak in less than 30 seconds) increases in FHR above the baseline, of more than 15 bpm in amplitude, and lasting more than 15 seconds but less than 10 minutes. Before 32 weeks' gestation, their amplitude and frequency may be lower (10 seconds and 10 bpm of amplitude).[6]

   Most accelerations coincide with foetal movements and are a sign of a neurologically responsive foetus that does not have hypoxia/acidosis. The presence of foetal heart rate accelerations, even with reduced baseline variability, is generally a sign that the baby is healthy. The absence of accelerations on an otherwise normal cardiotocograph trace does not indicate foetal acidosis.[4] After 32-34 weeks, with the establishment of foetal behavioural states, accelerations rarely occur during periods of deep sleep, which can last up to 50 minutes.[7] Prolonged acceleration is ≥ 2 minutes and < 10 minutes in duration. Acceleration of ≥ 10 minutes is a baseline change. The presence of accelerations is a normal/reassuring finding.

4. **Decelerations –** decreases in the FHR below the baseline, of more than 15 bpm in amplitude, and lasting more than 15 seconds.

   Following points should be noted while describing deceleration[4]

   - their timing in relation to the peaks of the contractions
   - the duration of the individual deceleration
   - whether or not the foetal heart rate returns to baseline
   - how long they have been present for
   - whether they occur with over 50% of contractions
   - the presence or absence of a biphasic (W) shape
   - the presence or absence of shouldering
   - the presence or absence of reduced variability within the deceleration.[4]

   Early decelerations - are shallow, short-lasting, with normal variability within the deceleration and are coincident with contractions. They are believed to be caused by foetal head compression and do not indicate foetal hypoxia/acidosis.[6] These decelerations are immediate and sharp.

   Variable decelerations (V-shaped) - decelerations that exhibit a rapid drop (onset to nadir in less than 30 seconds), good variability within the deceleration, rapid recovery to the baseline, varying size, shape and relationship to uterine contractions.[6] The decrease in FHR is 15 beats per minute or greater, lasting 15 seconds or greater, and less than 2 minutes in duration.[2]

   Variable decelerations constitute the majority of decelerations during labour, and they translate a baroreceptor-mediated response to increased arterial pressure, as occurs with umbilical cord compression. They are seldom associated with an important degree of foetal hypoxia/acidosis, unless they evolve to exhibit a U-shaped component, reduced variability within the deceleration, and/or their individual duration exceeds 3 minutes.[6]

   Variable decelerations may be divided into two groups[1]

   - Uncomplicated variable decelerations consist of an initial acceleration, rapid deceleration of the FHR to the nadir, followed by rapid return to the baseline FHR level with secondary acceleration. Uncomplicated variable decelerations are not consistently shown to be associated with poor neonatal outcome (reduced 5-minute Apgar scores or metabolic acidosis.
   - Complicated variable decelerations with the following features may be indicative of foetal hypoxia:
   - Deceleration to less than 70 bpm lasting more than 60 seconds
   - Loss of variability in the baseline FHR and in the trough of the deceleration
   - Biphasic deceleration
   - Prolonged secondary acceleration (post deceleration smooth overshoot of more than 20 bpm increase and/ or lasting more than 20 seconds.[1]

Late decelerations (U-shaped and/or with reduced variability) – decelerations with a gradual onset and/or a gradual return to the baseline and/or reduced variability within the deceleration. Gradual onset and return occur when more than 30 seconds elapse between the beginning/end of a deceleration and its nadir. When contractions are adequately monitored, late decelerations start more than 20 seconds after the onset of a contraction, a nadir after the acme, and a return to the baseline after the end of the contraction[6]. Late decelerations are caused by myocardial depression. It is widely believed that the purpose of these responses is to reduce myocardial workload and oxygen demand.[3] In the presence of a tracing with no accelerations and reduced variability, the definition of late decelerations also includes those with an amplitude of 10-15 bpm.[6]

Prolonged decelerations - (lasting more than 3 minutes) These are likely to include a chemoreceptor-mediated component and thus to indicate hypoxemia. Decelerations exceeding 5 minutes, with FHR maintained <80 beats per minute and reduced variability within the deceleration, are frequently associated with acute foetal hypoxia/ acidosis [8] and require emergent intervention.

Sinusoidal pattern - Visually apparent, smooth, sine wave-like undulating pattern in FHR baseline with a cycle frequency of 3–5 per minute which persists for 20 minutes or more.[2] This pattern coincides with absent accelerations.[6] Sinusoidal pattern occurs in association with severe foetal anaemia, as is found in anti-D allo-immunisation, foetal-maternal haemorrhage, twin-to-twin transfusion syndrome and ruptured vasa praevia.[6]

Pseudo-Sinusoidal Pattern - It resembles the sinusoidal pattern, but with a more jagged "saw-tooth" appearance, rather than the smooth sine-wave form. It lasts for less than 30 minutes and is there is normal pattern before and after it.

Normal contractions last 45-120 seconds in total duration

Tachysystole - represents an excessive frequency of contractions and is defined as the occurrence of more than 5 contractions in 10 minutes, in two successive 10-minute periods, or averaged over a 30-minute period.[2,6]

Based on all above factors a tracing is classified into 3 categories.

ACOG Guidelines classify into category I, II, III. category 1, normal FHR pattern predictive of normal acid base status at the time of observation; category II, intermediate FHR pattern not classified as category I or III, but not predictive of abnormal acid base status; and category III, abnormal FHR pattern associated with abnormal acid base at the time of observation.[3] Nice guidelines classify tracing based on these features as normal, suspicious and pathological. Overall major protocols are same for all the guidelines.

Table 1: NICE(2017) classification of CTG features

Description	**Feature**		
	Baseline (beats/minute)	**Baseline variability (beats/minute)**	**Decelerations**
Reassuring	110 to 160	5 to 25	None or early Variable decelerations with no concerning characteristics* for less than 90 minutes
Non-reassuring	100 to 109t OR 161 to 180	Less than 5 for 30 to 50 minutes OR More than 25 for 15 to 5 minutes	Variable decelerations with no concerning characteristics for 90 minutes or more OR Variable decelerations with any concerning characteristics* in up to 50% of contractions for 30 minutes cv more OR Variable decelerations with any concerning characteristics* in over 50% of contractions for less than 30 minutes OR Late decelerations in over 50% of contractions for less than 30 minutes, with no maternal or fetaL clinical risk factors such as vaginal bleeding or significant meconium
Abnormal	Below 100 OR Above 180	Less than 5 for more than 0 minutes OR More than 25 for more than 25 minutes OR Sinusoidal	Variable decelerations with any concerning characteristics* in over 50% of contractions for 30 minutes (or less if any maternal or fetal clinical risk factors [see above]) OR Late decelerations for 30 minutes (or less if any maternal or fetal clinical risk factors) OR Acute bradycardia, or a single prolonged deceleration lasting 3 minutes or more

Re-evaluation of the tracing should be carried out at least every 30 minutes. While evaluating CTG tracing other parameters like gestational age, medication administered and other medical conditions also should be kept in mind. Do not apply them in isolation and intervene for foetal compromise on the basis of isolated FHR tachycardia, reduced variability, lack of acceleration, or uncomplicated variable decelerations.[3]

Management- Normal tracing –One important feature of normal CTG tracing is, periods of reduced FHR variability, which alternate with periods of increased variability with or without accelerations: so-called cycling behaviour. Foetal cycling activity is a key behavioural state of the normal term or near-term foetus. It suggests neurological integrity and the absence of significant acidaemia or acidosis[3]. When a normal tracing is identified, it may be appropriate to interrupt the EFM tracing for up to 30 minutes to facilitate periods of ambulation, bathing, or position change.[1]

Suspicious - If there is 1 non reassuring and 2 reassuring feature[4]. For example, if FHS is 140, variability is good but there are variable decelration with no cocerning characterstics. Any reversible cause of compromise should be identified and modified (correction of maternal hypotension, treatment of excessive uterine contractility).[1] Further foetal evaluation by means of scalp stimulation (>34 weeks) is recommended.

Digital foetal scalp stimulation during a vaginal exam provides an indirect assessment of acid-base status. The goal is to elicit a sympathetic nerve response, and an acceleratory response to stimuli may be indicative of a normoxic fetus.[11] An acceleration of 15 bpm amplitude with a duration of 15 seconds has been shown to have a very high negative predictive value (i.e., normal tracing) and very high sensitivity with regard to the absence of foetal acidosis[1] Digital scalp stimulation is best avoided during a deceleration, as the deceleration reflects a vagal response that prevents any sympathetic nerve response during scalp stimulation.[1]

When an atypical tracing is apparent, intrauterine resuscitation should be commenced to improve uterine blood flow, umbilical circulation and maternal oxygen saturation. *Steps to accomplish this include the following:*

- Stop or decrease oxytocin
- Change maternal position of left or right lateral
- Improve hydration with IV fluid bolus
- Perform vaginal examination to relieve pressure of presenting part off cord
- Administer oxygen by mask
- Consider amnioinfusion if variable decelerations present
- Reduce maternal anxiety (to lessen catecholamine impact)
- Coach women to modify breathing or pushing techniques[1]

Ongoing foetal evaluation is required, and delivery should be considered if the situation persists over time or if the pattern deteriorates.[1]

Pathological - 1 abnormal feature OR 2 non-reassuring features.[4] For example late deceleration for 30 minutes with variability between 5-25 for 30-50 minutes.

In such cases exclude acute events (for example, cord prolapse, suspected placental abruption or suspected uterine rupture) Correct any underlying causes, such as hypotension or uterine hyperstimulation Start 1 or more conservative measures.[4] In the presence of an abnormal foetal heart rate pattern, usually operative delivery should be undertaken promptly unless there is clear indication of normal foetal oxygenation by means of scalp pH assessment or spontaneous delivery is imminent. Scalp sampling should not be considered in the case of prolonged deceleration of greater than three minutes. Usual action in the presence of an abnormal tracing includes preparing for operative delivery (operative vaginal delivery or Caesarean section).[1]

During the second stage of labour, due to the additional effect of maternal pushing, hypoxia/acidosis may develop more rapidly. Therefore, urgent action should be undertaken to relieve the situation, including discontinuation of maternal pushing, and if there is no improvement, delivery should be expedited.[6]

Limitations of Cardiotocography - suspicious and pathological tracings have a limited capacity to predict metabolic acidosis and low Apgar scores, i.e. a large percentage of cases with suspicious and pathological tracings do not have these outcomes. While there is a strong association between certain FHR patterns and hypoxia/acidosis, their capacity to discriminate between newborns with or without metabolic acidosis is limited. Thus, they are sensitive indicators, but have a low specificity and low positive predictive value.[6]

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Labour Analgesia: Where Epidural is not Feasible

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Introduction

The first stage of labour is associated with visceral pain transmitted via nerve roots T10 to L1 and in second stage of labour, pain is from uterine contractions and from distension of vaginal and perineal tissues transmitted through nerve roots S2 to S4. Labour pains during first stage of labour produces neuroendocrine stress response leading to hyperventilation, increased blood pressure, diminished uterine perfusion and impaired uterine contractility[1]. In addition to this, labour pains are also associated with emotional distress and women are more likely to develop posttraumatic stress disorder and postpartum depression[2]. WHO and American College of Obstetrician and Gynaecologists (ACOG) recommends that labour analgesia should be offered to all healthy pregnant women requesting for pain relief in labour.[3] Multiple pharmacological and non- pharmacological options are available for labour analgesia.

Pharmacological Options for Labour Analgesia

Drugs can be administered systemically or regional i.e. spinal epidural, combined spinal-epidural and pudendal block. Bilateral pudendal nerve block involves the infiltration of 1% lidocaine without epinephrine around pudendal nerve at the level of ischial spine. It provides relief in pain arising from vaginal and perineal distension during second stage of labour and pain arising from low forceps delivery.[4] It does not interfere with uterine contraction and hence does not interfere with progress of labour.[5]

Epidural Analgesia

Epidural analgesia is a proven method for relieving pain in healthy pregnant woman requesting pain relief during labour. It requires more expertise and equipment to monitor, detect and manage any undesirable effect of the procedure. An anaesthetist with training in epidural insertion and management of complications associated with epidural, nurse trained in for monitoring woman and an obstetrician trained in performing instrumental birth are required for providing epidural analgesia. To ensure safety of the mother and baby, epidural analgesia should only be offered in the settings with appropriate resources.

Inhalational Analgesia

Entonox used as a mixture of 50% nitrous oxide and 50% oxygen gas for labour analgesia. It is easy to administer, provides pain relief to a significant degree and is a good alternative option where facility of epidural analgesia is not there. Its safety is well proven. The most common side effects are nausea, vomiting and light-headed. It does not accumulate in mother or foetus and is eliminated quickly by the lungs. Also, it does not affect the progress of labour.[6]

Patient Controlled Analgesia (PCA)

Patient controlled intravenous (IV) analgesia is self administration of a programmed dose of IV medication with lockout intervals between doses. PCA is the most effective option for facility where epidural analgesia is not available. It provides better pain control and rapid onset of analgesia compared with bolus administration.

Short acting opioids like Remifentanil and fentanyl are used for PCA[7]. Remifentanil is given in bolus of 15 to 50 mcg with lockout times of 1 to 5 minutes. It has rapid onset of action and is an ultra short acting drug. It provides better pain relief than long acting opioid analgesics.[8,9] But is a potent respiratory depressant and has been observed to cause more drowsiness than pethidine. Respiratory rate and oxygen saturation monitoring needs to be done.[10] Fentanyl PCA also has rapid onset of action and is short acting (although longer than remifentanil). It is given as loading dose of 50 -100mcg with 10-25 mcg demand doses and lockout time of 5 to 10 minutes.

Intermittent Parenteral Opioids (intramuscular/ intravenous route)

Parenteral opioids provide some form of pain relief in labour. WHO recommends parenteral opioids such as fentanyl, diamorphine and pethidine for pain relief during labour. Short acting opioids have few undesirable side effects.

A recent Cochrane review[11] found that on comparing intramuscular pethidine in dose of 50mg/ 100mg with a saline placebo, pethidine reduced pain score to 40mm on a scale of 100mmm; 30 minutes after its administration. Pain relief was rated as good / fair after 1 hour of administration. Its administration was associated with nausea, vomiting and drowsiness. However, no long term side effects have been noted with opioid analgesia. Anti-emetics may be given to treat nausea/ vomiting. Neonatal respiratory depression can occur as opioids cross the placenta and hence naloxone should always be available[12]. The effect on the neonate is particularly important when the drug is given within 2 hours of delivery. Opioids should not be administered near delivery to avoid sedation while parturient is pushing and to avoid foetal effects[3]. Pethidine, diamorphine or other opioids may interfere with breastfeeding.

Cochrane review[11] found evidence suggestive of better pain relief with diamorphine, fentanyl and remifentanil rather than with pethidine. Diamorphine lowered more pain scores at 30 and 60 minutes after administration and was associated with less nausea and vomiting. Both the groups required prochlorperazine as anti-emetic. As compared to pethidine, pain scores were reduced by fentanyl at 1 hour of administration but more doses of fentanyl were required. Less maternal sedation was seen with fentanyl. Remifentanil causes more drowsiness than pethidine. More number of patients reported poor pain relief with tramadol compared to pethidine. Women should not enter a birthing pool within 2 hours of opioid administration or if they feel drowsy.

Acetaminopen and Non steroidal anti inflammatory drugs (NSAIDS): NSAIDS are avoided as they can precipitate premature closure of ductus arteriosus[13]. Two randomised control trials found significantly reduced visual analog pain scores with paracetamol infusion compared to placebo along with reduced need of rescue medication.[14,15] In another RCT comparing intravenous acetaminophen with intravenous morphine, similar reduction in pain scores and similar side effect profiles were seen with both but more patients needed rescue dose with acetaminophen.[16]

Non pharmacological pain relief options: They do not make pain disappear instead help woman cope labour pains. They are unlikely to be harmful.

Self- initiated soothing activities like walking, moving during labour, upright positions have shown benefit. Evidence suggest that progressive muscle relaxation and breathing techniques like slow breathing, counting breath, reciting a mantra in rhythm with breathing provide pain relief during latent phase of labour.[17] Women practicing relaxation, breathing and yoga postures experienced less pain during labour.[18,19] According to a recent Cochrane review, there is low quality evidence to suggest reduced pain intensity in latent phase of labour and greater satisfaction in pain relief with relaxation techniques (such as guided imagery, breathing exercises), yoga and music therapy compared to usual care. Use of birth ball reduces pain score. In sitting position on ball, pressure on perineum blocks nociceptive fibres and reduces pain sensation.[20]

Labour companion (such as doula) refers to a trained companion during labour who helps the woman cope up with labour pains by guidance, reassurance, encouragement, soothing touch, hand holding and massage.[4] Massage reduces pain scores in first stage of labour.[21] Reduced muscle tension in the body by massage is associated with decreased pain intensity in first stage of labour and a positive childbirth experience as suggested in a recent Cochrane review.[21] Superficial heat application of warm packs/ towels on parturient's back, lower abdomen, groin during active phase of labour provide pain relief and reduce labour discomfort.[22]

Labouring in warm shower, water birth helps in coping labour pains and reduce VAS pain scores.[23] Water immersion reduces labour pain and enhances relaxation.[24] ACOG recommends to offer water immersion to parturient during first stage of labour.[25] For women labouring in water, the temperature of the woman and the water should be monitored hourly to ensure that the woman is comfortable and not becoming pyrexial. The temperature of the water should not be above 37.5°C. Baths and birthing pools should be kept clean using a protocol agreed with the microbiology department and, in the case of birthing pools, in accordance with the manufacturer's guidelines. Music (audio analgesia) is for a pleasant distraction and decreases pain perception. Evidence supports that pain intensity is reduced by acupressure, Aromatherapy, acupuncture, acupressure, sterile water subcutaneous injections also help reduce labour pains. Hypnosis prevents pain experience reaching the conscious mind. Transcutaneous electric nerve stimulation and biofeedback has not shown any benefit in labour analgesia.

To summarize, WHO recommends labour analgesia should be offered to all healthy pregnant woman requesting for pain relief in labour. Bilateral pudendal nerve block helps in relieving pain in second stage of labour and low forceps delivery. Epidural analgesia is a proven method for relieving labour pains but it requires more expertise and equipment. Inhalational analgesia and patient controlled analgesia is a good alternative option where facility of epidural analgesia is not there. WHO recommends fentanyl, diamorphine and pethidine to be used for pain relief during labour.[32] Short acting opioids should be preferred. Naloxone and anti emetic should be available. Opioids should not be administered near delivery to avoid sedation while parturient is pushing and to avoid fetal effects. Non-pharmacological pain relief options like progressive muscle relaxation, breathing, music, mindfulness and Manual techniques, such as massage or application of warm packs are recommended by WHO to help woman cope up labour pains.

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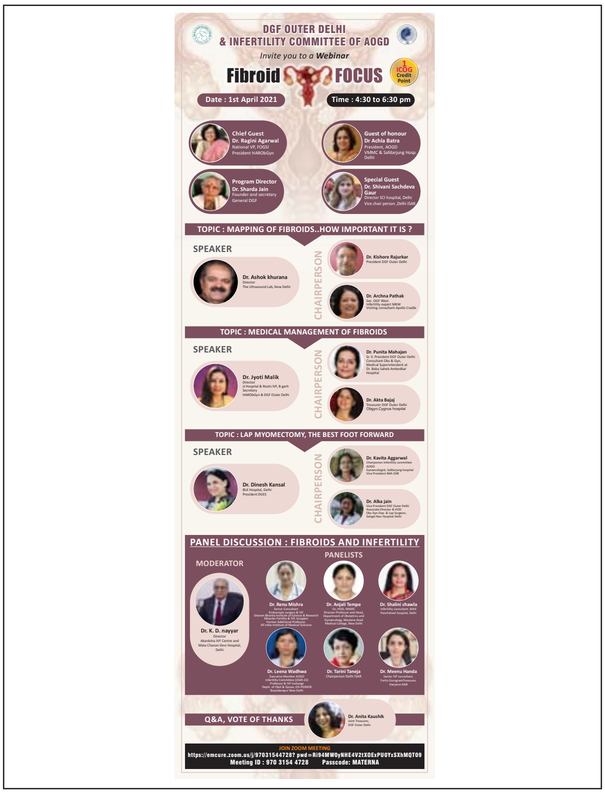
Events held under the aegis of AOGD in April 2021

Safdarjung Hospital took over AOGD Secretariat



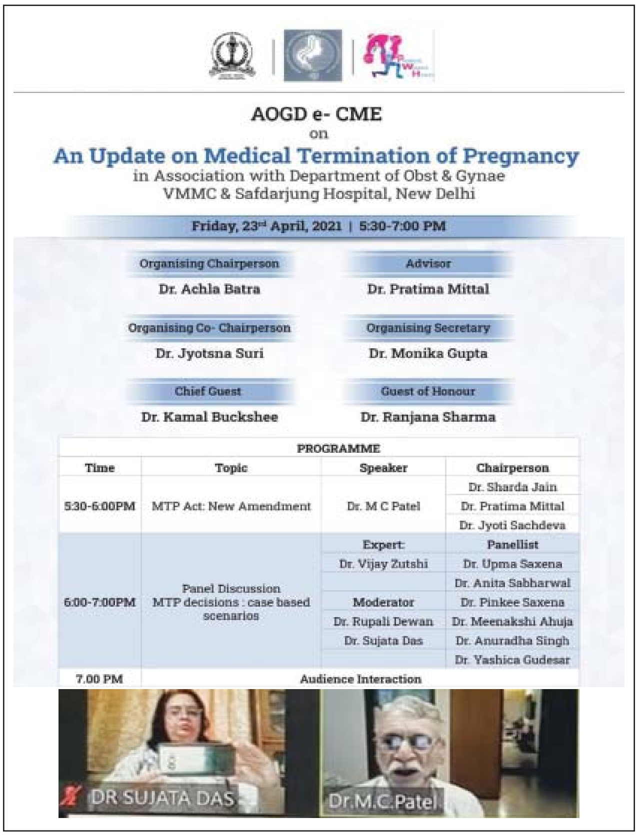
Fibroid FOCUS, Webinar on 1st April, 2021

Managing Committee Meeting held on 8th April, 2021

Webinar by Gynae Forum Dwarka & Multidisciplinary Committee of AOGD

Events held under the aegis of AOGD in April 2021

Public Awareness Programme
on Breast and Cervical Cancer Screening



An Update on Medical Termination of Pregnancy, e- CME

Virtual Meeting of AOGD Subcommittee Chairpersons held on 20th April, 2021

Events Held, April 2021

1. Webinar titled "Fibroid Focus" was organized by DGF, Outer Delhi and Infertility committee of AOGD on 1st April 2021. Dr Ashok Khuranna deliberated on "Mapping of fibroids: How important it is?" Medical management of fibroids was discussed by Dr Jyoti Malik and Dr Dinesh Kansal talked about "Lap Myomectomy: The best foot forward". The lectures were followed by a Panel discussion on "Fibroids and Infertility".
2. On 2nd April 2021, "FAQs on Care of Pregnant Women" was organized by Sir Ganga Ram Hospital under the aegis of AOGD.
3. Virtual AOGD Managing Committee Meeting was held on 8th April 2021. The meeting was attended by the executive members and chairpersons of AOGD subcommittees.
4. A Webinar was organized by Gynae Forum Dwarka in association with Multidisciplinary Committee of AOGD on 10th April 2021. "Evaluation of Cases of Breast Lump" was discussed by Dr Sunil Kumar Gupta and Dr Nikita Banerjee deliberated on, "Breast Cancer and Contraception".
5. Public Awareness Programme on Breast and Cervical Cancer Screening was held on 15th April 2021. It was organized by Lioness Club in association with Multidisciplinary Committee of AOGD. Dr Geeta Kadayaprath explained "Breast Self Examination & Early Detection of Cancer" and Dr Swasti discussed "Cervical Cancer Screening".
6. Virtual Meeting of AOGD Subcommittee Chairpersons was held 20th April 2021.
7. An Update on Medical Termination of Pregnancy, e- CME was held in association with the Department of Obstetrics and Gynaecology, VMMC and Safdarjung Hospital, on 23rd April, 2021. New amendment in the MTP act was discussed by Dr M C Patel and panel discussion on "MTP decision: Case Based Scenarios", was moderated by Dr Rupali Dewan and Dr Sujata Das. The CME was a huge success with 170 participants.

Forthcoming Events May 2021

1. Web CME on "Management of COVID in Pregnancy: A Medical perspective for Obstetrician" is planned to be held on 7th May 2021 between 6-8pm by AOGD Safe Motherhood & QI Committee.
2. Virtual CME on "Prevention & Management of Thalassemia Major: An Obstetrician's Perspective" will be held on 8th May 2021 between 3-5pm by AOGD Foetal Medicine and Genetics Committee.
3. Online panel discussion on "Management of Gynaecologic Cancers Amidst the COVID 19 Pandemic" will be organised by AOGD Oncology Subcommittee on 15th May, 2021.
4. Public Forum on "5 tips to Stay Safe from Anaemia during Pregnancy" will be conducted by Chairperson Multidisciplinary Committee AOGD Dr Shashi Lata Kabra on 15th May, 2021.
5. A Public Forum on "Pregnancy and Postpartum Care in COVID Era" will be organised by Safdarjung Hospital in aegis of AOGD on 17th May, 2021.
6. A webinar on "Thyroid Disorders in Pregnancy" will be organised by AOGD Adolescent Subcommittee on 18th May, 2021.
7. Online Group Discussion on "Mental and Social Wellbeing of Health Care Workers in COVID Era: Challenges and Solution" is planned for 21st May, 2021 between 5-7 pm.
8. E- CME on "MTP Act Old and New" is planned on 27th May, 2021 between 4 to 6pm, by Delhi Gynaecologist Forum, North-West, under the aegis of AOGD.
9. Virtual AOGD Monthly Clinical Meeting is planned for 28th May, 2021 by B L Kapoor Hospital.
10. Sister Shivani will give an Inspirational Talk virtually on 29th May, 2021.
11. RCOG in association with AOGD and NARCHI will organise a webinar on "Evidence Based Management of Intrahepatic Cholestasis of Pregnancy" on 30th May, 2021.
12. "Trials and Tribulations with Hysteroscopy", A webinar by AOGD Endoscopy Subcommittee will be held on 4th June, 2021

Induction of Labour: Monitoring and Management of Complications

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The process of artificial stimulation of uterus to start labour is known as induction of labour. Induction of labour refers to techniques for stimulating uterine contractions to achieve vaginal delivery prior to the spontaneous onset of contractions. Between 1990 and 2018, the frequency of labour induction almost tripled rising from 9.5% in 1990 to 27% (2018).[1] It is usually performed by administering oxytocin or prostaglandins to the pregnant woman, or by artificially rupturing the amniotic membranes. In low and middle income countries the rates are generally lower, but in some settings, they can be as high as those observed in the high income countries.[2,3] Induction of labour may increase the need for operative interference and certain complications like precipitate labour, uterine hyperstimulation, foetal distress, failed induction, cord accidents, and post partum haemorrhage, hence meticulous monitoring of labour is required.

Monitoring in Induction of Labour (IOL)

Before Induction

a. *Indication of IOL* should be thoroughly reviewed and documented. Though there are no clear cut indications of elective induction in India but Meta-analysis of six cohort studies in more than 66,000 women undergoing elective labour induction at 39 weeks were compared with those of more than 584,000 women undergoing expectant management beyond that gestational age, elective induction was associated with a significantly lower risk of caesarean delivery, maternal peripartum infection, and adverse perinatal outcomes.[4]
b. *Risks and benefits of IOL* should be counselled and exact success rate of IOL and alternative options should be sought for.
c. *Pre induction maternal and foetal assessment*- reconfirming the period of gestation through reliable methods, foetal presentation, Bishop's assessment and preinduction non stress test for foetal well being should be done.
d. *Method of IOL and exact duration of IOL*- cervical ripening methods (eg. Dinoprostone gel, misoprostol) would be required for women with unfavourable cervix (bishops score ≤ 6) but in ripe cervix (bishop >6) oxytocin can be used as method of induction.[5]

During Induction and Labour

a. *Reassessment of patient* - Bishop's score should be assessed 6 hours after vaginal PGE_2 tablet or gel insertion and 24 hour after the controlled release pessary insertion or earlier if patient starts having good uterine contraction. If oxytocin is used as method of induction the target is to achieve strong uterine contractions every 2-3 minutes or a uterine activity of 200-250 Montevideo units.[6]
b. *Monitoring of labour progress*- The duration of the latent phase of labour is longer in induced labour. In an observational study the total length of time from admission to delivery in women were 3- 4 hour prolonged than the patient who

CTG Trace

Category 1	**Category 2 ***	**Category 3**
No Intervention Is Required	Reassess the 3P's(power, Passage and Passesnger) Discontinue induction Rehydrate Left lateral position and oxygen	Immediate Intervention Arm if in labour or operative interference

*If category 2 CTG trace recover continue with induction if not consider as category 3

Fig 1: Action to be taken according to the CTG Tracing during IOL

Table 1: Complications of IOL and their Management

S.No.	Complications	Management
1.	*Uterine Hypercontractibilty/ Tachysystole* Incidence- 1 to 5% Defined as[9-11] • four or more contractions in 10 minutes over a 30 minutes period or • contractions lasting more than 2 minutes in duration or • contraction of normal duration occurring within 60 sec of each other.	• *Category 1 CTG*- analgesics, continuous foetal heart monitoring, reducing the syntocinon drip rate to previous rate. • *Category 2 CTG*- same as category 1, discontinue the induction and reassess after 30 minutes. • *Category 3 CTG*- same as CTG 2, consider terbutaline (250 micrograms IV/SC) or sublingual GTN .[12] if foetal compromise continued then expedite the birth (operative interference)
2.	*Cord Accidents* • Incidence – 0.4%[13] • One of the potential risks at the time of labour especially when induction done in free floating head. • At the time of preliminary vaginal examination the umbilical cord presentation should be looked for.	• Manual reposition is not recommended. • Minimal handling of cord outside vagina to avoid vasospasm. • Disengage the foetal head by either maternal knee chest position or filling the bladder. • Expedite delivery – if dilated vaginal if not caesarean.
3.	*Failed Induction* • Though there is no general consensus and incidence for this outcome but this term is generally used as an indication of caesarean delivery where after induction, vaginal delivery is unlikely. • It is defined as failure to generate regular contractions and cervical change after at least 24 hours of oxytocin administration, with artificial membrane rupture as soon as feasible and safe. • The time devoted to cervical ripening is not included when calculating the length of induction or diagnosing failed induction.[9,10]	• Further attempt to prolong the induction is as per clinician discretion and woman's wishes. • The method and timing of IOL should be chosen as the bishop's score of the patient.
4.	*Uterine Rupture* • Women with scarred uterus are prone to this complication. • Proper risk assessment should be done before inducing labour in scarred uterus. • The risk of rupture is two times than the patients with spontaneous labour in women with scarred uterus.	• Misoprostol should not be used for cervical ripenining or induction (ACOG 2019, Level A) in women with scarred uterus • Clinicians should be aware that induction of labour using mechanical methods (amniotomy or Foley catheter) is associated with a lower risk of scar rupture compared with induction using prostaglandins. [RCOG 2015, Level D} • In cases with suspected scar dehiscence immediately wheel-in the patient for emergency caesarean section.
5.	*Infectious Morbidity* • Usually associated in women with prolonged rupture of membranes.	• The timing of rupture of membranes or amniotomy should be documented properly and antimicrobials should be started.[14,15]
6.	*Preciptate Labour and Post Partum Hemorhhage* • Usually occurs due to prostaglandins. • Atonic and traumatic PPH is common.	• Supervised delivery • Timely intervention • Adequate blood products arrangements. • Proper assessment and monitoring of labour during induction is important.
7.	*Amniotic Fluid Embolism* • In one retrospective series, the adjusted odds ratio was 1.8 (95% CI 1.2-2.7), but the absolute risk difference was small (10.3 per 100,000 births with medical induction versus 5.2 per 100,000 births without medical induction)[16]	• The inadvertent use of prostaglandins and oxytocics along with precipitant labour and predispose this catastrophe.
8.	*Hypersenstivity Reaction* • Though true allergic reactions are rare but a reported entity.	• Antihistaminics should be administered timely.

had expectant management but the duration of active labour remained comparable in two.[7]

c. *Monitoring the foetal heart-* continuous cardiotococgraphy (CTG) monitoring of induced labour is preferable. However if CTG is not available intermittent auscultation every 15 minutes in first stage and after every contraction in second stage is recommended.

The interpretations and management of labour is pre-requisite in successful outcome of induced labour. We generally use the three-tiered classification systems for categorizing the CTG trace into category I, II and III. Though there are many guidelines regarding the defining features of CTG trace but they all have a common agreement about the baseline heart rate, beat to beat variability and accelerations but a disagreement about the decelerations. Santo et al in a study found that ACOG group classified 81 % of tracings as category II, whereas the suspicious classification was only 52% in FIGO group and 33% in NICE group.[8] The action to be taken during IOL according to the CTG trace is shown in Figure 1

A. **Managing the complications of IOL**

Even though IOL is largely considered a safe procedure, it may be associated with maternal or foetal complications. The complications as well as their management are defined in Table 1.

Key Points

- Induction of labour should be done for an appropriate indication with an appropriate method.
- Strict monitoring during the procedure is important.
- Meticulous monitoring of induced labour can help in early detection of the complications so that timely interventions can be done.

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Third Stage of Labour: Prevention and Management of PPH

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"Third stage is the most unforgiving stage of labour, and in it there lurks more unheralded treachery than in both the other stages combined. The normal case can, within a minute, become abnormal and successful delivery can turn swiftly to disaster."

The third stage of labour commences with the completed delivery of the foetus and ends with the completed delivery of the placenta and its attached membranes. The average duration is 5-15 minutes.

The complications of third stage are- Postpartum Haemorrhage (PPH), retained placenta, and uterine inversion. Placenta accreta and its variants also may manifest for the first time during the third stage. Most complications of the third stage occur in low-risk women; therefore protocols and management strategies have to be in place to deal with these problems promptly when they arise.

PPH

A blood loss of 500 ml after vaginal delivery and 1000 ml after caesarean section is taken as primary PPH. It is classified as Minor PPH when loss is <1000 cc and major when loss is >1000cc.

PPH can lead to serious maternal morbidities like multi organ failure, multiple blood transfusions, hysterectomy and even death. About 25% of maternal deaths occur because of PPH (WHO). It also results in Iron deficiency anemia (with associated fatigue and newborn care difficulties) and prolongation of hospital stay.

Prevention of Postpartum Haemorrhage

Anticipation, preparedness, taking prophylactic measures, and vigilance for PPH are the cornerstones of PPH prevention. **Anticipation** involves knowing the risk factors which can cause PPH (Table 1) and be prepared with blood components and expert obstetrician at onset of labour.

Preparedness for PPH: PPH can occur unexpectedly also therefore in all cases of delivery preparedness for PPH is essential. This involves-

1. PPH trolley in labour room which should have everything required for management of bleeding patient (Table 2)
2. Training of labour room staff for estimation of blood loss and PPH Drill
3. Avoidance of routine episiotomy and performance of active management of third stage of labour (AMTSL)

Active management of the third stage of labour reduces the risk of PPH. The components of AMSTL are uterotonics at anterior shoulder delivery or immediately after the delivery of baby, delayed cord clamping and controlled cord traction (CCT) to deliver the placenta.

Uterine fundus should be assessed immediately after delivery of baby but uterine massage should be avoided before placental delivery. Uterotonic should be kept ready before the delivery in order to facilitate rapid administration.

Table 1: Risk Factors for PPH

Prenatal	Antenatal	Intranatal
Previous caesarean BMI>35, Age >40 year Large uterine myoma Bleeding disorder Grand multipaity History of PPH	Primiparity Macrosomia in baby Multiple pregnancy Hydramnios Coagulopathy Platelet <50,000/ cumm APH Gestational hypertension, PE Anaemia Placenta previa, placenta accrete spectrum	Fever Prolonged labour Operative vaginal delivery Episiotomy Caesarean

Table 2: Components of PPH Trolley

IV fluids- Lactated Ringer, saline Uterotonic drugs (In fridge): Oxytocin, Carboprost, and ergometrine Misoprostol tablets	I/V set, Venflon, Syringes, needles, adehisive tape Foleys catheters, condoms, silk thread Oxygen mask	Vials for blood collection for haemogram, coagulation profile, blood grouping & cross matching Requisition forms for blood components & investigation

Oxytocin (10 IU), administered intramuscularly after delivery of the anterior shoulder/baby, is the preferred medication and route for the prevention of PPH in low-risk vaginal deliveries. Intravenous infusion of oxytocin (20 to 40 IU in 1000 mL, 150 mL per hour) is an acceptable alternative for AMTSL. Carbetocin, 100 µg given as an IV bolus over 1 minute, can be used instead of continuous oxytocin infusion in elective Caesarean section for the prevention of PPH and to decrease the need for therapeutic uterotonics.

Ergometrine 0.2 mg IM, and misoprostol 600 to 800 µg given by the oral, sublingual, or rectal route, may be offered as alternatives in vaginal deliveries when oxytocin is not available. Ergometrine is contraindicated in patients with hypertension, not routinely used.

Cord blood harvesting should not delay uterotonic administration. In fact, uterotonics may increase the amount of blood harvested due to placental compression. Assessment of the placenta and membranes for completeness should be done and uterine exploration is only done if suspicious of incomplete placenta or membranes. Following delivery of the placenta, the abdomen should be palpated to assess and monitor uterine tone and size. Uterine massage is done if concern exists regarding uterine tone. Once good, sustained uterine tone has been established, the lower genital tract should be examined using adequate lighting and appropriate positioning. The cervix should also be explored after instrumental vaginal deliveries.

Any episiotomy or lacerations should be repaired. The patient should be observed for blood loss by visual inspection and vital monitoring over the next hour, with assessment of uterine tone and size at least every 15 minutes.

Early breastfeeding should be done as it promote endogenous oxytocin release.

Estimation of Blood Loss

Estimation of blood loss can be visual (Figure 1) and by clinical sign & symptoms

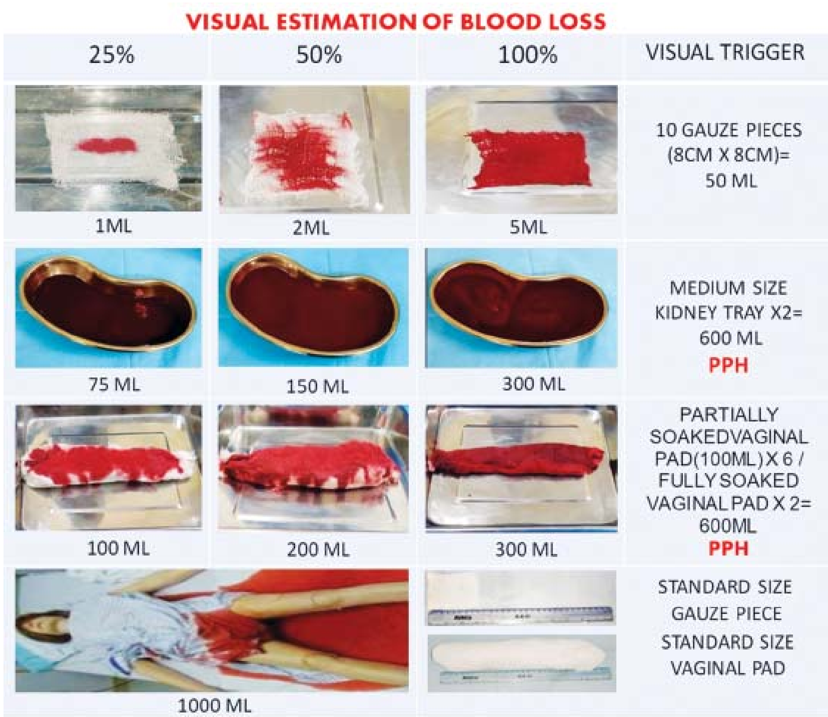


Fig 1: Visual Estimation of Blood Loss

Brass V drape **Kellys Pad**

Fig 2: Calibrated drape

Calibrated drape- These can be put under patients buttocks after delivery to collect blood in calibrated drape or container (Figure 2).

Clinical Assessment of Blood loss –A patient who comes after delivery with history of PPH, clinical sign and symptoms can guide regarding amount of blood loss (Table 3).

Table 3: Clinical Assessment of Blood loss

Blood volume loss	Systolic BP (mm Hg)	Symptoms & Signs	Degree of Shock
500-1000 ml (10-15%)	Normal	Palpitation Tachycardia Dizziness	Compensated
1000-1500 ml (15-25%)	Slight fall (80-100)	Weakness Tachycardia Sweating	Mild
1500-2000 ml (25-35%)	Moderate fall (70-80)	Restlessness Pallor Oligurea	Moderate
2000-3000 ml (35-50%)	Marked fall (50-70)	Air hunger Collapse Anuria	Severe

Shock Index- The Shock Index (SI) is calculated by dividing heart rate by systolic blood pressure It gives quick assessment of degree of shock. A SI of 0.9 or above should be taken as a warning sign of shock.

- Normal Non Pregnant= 0.5-0.7
- Pregnant woman= 0.7-0.9
- SI <0.9- Reassurance
- SI >0.9 indicates hypovolemia
- SI >1.2= 30% blood loss

Management of PPH

The cause of PPH can be- Atony, Trauma, DIC, Retained placenta or placental bits. Management of PPH requires a team approach as, assessment, resuscitation and treatment has to be done simultaneously.

Minor PPH

Intravenous access should be obtained with 2 wide bore cannulas and crystalloids (Lactated ringer or normal saline) are started. Blood samples for grouping cross matching, coagulation profile should be taken. Simultaneously uterine tone is assessed, uterine message and oxytocin drip with 20 units in 500 ml ringer started at 40 drops/min when uterus is atonic. Bladder is catheterised and vagina and cervix are visualised if not done already.

Table 4: Team Organization

The first step is calling for help and team organization and starting assessment resuscitation and treatment simultaneously. The leader of team will assess for tone of uterus, injury to genital tract, presence of retained placental bits and guide the team. Bladder should be catheterised to keep it empty and record output

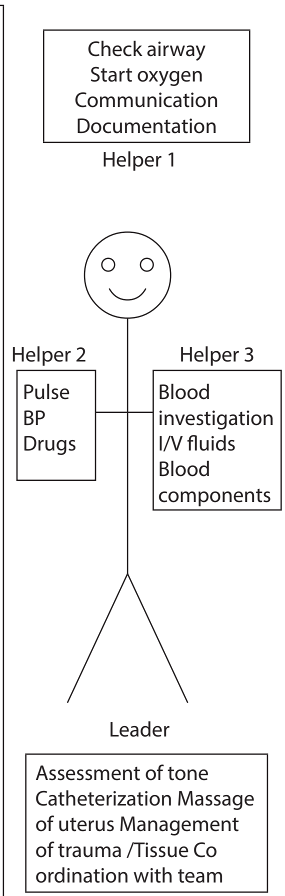
The helper 1, at head end will assess consciousness level, airway and breathing and start oxygen therapy. The recording of events, drugs & fluid administered as well as communication with other specialities and relatives would also be done by helper 1

Helper 2 at arm end will secure I/V access by 2 large bore canula (14or16) and start crystalloids and give drugs as required

Helper 3 at other arm will monitor vitals and send samples for blood grouping and crossmatching, haemogram, coagulation profile, RFT, LFT and electrolytes

Traumatic cause when repaired or retained placental bits when removed will control PPH

The cause of PPH in 80% cases is atony and is most challenging to treat. If uterus is found atonic fundal massage followed by bimanual massage is done and uterotonic drugs are given



Blood loss is estimated and if blood loss is upto 1000cc in a non anaemic women and PPH is controlled, there no need to transfuse blood.

Major PPH but Bleeding Controlled

If blood loss 1000-1500cc, 2 units packed cells should be transfused. If blood loss > 1500cc, after 2 packed cells give PRBC, FFP and platelets according to reports.

Ongoing Major PPH

This requires multidisciplinary approach, involving senior obstetrician, anaesthesiologist and haematologists (Table 4).

Tranexamic Acid

Tranexmic acid 1 gram IV slowly given within 3 hours of PPH is effective in reducing bleeding especially in traumatic PPH. It can be repeated after 30 minutes but not more than 10mg/kg per day can be given. It is not given if coagulopathy present. Drugs used in PPH are listed in Table 5.

Table 5: Atonic PPH Drugs

Drug	Initial Dose	Continuation Dose	Total Dose
Oxytocin	IV: 20 u in 1 litre at 60 drops/min IM:10 units	IV:20u in 1 litre at 40 drops/min	Not >3 litres of IV fluid containing oxytocin
Ergometrine	IM or IV (slow) 0.2 mg	Repeat 0.2 mg IM after 15 minutes, if required, give 0.2 IM or IV (slowly) every four hours	Five doses (total 1.0 mg)
Misoprostol	Sublingual 800 mcg	Repeat 200-800 mcg	Not more than 1600 mcg
15-Methyl PGF2α	IM 250 mcg	0.25 mg every 15-90 minutes	8 doses (total 2 mg)

Intrauterine Balloon Tamponad

If bleeding not controlled by medical management then uterine cavity balloon tamponade is done and operation theatre is prepared simultaneously (figure 3). balloon can be inflated with 300-500 cc of fluid and has to be placed near fundus. The vagina is packed to keep balloon in place. If bleeding controlled then balloon is left in situ for 6-8 hours.

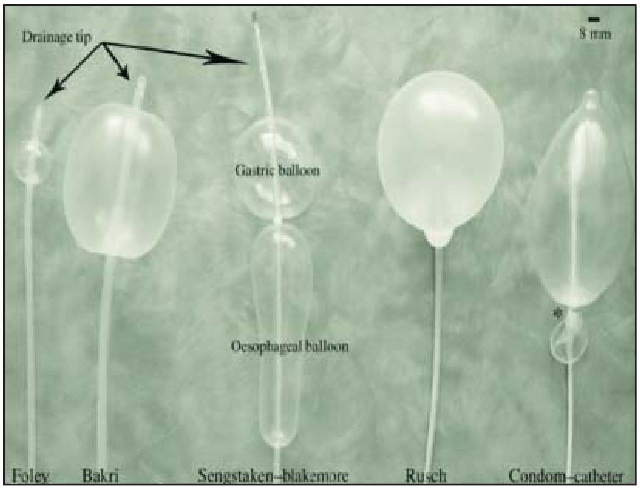


Fig 3: Uterine Tamponade Balloons

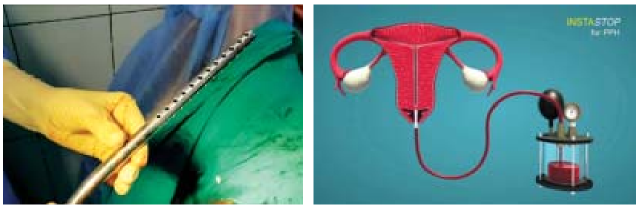


Fig 4: PPH Cannula

Vaccume Retraction by PPH Cannula

A specially made stainless steel or plastic cannula of 12 mm in diameter and 25 cm in length with multiple holes of 4 mm diameter at the distal 12 cm of the cannula is introduced into the uterine cavity through the vagina to reach the fundus (Figure 4). The cannula is connected to a suction apparatus, and a negative pressure of 700 mm mercury is created to suck out blood. Suction is kept for 30 minutes. The inner surface of the uterine cavity gets strongly sucked by the cannula. All the bleeding vessels including arterioles and sinusoids get sucked into the holes of the cannula, thereby mechanically closing them. The bleeding points are permanently closed due to clot formation within 30–40 min.

Volume Replacement in PPH

When major blood loss occurs there is decrease in blood volume which has to be replenished to maintain cardiac output. Till blood arrives this has to be done by replacing with crystalloids in the ratio 1:3 for each volume of blood lost. The fluid should not be cold as hypothermia decreases dissociation of oxygen from haemoglobin to tissue and shivering can cause acidosis due to lactic acid production from contracting muscles. Fluid has to be given fast in boluses of 500-1000cc in 15-20 minutes, after

2.5 litre of fluids blood must be given otherwise dilutional coagulopathy can occur

Blood Component Replacement in PPH

When the blood loss is more than 2000cc then the transfusion of all components of blood in the ratio 1:1:1 has to be done. FFP should be given only after 4 unit of packed cells have been given unless there is high risk of coagulopathy as in abruption or amniotic fluid embolism or massive blood loss has occurred. Transfusion of 4 unit of packed cell, 4 unit FFP and 4 unit platelet rich plasma is done initially and further transfusion depend on report of coagulation parameters and haemoglobin if bleeding stops. If onging PPH, all components have to be repeated till reports come.

Targets to be achieved are - Hb ≥8 gm%; PT ≥1.5; APTT≥1.5; Fibrinogen ≥100gm/dl; and Platelet count >50000/microlitre

Monitoring

Pulse rate, blood pressure respiratory rate, consciousness level and output should be recorded on a flow chart such as the modified obstetric early warning system charts. Documentation of fluid balance, blood, blood products and procedures should be done

External Aortic Compression- It is a simple life saving procedure & can be used to arrest bleeding at any stage (Figure 5). Downward pressure is applied over abdominal aorta through abdominal wall a little to left of umbilicus. The other hand is used to feel for femoral pulse to see if it becomes feeble during compression. This is done till patient is taken to operation theater or bleeding is controlled.

Fig 5: External Aortic Compression

Fig 6: Position of patient

Surgical Management of Atonic PPH

If bleeding not controlled by these measures then patient is taken for surgical management. The important points to be considered during surgical management are -

Position of patient: The position of patient on table should never be supine, it should be 30 degree trendelenburg with hips flexed at 15 degree to allow for visualization of perineum for assessment of bleeding (Figure 6).

Compression Sutures

The first surgical procedure according to WHO guidelines is compression sutures but before putting the sutures compression test should be done which involves exteriorising the uterus and compressing it by placing one hand on posterior side and other on anterior side of uterus for 3-4 minutes and if this decreases the bleeding only then compression sutures should be applied.

Compression sutures include the ‘B-Lynch’ suture (Figure 7), Hayman suture (Figure 8), horizontal and vertical brace sutures and various modifications, including Cho’s multiple square technique (Figure 9). The main aim of these compression sutures is to control bleeding from the placental site, by apposing the anterior and posterior uterine walls together.

Needles and Sutures Required

Needles- 70 mm round bodied hand needle or Straight needle which should ideally be 6 cm long so as to exceed the combined thickness of the anterior and posterior lower segment. Sutures used are DEXON or VICRYL number 1 or number 2 chromic catgut suture.

A number of compression sutures have been described, both vertical and horizontal but one must know that in one segment of uterus both horizontal vertical sutures should not be taken as it can impede clearance of secretion and also cause tissue necrosis by total occlusion of blood supply.

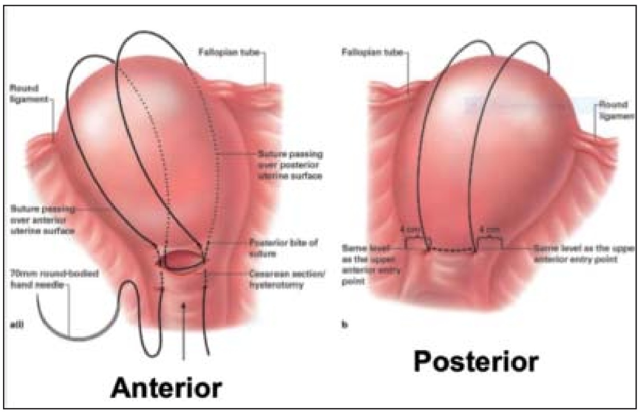


Fig 7: B Lynch Suture

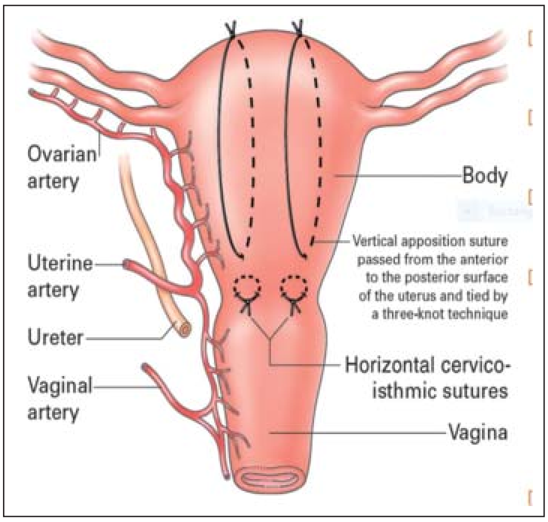


Fig 8: Hayman & Cervicoisthemic Suture

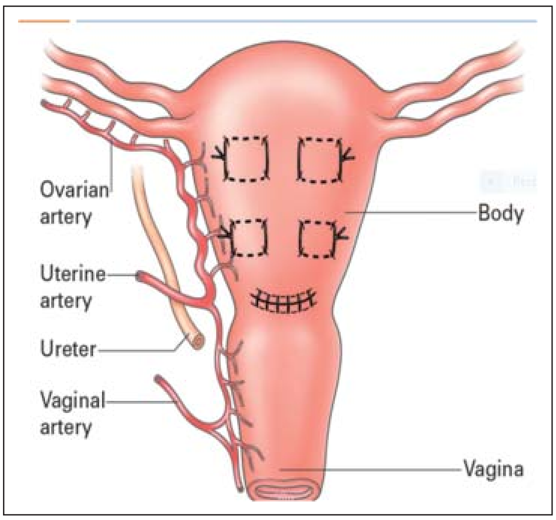


Fig 9: CHO Sutures

If bleeding is not controlled by brace sutures then a balloon tamponade can also be done after brace stitches. The balloon should not be inflated more than 200 cc to prevent ischemia.

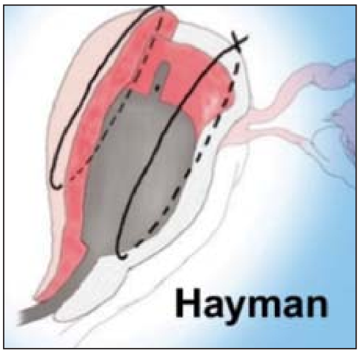


Fig 10: Sandwich Technique

Step Wise Devasculariation

When bleeding persists after compression sutures or compression test is negative, systematic pelvic devascularization is done. It includes ligation of uterine, tubal branch of the ovarian as well as anterior division of internal iliac arteries respectively (Figure 11).

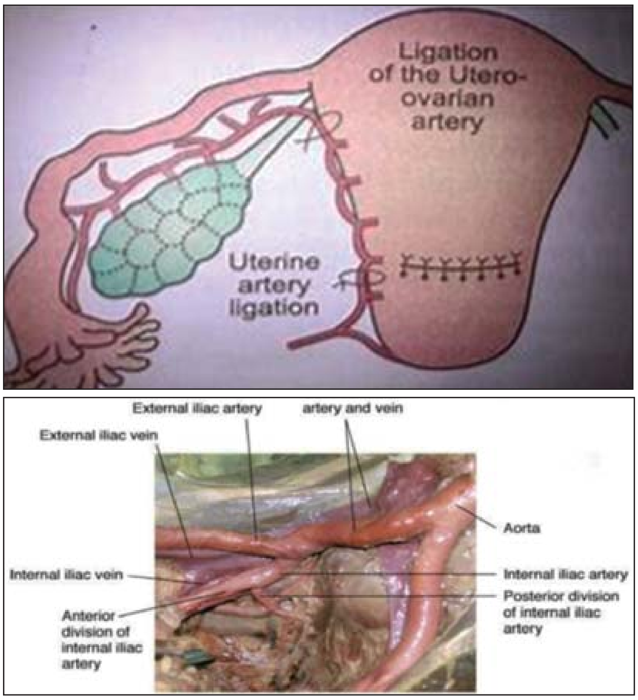


Fig 11: Step Wise Devasculariation

Peripartum Hysterectomy

In a hemodynamically unstable patient, readiness for definitive management with a hysterectomy is necessary in order to reduce the risk of maternal mortality. Subtotal or total abdominal hysterectomy is attempted as the last resort to save life. ***This might need to be considered earlier if the patient is haemodynamically unstable.*** The decision to perform a hysterectomy should be made by the most senior obstetrician

Subtotal hysterectomy is safer, quicker and easier to perform than total abdominal hysterectomy, and is indicated in cases in which the source of bleeding is from the upper segment. It is not useful in cases of placenta praevia or when cervical or upper vaginal tears contribute to PPH; in such cases, a total abdominal hysterectomy is warranted to arrest haemorrhage.

Selective Artery Embolisation

In a haemodynamicaly stable patient uterine or internal iliac artery embolisation can be done to decrease bleeding at centres where this facility is available, It is useful specially in cases of placenta accrete spectrum where it can be planned before hand.

Conclusion

PPH prevention involves predicting, anticipating and preparedness to deal with PPH. Active management of third stage decreases the amount of blood loss in 3rd stage. Management of PPH involves team work as the assessment, resuscitation and management have to be done simultaneously. Estimation of blood loss must be done both visually and by clinical signs and symptoms. Fluid replacement has to be done by crystalloids in ratio 1:3 (3 times of blood loss) to maintain cardiac output. To control PPH tone, trauma, DIC and retained tissue have to be addressed. Decision of surgical intervention must be taken timely. Monitoring, documentation and communication are very important. The golden first hour of management of PPH is most crucial.

Suggested Reading

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2. A comprehensive textbook of postpartum hemorrhage Sabaratnam Arulkumaran (ed.) Publisher: Sapiens Publishing 2012. ISBN/ASIN: 0955228271. ISBN-13: 9780955228278.

Reducing Caesarean Birth: Non-clinical Interventions

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Introduction

In recent years caesarean section has become an overused mode of termination of pregnancy. Globally caesarean rates increased from 12% in 2000 to 21% in 2015.[1] In India rates rose from 8.5% to 17.2% from 2005-06 to 2015-16. In private sector, including non-profit organization rate of caesarean birth varies from 27.7 to 40.9%-70%.[2,3] There is minimal or no reduction in the neonatal and maternal mortality with rising caesarean rates. The caesarean births have been associated with maternal deaths, anomalous placentation in subsequent pregnancies, transient neonatal respiratory distress and long hospital stays (Table 1). Besides they require larger human resources and incur higher costs on the health system.

Indicated verses Unindicated Caesarean Sections

It is postulated that merely 10-15% of women actually require caesarean delivery (ideal caesarean rate). Rates >15% are associated with higher maternal mortality.[4] However, World Health Organization (WHO) statement 2015, emphasized on offering caesarean deliveries as per an optimal patient management protocol, rather than striving to achieve a specific rate.[5] The Federation of Obstetrics and Gynaecological Society of India (FOGSI) statement 2014 denies any ideal recommended rate for caesarean section. It says labour management should be individualized for each labouring woman with the expectation of a successful and safe vaginal delivery, together with the ability to intervene with a caesarean delivery, if needed, to prevent morbidity and mortality.[6]

Common indications of caesarean sections include labour dystocia and abnormal foetal heart tracings.[7] Not all caesarean deliveries are indicated. An 'indicated caesarean delivery' is defined as a surgical procedure to deliver a viable foetus through an abdominal and uterine incision, when benefits of this procedure outweigh the risk associated with the procedure itself. An 'unnecessary or unindicated caesarean delivery' is labelled when the procedure is undertaken for reasons not associated with anticipated adverse outcomes of natural birth. These reasons may be social convenience, peer group pressure, avoidance of uncertain risk of an emergency caesarean or an instrumental delivery. Fear of labour pain, rising demand for caesarean sections by affluent patients, reluctance of treating obstetrician to conduct a normal vaginal or an operative vaginal delivery due to lack of training and experience, remuneration services provided at private setups, lack of support from midwives

Table 1: Maternofetal Risks Associated with Caesarean and Vaginal Births

Maternal risks	Foetal risks
Caesarean deliveries- • Higher overall severe mortality and morbidity • Higher rates of placental abnormalities in next pregnancy (Incidence of placenta previa increases from 1% with one prior caesarean delivery to 3% with ≥3 caesarean sections; Incidence of morbidly adherent placenta with placenta previa with 3 prior caesarean deliveries is 40% and >60% in ≥5 prior caesarean sections) • Higher rates of amniotic fluid embolism • Higher anaesthesia complication, blood loss, infection • Long term adverse outcomes- subfertility due to pelvic adhesions • Prolonged hospital stay **Vaginal deliveries-** • Higher rates of 3rd and 4th degree perineal tears • Similar rates of urinary incontinence and postpartum depression as caesarean section.	**Caesarean deliveries-** • Higher rates of neonatal lacerations • Higher rates of respiratory morbidity (without labour). • Increased risk of childhood and adult disease later in life due to gut dysbiois, impaired immune and stress response in foetus • Cognitive disorders in baby on long term **Vaginal deliveries-** Risk of shoulder dystocia

and fear of litigation are other reasons. Out of the total 6.2 million unindicated caesarean sections conducted worldwide each year, half are performed in China and Brazil.

Strategies for Reducing Caesarean Section Rates

Robson Ten Group Classification System (TGCS)- Clinical audits at institutional and health system organisation levels remains the frontline option for reducing caesarean section rates. Institution specific quality improvement initiatives may be taken based on these audits. One approach is to follow a standardized, international accepted classification system to monitor and compare caesarean section rates in a consistent and action oriented manner at local and international level. The WHO systematic review and critical appraisal of available classification of caesarean section concluded one such Robson TGCS based on five basic characteristics of pregnancy (parity, onset of labour, gestational age, foetal presentation and number of foetuses), which fulfils best the local and international needs. The ten groups are totally inclusive and mutually exclusive and categorises each pregnant woman delivering irrespective of the mode of delivery.[8]

Robson group 1, 2 and 5 contribute to two-third of the overall caesarean section rates. Among them group 5 comprises 61 % of all Caesarean sections.

- Reducing caesarean rates in repeat caesarean section group (Group 5)-The best way is preventing primary (first) caesarean section and encouraging VBAC (Vaginal Birth After Caesarean section).
- Reducing caesarean section rates in primary caesarean section group (Group 1 and 2)-

Labour dystocia is responsible for the maximum number of caesarean deliveries being conducted in this group.

The definition of active stage of labour and duration of latent and active phase of labour has been evolving since the classification of labour dystocia by Freedman.[9-11] Recently WHO has proposed Labour care guide with a novel partographic assessment of labour progress.[12]

Non-clinical Interventions to Reduce Unnecessary Caesarean Sections

In 2018, WHO released recommendations on non-clinical interventions to reduce unnecessary caesarean sections. It divided targeted interventions at three groups- the woman, health care professionals and health organisation, facilities or system (Table 2).[13]

- Other strategies for reducing caesarean section rates includes raising awareness among obstetricians and patients about labour analgesia; Mobilization during labour process; Teaching nurses and the parturient favourable labour positions to encourage vaginal deliveries; Writing cardiotocographic examination reports in the medical records and later auditing them by a medical record committee; Creating realistic labour induction protocols individualized according to institutions; Rigorous audit of caesarean sections; Providing uniform remuneration for both caesarean and vaginal deliveries; Mandatory second opinions; and Expanding role of midwives.[14]

Table 2: Recommendations by international organisations for reducing Caesarean rates

ACOG recommendations for the safe prevention of primary caesarean delivery, 2014[1]	**WHO recommendations Intrapartum care for a positive childbirth experience, 2018[11]**	**WHO recommendations non-clinical interventions to reduce unnecessary caesarean sections, 2018[13]**
First and second stage of labour: • A prolonged latent phase (>20 hrs nullipara; >14 hrs multipara)- Not an indication of Caesarean delivery • Slow but progressive first stage of labour – Not an indication for Caesarean section. • Cervical dilation of 6 cm as threshold of active first stage of labour. • Active first stage of labour arrest defined at ≥ 6cm of cervical dilatation with ruptured membranes and failure to progress despite 4 h of adequate	**First stage of labour-** • Latent first stage is characterized by painful uterine contractions and variable changes of the cervix, • Associated with some degree of effacement and slower progression of dilatation up to 5 cm. • The active first stage is characterized by regular painful uterine contractions, a substantial degree of cervical effacement and more rapid cervical dilatation from 5 cm until full dilatation.	**Interventions targeted at women-** Health education for women through childbirth training workshops, nurse-led applied relaxation training programme, psychological couple-based prevention programme and psychoeducation. No specific form of intervention (pamphlets, videos, role play, education) is considered superior.

uterine contractions or 6 h of oxytocin administration with inadequate contraction and no cervical change- Caesarean section recommended

- No specific minimum duration of second stage of labour for operative vaginal delivery.
- Second stage arrest of descent defined only after 2 h of pushing in multipara and 3 h of pushing in nullipara with reassuring maternofoetal condition (longer duration may apply in malpresentation and epidural analgesia)- An indication for Caesarean section.
- Operative vaginal delivery by an experienced physician is an acceptable alternative to caesarean section.
- Training in operative vaginal deliveries to be advocated.
- Manual rotation of foetal head may be considered before operative vaginal deliveries.

FHR monitoring

- Amnioinfusion may be done for repetitive variable foetal deceleration.
- Scalp stimulation of assessing acid-base status of foetus with abnormal or indeterminate heart patterns.

Labour induction

- Inductions should be done at 41 weeks. Before that depending on maternofoetal condition.
- Use cervical ripening method in unfavourable cervix
- Failed induction of labour in latent phase defined as ≥ 24 h of latent phase and oxytocin administered for at least 12-18 h after membrane rupture- indication of caesarean section

Document foetal presentation at the start of 36 weeks to allow for the scope of external cephalic version in breech presentations and transverse lie.

Fetal macrosomia- Fetal weight ≥ 5 kg without maternal diabetes and ≥ 4.5 kg with diabetes – An indication of caesarean section.

Counsel mothers against excessive weight gain in pregnancy

Twins- Vaginal delivery should be offered in twins with first twin in cephalic presentation.

Individual organisations and government bodies to work together and make policies to reduce caesarean rates.

- A standard duration of the latent first stage has not been established and can vary widely. Duration of active first stage does not extend beyond 12 h in primipara and 10 h in multipara.
- Epidural analgesia is recommended for healthy pregnant women requesting pain relief during labour. Parenteral opioids (fentanyl, diamorphine and pethidine) are other recommended options. Relaxation techniques (progressive muscle relaxation, breathing, music, mindfulness) and manual techniques (massage or application of warm packs) are recommended for pain relief.
- Mobility and an upright position during labour in women at low risk is recommended.

Second stage of labour-

- The second stage is the period of time between full cervical dilatation and birth of the baby, during which the woman has an involuntary urge to bear down, due to expulsive uterine contractions.
- Duration of the second stage varies from one woman to another. It usually lasts 3 hr in primipara and 2 hr in nullipara.
- For women without/ with epidural analgesia, adoption of birth position as liked by woman is recommended.

Fetal heart rate monitoring

Intermittent auscultation of the foetal heart rate with either a Doppler ultrasound device or Pinard foetal stethoscope is recommended for healthy pregnant women in labour

Interventions targeted at health care professionals-

- Implementation of evidence-based clinical practice guidelines combined with structured, mandatory second opinion for caesarean section indication is recommended to reduce caesarean births in settings with adequate resources and senior clinicians able to provide mandatory second opinion for caesarean section indication.
- Implementation of evidence-based clinical practice guidelines, caesarean section audits and timely feedback to health-care professionals are recommended to reduce caesarean births.

Interventions targeted at health organisations, facilities or systems-

- Collaborative midwifery-obstetrician model of care (a model of staffing based on care provided primarily by midwives, with 24-hour back-up from an obstetrician who provides in-house labour and delivery coverage without other competing clinical duties) is recommended only in the context of rigorous research. This model primarily addresses intrapartum caesarean sections.
- Financial strategies (i.e. insurance reforms equalizing physician fees for vaginal births and caesarean sections) for health-care professionals or health-care organizations are recommended only in the context of rigorous research.

Conclusion

Clinical audits at institutional and health system organisation level remains the frontline option for reducing caesarean section rates. TGCS should be used to audit and monitor caesarean sections on main contributor population. Appropriate interventions and resources may then be directed to reduce caesarean rates.

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Simplified Bishop's Score for Prediction of Successful Induction of Labour in Nulliparous Women

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Abstract

Objective: To compare simplified Bishop's score with original Bishop's score for prediction of labour induction outcome in nulliparous women. **Material and Methods:** After informed consent 300 women undergoing induction of labour in labour ward of a tertiary care centre were included in the study. Pelvic examination was done and Bishop's score was calculated. Simplified Bishop's score using cervical dilation, effacement and head station was also noted. Women were induced according to the existing institutional protocol and followed for mode of delivery and induction delivery interval. Receiver operating characteristic curve was used to find out cut off point of original and simplified Bishop's Score to predict vaginal delivery. **Result:** Out of 300 women, 214 (71.33%) had normal vaginal delivery, 9 (3%) had operative vaginal delivery and 77 (25.67%) had caesarean delivery. The cut off obtained by receiver operating characteristic curve was >2 for original bishop's score and >1 for simplified bishop's score for prediction of successful induction in terms of vaginal delivery. The sensitivity, specificity, positive predictive value and negative predictive value of original and simplified bishop's score for prediction of vaginal delivery were, 78.48%, 63.64%, 86.2%, 50.5% and 90.58%, 66.23%, 88.6% and 70.8% respectively. **Conclusion:** Simplified bishop's score has higher diagnostic accuracy for prediction of vaginal delivery in nulliparous women undergoing induction of labour.

Keywords: induction of labour, successful IOL, bishop's score, simplified bishop's score, induction delivery interval

Introduction

Induction of labour is done when continuation of pregnancy poses threat either to the mother or the baby and vaginal delivery is not contraindicated. It is one of the most common procedures done in obstetrics. In 1964, Edward Bishop established a pelvic scoring system for elective induction of labour. The pelvic scoring system is known as Bishop's score and it basically guides for requirement of cervical ripening before induction of labour.[1] It is the most widely acceptable and performed pre-induction scoring and can be assessed by digital examination at the time of induction.

Bishop's score comprises of five parameters, cervical dilation, effacement, position, consistency and station of head. The total score is 0-13 (Table 1). A score of 8 or more has the same chance of vaginal delivery subsequent to labour induction as in spontaneous labour, whereas a score of 6 or less signifies unfavourable cervix which needs cervical priming when induction is indicated. Later, many modifications of this scoring were done, of them modified bishop's score was introduced by Calder AA et al in 1974 in which the cervical effacement was replaced by cervical length.[2] Another modification was done by Laughon SK et al in 2011, he use a simplified bishop's score using three parameters (cervical dilation, effacement and station of head) which were most significant in predicting vaginal birth.[3] They found that a score of 5 is equivalent to the score of 8 in original Bishop's score in predicting vaginal birth. Ivras J et al added parity as a predictive parameter and also tried to simplify the Bishop's score. They found that effacement and station are the most significant parameters predicting success of labour induction.[4]

Although till now the original Bishop's score is widely used, it is cumbersome to do it in a busy labour ward and also all the parameters are subjective having high inter-observer variation. Our attempt is to study simplified score suggested by Laughon SK et al using the most significant parameters i.e. dilation, effacement and station for predicting the success of labour induction and also to compare its predictability with the original Bishop's score.[3]

Table 1: Bishop's score

Parameters	Score			
	0	1	2	3
Dilation (cm)	closed	1-2	3-4	>5
Effacement (%)	0-30	40-50	60-70	>80
Station	-3	-2	-1,0	+1,+2.+3
Position	Posterior	Mid-position	Anterior	-
Consistency	Firm	Medium	Soft	-

*Simplified Bishop's score- dilatation, effacement and head station

Materials and Method

It was an observational study conducted on 300 term nulliparous women undergoing IOL in the Department of Obstetrics and Gynaecology, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India. Nulliparous women, admitted for induction of labour were eligible to participate in the study. Women with APH, foetal macrosomia, foetal growth restriction, preterm rupture of membranes, previous uterine surgery and with favourable Bishop's score (>6) were excluded from the study. In all patients digital vaginal examination was done, cervical parameters included in bishop's score were assessed and total score calculated. Simplified bishop's score explained by Laughon SK et al taking three parameters dilatation, effacement and station, was also calculated. After assessment of above mentioned parameters induction of labour using dinoprostone (PGE_2) gel was done. Assessment after the first dose of dinoprostone gel was done after 6 hours and a second dose was administered based upon the Bishop's score. Maximum two doses of gel were used for priming of cervix followed by induction or augmentation of labour with oxytocin according to the cervical favourability and uterine contractions. Failed induction was defined as failure to enter active stage of labour (cervical dilation ≥4cm) with regular uterine contractions after 2 doses of dinoprostone gel and 6-12 hours of oxytocin administration after ARM.[5] These women were followed for mode of delivery and induction to delivery interval.

Statistical Analysis

The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software version 21.0. The presentation of the Categorical variables was done in the form of number and percentage (%). The presentation of the continuous variables was done as mean ± SD and median values. The data normality was checked by using Kolmogorov-Smirnov test. The cases in which the data was not normal, we used non parametric tests. The following statistical tests were applied for the results: The association of the induction to delivery intervals with Dilatation, Effacement, Original and modified Bishop's score were analysed using Mann-Whitney Test and Station, Position, Consistency were analysed using Kruskal Wallis test. The association of the variables: Dilatation, Effacement, Station, Position, Consistency, Original and modified Bishop Scores which were qualitative in nature with mode of delivery were analysed using Chi-Square test. Receiver operating characteristic curve was used to find out cut off point of original and modified Bishop Scores to predict vaginal delivery. Sensitivity, specificity, PPV and NPV was calculated. DeLong et al test was used to compare AUC of original and modified Bishop's score. Logistic regression was used to predict vaginal delivery. For statistical significance, p value of less than 0.05 was considered as significant.

Results

Most women were in the age group of 21-30 years (83%) with late term gestation i.e. 39-40^{+6} weeks

Table 2: Distribution of parameters of Bishop's score in study subjects

Parameters of Bishop score	No of observations (n=300)	Percentage (%)
Dilatation		
0{Closed}	65	21.67
1{1-2 cm}	235	78.33
Effacement		
0{0-30%}	185	61.67
1{40-50%}	115	38.33
Station		
0{-3}	97	32.33
1{-2}	119	39.67
2{-1}	84	28.00
Position		
0{Posterior}	208	69.33
1{Mid position}	84	28.00
2{Anterior}	8	2.67
Consistency		
0{Firm}	173	57.67
1{Medium}	112	37.33
2{Soft}	15	5.00

(52%). Almost half of the study population had normal BMI (45.34%). The most common indication for IOL was postdatism (43.34%) followed by hypertensive disorders (25%). Out of 300 women, 214 (71.33%) had normal vaginal delivery, 9 (3%) had operative vaginal delivery and 77 (25.67%) had caesarean delivery. Caesarean section were done for non-reassuring foetal heart rate with or without meconium stained liquor (37.66%), arrest of labour (5.19%) and failed induction (57.14%). Most babies

Table 3: Receiver operating characteristic curve of original and modified Bishop score to predict vaginal delivery

Vaginal delivery	Original Bishop score	Simplified Bishop score
Area under the ROC curve (AUC)	0.755	0.857
Standard Error	0.0299	0.0232
95% Confidence interval	0.703 to 0.803	0.813 to 0.895
P value	<0.0001	<0.0001
Cut off	>2	>1
Sensitivity(95% CI)	78.48% (72.5 - 83.7%)	90.58% (86.0 - 94.1%)
Specificity(95% CI)	63.64% (51.9 - 74.3%)	66.23% (54.6 - 76.6%)
PPV(95% CI)	86.2% (80.7 - 90.6%)	88.6% (83.7 - 92.4%)
NPV(95% CI)	50.5% (40.2 - 60.8%)	70.8% (58.9 - 81.0%)
Diagnostic accuracy	74.67%	84.33%
P value comparing AUC	0.0001	

Table 4: Association of Bishop's Score Parameters with Vaginal Delivery and Induction to Delivery Interval

Parameters	LSCS (n=77)	Vaginal delivery (n=223)	P value	Induction to delivery interval(hours)	P value
Dilatation					
0	35 (53.85%)	30 (46.15%)	<.0001*	18.67 (12.417-22)	0.048#
1	42 (17.87%)	193 (82.13%)		15.65 (11.15-20.817)	
Effacement					
0	59 (31.89%)	126 (68.11%)	0.002*	17.53 (11.7-21.833)	0.021#
1	18 (15.65%)	97 (84.35%)		14.5 (11.075-19.042)	
Station					
0	60 (61.86%)	37 (38.14%)	<.0001*	16.83 (12-20.5)	0.919$
1	14 (11.76%)	105 (88.24%)		16.42 (10.933-21.167)	
2	3 (3.57%)	81 (96.43%)		16.12 (11.65-21.504)	
Position					
0	40 (19.23%)	168 (80.77%)	0.006*	15.6 (11.242-20.896)	0.143$
1	34 (40.48%)	50 (59.52%)		16.94 (11.587-21.562)	
2	3 (37.50%)	5 (62.50%)		22.04 (16.333-28.417)	
Consistency					
0	29 (16.76%)	144 (83.24%)	<.0001*	16.53 (11.75-21.333)	0.221$
1	40 (35.71%)	72 (64.29%)		15.29 (9.458-20.842)	
2	8 (53.33%)	7 (46.67%)		17.67 (12.65-19.75)	
Original Bishop score					
<=2	49 (50.52%)	48 (49.48%)	<.0001*	17.67 (12.417-21.9)	0.091#
>2	28 (13.79%)	175 (86.21%)		15.5 (11.15-20.742)	
Simplified Bishop score					
<=1	51 (70.83%)	21 (29.17%)	<.0001*	18.02 (12.312-21.183)	0.228#
>1	26 (11.40%)	202 (88.60%)		15.8 (11.158-20.975)	

*- Chi-square test, #- Mann-Whitney test, $-Kruskal Wallis test

had normal birth weight (77.33%) and rest were small for gestation (SGA) babies (22.67%).

The distribution of different parameters of Bishop's score is shown in Table 2. Cut off for prediction of successful induction in terms of vaginal delivery by Receiver operating characteristic curve was >2 for original Bishop's score and >1 for simplified Bishop's score, Figure 1. Diagnostic accuracy for simplified Bishop's score as compared to original Bishop's score was high and standard error was less, Table 3. Cervical dilation and effacement had significant association with induction to delivery interval, p< 0.05, Table 4. The variance was calculated after removing one or more parameters with regression model. It showed least variance (51.53%) when effacement, consistency and position were removed, Table 5.

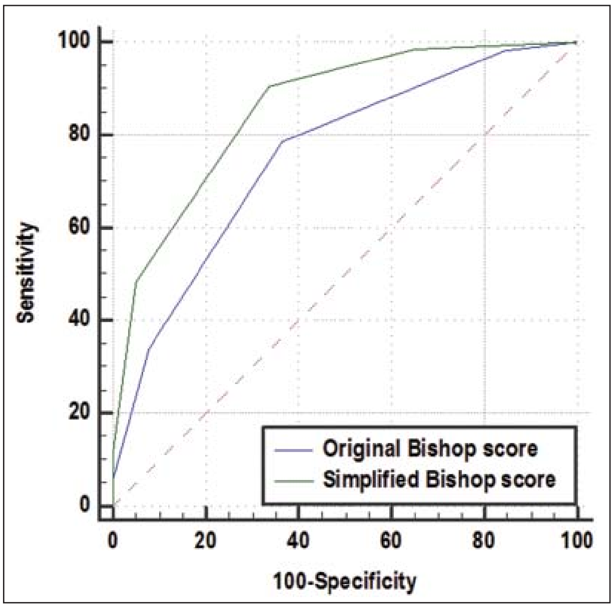

Fig 1: Receiver operating characteristic curve of original and modified Bishop score to predict vaginal delivery

Discussion

Bishop's score has been used for assessment of cervical favourability before induction of labour. Various variations of the Bishop's score have been created in an attempt to simplify the score with similar or higher predictive ability.[3,4,6-10] In our study we evaluated simplified Bishop's score and found it to have higher accuracy in prediction of vaginal birth following IOL.

A total of 300 nulliparous women undergoing cervical priming before labour induction were included in the study. Original and simplified Bishop's scores were calculated, vaginal delivery (either normal delivery or operative vaginal delivery) was considered as the primary outcome for successful induction of labour. All the five parameters of original Bishop's score were assessed individually for association with mode of delivery and also induction to delivery interval. The simplified and the original Bishop's score were also evaluated for the same. In our study group dilation, station and consistency were the most significant parameters (p<0.0001) followed by effacement (p 0.002) and position of the cervix (p 0.006). Lyndrup J et al also reported foetal head station to be the most significant parameter associated with success of IOL (p<0.05) followed by cervical dilatation.[7] Ivras J et al found fetal station, cervical effacement, and parity to be the only factors associated with the success of induction. It is also reported that consistency and position are not useful in predicting success of IOL.[3,4]

In our study, we found higher sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of simplified Bishop's score as compared to original Bishop's score for prediction of vaginal delivery, 78.48%, 63.64%, 86.2%, 50.5% and 90.58%, 66.23%, 88.6%, 70.8%, respectively. Laughon SK et al who proposed this simplified Bishop's score found similar or better PPV (87.7% compared with 87.0%), NPV (31.3% compared with 29.8%), positive likelihood ratio (2.34 compared with 2.19), and correct classification rate (51.0% compared with 47.3%) of simplified compared with the original Bishop score.[3]

Table 5: Evaluating Regression Model with Outcome of Vaginal Delivery

Number of variable removed	Variable removed	Proportion of explained variance
0	None were removed	54.61%
1	Consistency	54.27%
	Position	53.80%
2	Consistency + Position	53.34%
	Position + Effacement	51.99%
	Consistency + Effacement	52.08%
3	Consistency + Position+ Effacement	51.53%

To find out the importance of each parameter of original Bishop's score, we used regression model to calculate amount of variance after removing one or more parameters. In our study cervical position was found to be the least significant parameter for prediction of vaginal delivery. The variance was decreased when position was removed individually (53.80%) and in combination with effacement (51.99%) and consistency (53.34%) as compared to when no parameter was removed (54.61%). Also the variance was least (51.53%) when effacement, consistency and position were removed suggesting dilation and station being the most important parameters of Bishop's score, Table 5. Similar findings are supported by other authors in their respective studies.[3,6]

Individual parameters of Bishop's score were also evaluated for association with induction to delivery interval, and only cervical dilatation and effacement were found to be significantly associated with induction to delivery interval, $p < 0.05$ (Table 4). For calculated cut off of simplified bishop's score of >1 and original bishop's score of >2, the mean induction to delivery interval were 15.8 hours and 15.5 hours, respectively. Reis FM et al demonstrated dilatation ($v2 = 16.29$, $P < .0001$) and effacement ($v2 = 20.83$, $P < .0001$) to be significantly associated with delivery within 24 hours. However, they did not find cervical position ($v2 = 3.47$, $P = 0.10$), consistence ($v2 = 3.73$, $P = 0.2$), and head station ($v2 = 1.34$, $P = 0.2$) to be useful in prediction of vaginal delivery after labour induction.

As cervical consistency and position of cervix are not found to be useful parameters in predicting outcome of labour induction in nulliparous women, therefore the simplified Bishop's score suggested by Laughon SK et al may be used for assessment of cervix favourability before IOL.

The main strength of study is the large sample size of 300 homogenous population including only term nulliparous women. The limitation of the study was that primary outcome of successful IOL was vaginal delivery and not the failure to enter active stage of labour as one third of caesarean sections were done for foetal distress.

Conclusion

Simplified bishop's score has lesser parameters to be assessed, is easy to calculate and has higher accuracy for prediction of induction of labour than original bishop's score.

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Correlation of Digital Vaginal Examination with Transabdominal Ultrasound to Assess Foetal Head Position Prior to Operative Vaginal and Caesarean Delivery

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Abstract

Objective: To compare transabdominal ultrasound (TAS) with digital vaginal examination (DVE) for determination of foetal head position (FHP) during active labour prior to operative vaginal delivery (OVD) and caesarean sections (CS). **Material and Methods:** This was a prospective observational study at Vardhman Mahavir Medical College and Safdarjung Hospital. Low-risk pregnant women in active labour with singleton foetus in vertex presentation were enrolled in the study. DVE and TAS were done for the assessment of FHP prior to OVD and CS and agreement of FHP via DVE and TAS was recorded. Inter-rater agreement kappa (k) was used to find out the strength of agreement between FHP by DVE and TAS. A p value of <0.05 was considered statistically significant. **Results:** Amongst 335 women, 302 (90.15%) delivered vaginally, 12 (3.58%) underwent OVD, and 21 (6.27%) had CS. TAS could determine FHP in all (100%) women who underwent OVD. There was good concordance between DVE and TAS for determining FHP in second stage of labour, Kappa= 0.633; p value= <0.0001 in women undergoing OVD. There was fair correlation between DVE and TAS in second stage of labour for determining FHP, Kappa= 0.558; P value= <0.0001 in women undergoing CS. **Conclusion:** A higher percentage of the occiput-transverse and occiput-posterior positions can be misdiagnosed on DVE. TAS can be a useful adjunct to correctly determine the FHP prior to vacuum application as well as before CS to avoid both unnecessary caesarean section and delay in caesarean.

Keywords: Foetal head position, Digital vaginal examination, Transabdominal ultrasound, Normal vaginal delivery, Operative vaginal delivery, Caesarean section

Introduction

Labour is defined as the process by which the foetus is delivered from the uterus. Position of foetus refers to the relationship of foetal presenting part to the maternal pelvis as foetal occiput in cephalic presentation. Intrapartum foetal head position (FHP) assessment can be used to predict the course of labour.[1] Traditionally this is performed by palpation of sagittal suture, and anterior & posterior fontanelle on digital vaginal examination (DVE).[2] The main reasons of misinterpretation by this method are presence of tense bag of membrane, large caput succedaneum, asynclitism of foetal head and moulding. Other disadvantage of DVE is that it is subjective so, inaccurate, painful, intrusive and associated with risk of infections. Inaccurate assessment as in case of occipito-posterior position if early rupture of membranes is done it can make long anterior rotation of foetal head difficult, resulting in prolonged labour and higher rates of operative delivery along with adverse maternal and neonatal outcomes.[3]

With the advent of transabdominal ultrasound (TAS), more precise assessment of FHP in pelvis during active labour is possible. It is less invasive, associated with better outcomes for vaginal delivery, decreased caesarean section rates and reduced risk of ascending infections.[4] It may be of great value in certain clinical situations such as prior to instrumental delivery to improve the accuracy of vaccum cup placement.[5] Error in assessment of FHP can result in a deflexed and an asynclitic head attitude leading to failure of vacuum delivery. Failure of instrumental delivery in turn followed by caesarean section is associated with an increased decision-to-delivery interval and further increased risk of maternal and foetal trauma. Studies have generally used TAS, as by this route both midline structures as well as occiput positions (anterior and posterior) could be defined in 94%, although it may be technically difficult with a deeply engaged foetal head in the second stage of labour.[6] In current study TAS was used for determining FHP as it is easily accessible in labour room, skills can be learnt easily and it helps to determine the position of spine and thus the foetal occiput.

Material and Methods

This was a prospective observational study conducted in Department of Obstetrics and Gynaecology at Vardhman Mahavir Medical College over a period of 18 months post ethical clearance. Nulliparous pregnant women with term singleton pregnancy in the active phase of the first stage of labour (cervical dilatation 4–6 cm) with cephalic presentation were enrolled in the study after informed consent. Digital vaginal examination was carried out by the labour ward resident for the assessment of cervical status, station of head, membrane status, and any cephalopelvic disproportion. The FHP (foetal head position) was noted by the resident and this was followed by TAS (transabdominal ultrasonography) which was done within 10 minutes of DVE (digital vaginal examination). Women prepared for emergency caesarean section in the first stage of labour, pregnancy with intrauterine death, women with medical emergencies necessitating immediate delivery, previous cervical surgery (cone biopsy and cervical cerclage), foetal macrosomia (baby weight ≥ 4 kg), and all other nonvertex presentations in labour were excluded from the study. All ultrasonographic assessments were done with Toshiba's model SSA640 A with 3–5 Hz probe. The person performing the ultrasound examination was blinded to the findings of DVE. Compliance of Preconception Prenatal Diagnostic Techniques (PCPNDT) Act was strictly adhered.

On DVE, the FHP was determined based on the position of the occiput and posterior fontanel. TAS was performed using 3–5 Hz probe of two-dimensional (2D) ultrasound. The FHP was determined using the foetal spine as landmark and defining the occiput as the denominator. TAS findings were considered as the gold standard. It was expressed in the form of 12-hour clock system such that the examiner was always facing the perineum. By TAS, the OA (occiput-anterior) position was defined to be from >9:30 to <2:30 clock hours, the left occiput transverse (LOT) position from 2:30 to 3:30 clock hours, the right occiput transverse (ROT) position from 8:30 to 9:30 clock hours, and the OP (occiput-posterior) position from >3:30 to <8:30 clock hours (Fig. 1).

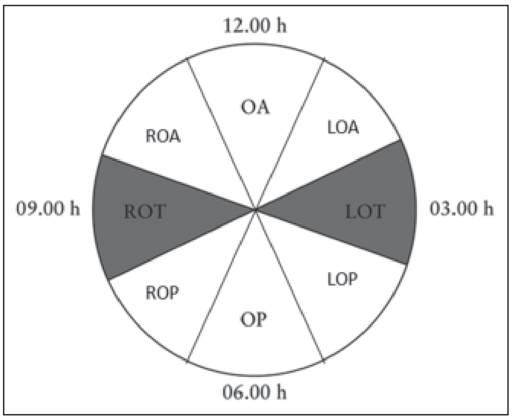

Fig 1: Position of the foetal head on transabdominal sonography

The operator first determined the location of the foetal spine with the ultrasound probe placed longitudinally on the mother's abdomen. If the cervical spine was seen at the midline, then the foetus was in the direct OA position (Fig. 2). If the cervical spine was seen by tilting the probe more than 45° from midline, then the foetus was in the right occiput anterior (ROA) or left occiput anterior (LOA) position. If the cervical spine was only seen by putting the probe near either left or right anterior superior iliac spine, then the foetus was determined to be in the LOT or ROT position, respectively. If the

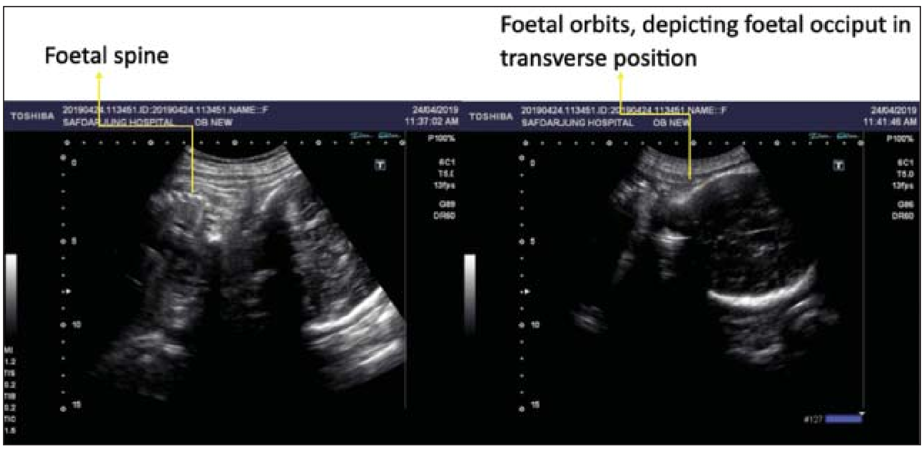

Fig 2: Foetal head position on transabdominal sonography with respect to foetal spine

cervical spine could not be seen, then the ultrasound probe was rotated to orientate transversely to the maternal spine and the operator would identify the foetal orbits. Depending on the orientation of the foetal orbits, the FHP was classified as direct OP, left occiput posterior (LOP), or right occiput posterior (ROP) position accordingly (Fig. 2). Both examinations were done in the active first stage of labour (cervical dilatation 4–6 cm) and the beginning of the second stage of labour (full dilatation) in the same women. In few cases, the FHP could not be determined in the second stage of labour, due to deeply engaged head.

Statistical Analysis

Categorical variables were presented as numbers and percentages, and continuous variables were presented as mean ± SD and median. Qualitative variables were correlated using Chi-square test. Inter-rater κ agreement was used to find out the strength of agreement between the FHP by DVE and USG. A p value of <0.05 was considered statistically significant. The data were entered in MS Excel spreadsheet, and the analysis was done using SPSS version 21.0. K value interpretation was taken as poor (<0.20), fair (0.21-0.4), moderate (0.41-0.6), good (0.61-0.8) and very good (0.81-1.00)

Results

A total of 335 women were enrolled in the study and followed up by DVE and TAS to determine the FHP in the active first stage (cervical dilatation 4–6 cm) and in the early second stage of labour. The mean age of women participating in the study was 22.81 ± 2.91 years. Maximum number of women (60.0%) had mean body mass index (BMI) of 23.25 ± 11.85 kg/ m^2. The mean gestational age of women was 39.07 ± 0.79 weeks (37–42 weeks). Period of gestation was 39–39 + 6 in 54.39% of women. Most of the babies [236 (70.45%)] weighed between 2.5 and 3.5 kg, and 20.3% babies were of low birth weight. Amongst 335 women, 302 (90.15%) had a normal vaginal delivery, 12 (3.58%) underwent operative vaginal delivery, and 21 (6.27%) had second stage caesarean section (Table 1).

DVE was able to correctly diagnose FHP in 7/10 (70%) women with OA position.DVE could not diagnose the solitary OP position which was delivered by forceps application. TAS however could determine FHP in all (100%) women who underwent **OVD**. The absolute agreement between DVE & TAS in OVD was 66.67% (Table 2). There was good concordance between DVE and TAS for determining FHP in second stage of labour, Kappa= 0.633; P value= <0.0001 in women undergoing operative vaginal delivery. (Table 3)

Amongst women who had **caesarean section (CS)**, DVE was able to correctly diagnose FHP in 83.33%(5/6) women with OA position and in 33.33%(1/3) with OP position. While TAS correctly identified 85.7% (18/21) FHP prior to second stage caesarean, there were 14.29%(3) observations in which the FHP could not be determined by TAS. This was due to deep seated foetal head in maternal pelvis or obstructive view of foetal occiput due to maternal pubic bones.(Table 4). There was absolute agreement of 47.61% between DVE and TAS prior to second stage caesarean section. There was fair correlation between DVE and TAS in second stage of labour for determining FHP, Kappa= 0.558; P value= <0.0001(Table 5)

Table 1: Labour outcomes with relation to foetal head position

	OA	LOA	ROA	ROT	LOT	ROP	LOP	OP	UD	TOTAL
Vaginal	139 (95.2%)	116 (95.08%)	30 (90.9%)	0 (0.00%)	0 (0.00%)	2 (66.6%)	1 (50.0)	5 (71.4%)	9 (75.0%)	302 (90.1%)
Operative vaginal	2 (1.37%)	5 (4.1%)	3 (9.09%)	1 (14.2%)	0 (0.00%)	1 (33.3%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	12 (3.58%)
Caesarean	5 (3.42%)	1 (0.82%)	0 (0.00%)	6 (85.7%)	3 (100.0%)	0 (0.00%)	1 (50.0%)	2 (28.5%)	3 (25.0%)	21 (6.27%)

Table 2: Agreement between foetal head position in vaginal examination and ultrasonography in "operative vaginal delivery"

	Actual no. Diagnosed by TAS (Number/ %)	**Absolute agreement with DVE (Number/ %)**
Occiput-anterior position	10(83.33%)	7(70.0%)
Occiput-transverse position	1(8.33%)	1(100.0%)
Occiput-posterior position	1(8.33%)	0(0.00%)
Total	12(100.00%)	8(66.67%)

Table 3: Correlation of foetal head position on vaginal examination and ultrasonography in "operative vaginal delivery"

		FHP IN 2ND STAGE BY USG (N=12)					Total
		LOA	OA	ROA	ROP	ROT	
FHP in 2nd Stage by DVE	LOA	**3 (25.00%)**	1 (8.33%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	**4 (33.33%)**
	OA	1 (8.33%)	**1 (8.33%)**	0 (0.00%)	0 (0.00%)	0 (0.00%)	**2 (16.67%)**
	ROA	0 (0.00%)	0 (0.00%)	**3 (25.00%)**	0 (0.00%)	0 (0.00%)	**3 (25.00%)**
	ROT	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (8.33%)	**1 (8.33%)**	**2 (16.67%)**
	UNDETERMINED	1 (8.33%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	**1 (8.33%)**
Total		**5 (41.67%)**	**2 (16.67%)**	**3 (25.00%)**	**1 (8.33%)**	**1 (8.33%)**	**12 (100.00%)**

Table 4: Agreement between foetal head position in vaginal examination and ultrasonography in "caesarean section"

	Actual no. Diagnosed by TAS (Number/ %)	**Absolute agreement with DVE (Number/ %)**
Occiput-anterior position	6(28.57%)	5(83.33%)
Occiput-transverse position	9(42.85%)	4(44.44%)
Occiput-posterior position	3(14.28%)	1(33.33%)
Undetermined	3(14.28%)	0(0.00%)
Total	21(100.00%)	10(47.61%)

Table 5: Correlation of foetal head position on vaginal examination and ultrasonography in "caesarean section"

		FHP IN 2ND STAGE BY USG							Total
		LOA	**LOP**	**LOT**	**OA**	**OP**	**ROT**	**UNDETERMINED?**	
FHP in 2nd Stage by DVE	**LOA**	**1 (4.76%)**	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (4.76%)
	LOP	0 (0.00%)	**0 (0.00%)**	1 (4.76%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (4.76%)
	LOT	0 (0.00%)	1 (4.76%)	**2 (9.52%)**	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	3 (14.29%)
	OA	0 (0.00%)	0 (0.00%)	0 (0.00%)	**4 (19.05%)**	0 (0.00%)	0 (0.00%)	0 (0.00%)	4 (19.05%)
	OP	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	**1 (4.76%)**	0 (0.00%)	3 (14.29%)	4 (19.05%)
	ROA	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (9.52%)	0 (0.00%)	2 (9.52%)
	ROP	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (4.76%)	1 (4.76%)	0 (0.00%)	2 (9.52%)
	ROT	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	**2 (9.52%)**	0 (0.00%)	2 (9.52%)
	UNDETERMINED	0 (0.00%)	0 (0.00%)	0 (0.00%)	1 (4.76%)	0 (0.00%)	1 (4.76%)	0 (0.00%)	2 (9.52%)
	Total	1 (4.76%)	1 (4.76%)	3 (14.29%)	5 (23.81%)	2 (9.52%)	6 (28.57%)	3 (14.29%)	21 (100.00%)

Discussion

Accurate intrapartum assessment of FHP is considered important for the management of both normal and abnormal labours as this influences the obstetric outcomes such as management of labour dystocia, choice of instruments for assisted delivery, success of vaginal delivery and fetomaternal complication.[3] In present study, 90.15% women had normal vaginal delivery, 3.58% had OVD and 6.27% underwent CS. Vaginal delivery was favourable for 94.37% cases of OA (occiput-anterior) and 66% of OP (occiput posterior) positions. In a similar study, Gardberg et al reported OA as the most common positions to be delivered vaginally and OP positions to be more commonly delivered by OVD or CS.[7] In another article by the authors of current study, the FHP by DVE significantly correlated with TAS in anterior positions ($p<0.0001$) and kappa showed moderate concordance (0.606). In 72 (22.98%) women DVE differed by >45° with respect to TAS.[8]

The rate of error was found to be 50-76% with vaginal examination when ultrasound examination findings were taken as gold standard in studies by Akmal et al and Sherer et al.

Sherer et al studied 112 patients and reported agreement in 40% of cases (p=0.044) and kappa was fairly concordant (0.25) in second stage of labour between DVE and TAS. When vaginal examinations recorded within ±45° of the USG assessments were considered as consistent, it increased the agreement to 68% however kappa was fairly concordant (0.30).[9] Akmal et al studied 64 patients immediately before OVD and found that the difference was >45° in 19% of cases between the two modalities.[10] Zara et al studied 34 patients and reported absolute agreement between DVE and TAS in 27(54%) of cases (kappa 0.073) and agreement with ±45° allowance was in 40 (80%) of cases (kappa=0.728).[11] Hence digital examinations are reliable for anterior positions in second stage of labour, however ultrasound should be used as an adjunct for confirmation in occiput posterior and transverse positions as these can be misdiagnosed on vaginal examination. Dupuis et al reported that they were unable to locate the FHP in second stage of labour by DVE in 7 out of 110 women, similar to the findings of current study.[12] Hence TAS is useful in such conditions with an advantage to provide an opportunity to objectively assess the FHP as well as being non intrusive and comfortable for the labouring woman.[13]

Correct determination of FHP in second stage of labour is particularly useful before instrumental delivery because errors in assessment may result in deflexed and asynclitic head attitudes and consequent failure of vaccum delivery.[5] In the present study, 12(3.58%) women underwent OVD (vaccum or forceps assisted). DVE was able to determine correct FHP in 100% observations in ROT and ROA in second stage of labour. DVE had agreement with TAS during second stage of labour in 7(70%) observations in OA positions. There was no agreement between DVE and TAS in OP positions (kappa=0.633). Akmal et al reported 75% agreement in determining FHP by DVE and TAS prior to instrumental delivery and the accuracy of digital examination was higher in OA positions (83%) than it was for OT and OP positions (54%) as was in current study.[14] In current study there was no case of failed instrumental delivery and vaccum cup displacement. Mola *et al*. examined the outcome of 59 trials of instrumental deliveries and reported that in the 12 cases in which the trial failed, it was 4.5 times more likely that a deflexing application of the vacuum cup had been performed, which more commonly occurs with occiput-lateral or posterior position.[15] Vacca and Kreiser examined the outcome of 244 vacuum extractions and reported that incorrect application and failure is associated with neonatal injury in the form of subdural or cerebral, intraventricular and subarachnoid haemorrhage.[16] Therefore, early diagnosis will help the obstetrician to provide women with additional information about the timely need for OVD. Kappa showed good concordance (0.633) between DVE and USG in instrumental delivery. In the current study ultrasound was able to correctly diagnose and facilitate instrumental delivery in OA and OT positions.

OP is the most common malposition at term with an incidence of 2-10% cases in labour. In 90% cases it rotates anteriorly, while the remaining 10% should be accurately diagnosed for they may account for second stage. CS.[3] In the present study, caesarean sections were done in 21(6.26%) women mainly for arrest of descent of head apart from foetal indication. Women undergoing CS in first stage were excluded from the study to maintain uniformity in both stages of labour. DVE was able to determine FHP in second stage of labour before CS in 5(83.33%) cases in OA positions and 4 cases (44.44%) in OT positions. Agreement between DVE and TAS was seen in one (33.33%) woman with OP positions. Akmal et al studied 601 women and reported the incidence of caesarean in OP position in 19% and occiput transverse and anterior position in 11%.[17] TAS was undetermined in 3(14.28%) observations in which the foetal head was deep seated in maternal pelvis or view of foetal occiput was obstructed due to maternal pubic bones.

Conclusion

A higher percentage of the foetal occiput-transverse and occiput-posterior positions are misdiagnosed on digital vaginal examination (DVE). Transabdominal ultrasonography (TAS) compared to DVE can be a useful adjunct to correctly determine the FHP prior to instrumental delivery and to facilitate delivery of the foetal head in second stage caesarean section.

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Journal Scan

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Continued Versus Discontinued Oxytocin Stimulation in the Active Phase of Labour (CONDISOX): Double Blind Randomised Controlled Trial

Sidsel Boie, Julie Glavind, Niels Uldbjerg Philip J Steer, Pinar Bor

BMJ 2021;372:n716. (Published 14 April 2021)

Objective: To determine whether discontinuing oxytocin stimulation in the active phase of induced labour is associated with lower caesarean section rates.

Design: International multicentre, double blind, randomised controlled trial.

Setting: Nine hospitals in Denmark and one in the Netherlands between 8 April 2016 and 30 June 2020.

Participants: 1200 women stimulated with intravenous oxytocin infusion during the latent phase of induced labour.

Intervention: Women were randomly assigned to have their oxytocin stimulation discontinued or continued in the active phase of labour.

Main Outcome Measure: Delivery by caesarean section.

Results: A total of 607 women were assigned to discontinuation and 593 to continuation of the oxytocin infusion. The rates of caesarean section were 16.6% (n=101) in the discontinued group and 14.2% (n=84) in the continued group (relative risk 1.17, 95% confidence interval 0.90 to 1.53). In 94 parous women with no previous caesarean section, the caesarean section rate was 7.5% (11/147) in the discontinued group and 0.6% (1/155) in the continued group (relative risk 11.6, 1.15 to 88.7). Discontinuation was associated with longer duration of labour (median from randomisation to delivery 282 *v* 201 min; P<0.001), a reduced risk of hyperstimulation (20/546 (3.7%) *v* %12.9) 541/70); P<0.001), and a reduced risk of fetal heart rate abnormalities (%27.9) 548/153) *v* %40.8) 537/219); P<0.001) but rates of other adverse maternal and neonatal outcomes were similar between groups.

Conclusions: In a setting where monitoring of the fetal condition and the uterine contractions can be guaranteed, routine discontinuation of oxytocin stimulation may lead to a small increase in caesarean section rate but a significantly reduced risk of uterine hyperstimulation and abnormal fetal heart rate patterns.

Tranexamic Acid for the Prevention of Blood Loss after Cesarean Delivery

Loïc Sentilhes, Marie V. Sénat, Maëla Le Lous, Norbert Winer, Patrick Rozenberg, et al

N Engl J Med 2021; 384:1623-1634 (April 29, 2021)

Background: Prophylactic administration of tranexamic acid has been associated with reduced postpartum blood loss after cesarean delivery in several small trials, but evidence of its benefit in this clinical context remains inconclusive.

Methods: In a multicenter, double - blind, randomized, controlled trial, we assigned women undergoing cesarean delivery before or during labor at 34 or more gestational weeks to receive an intravenously administered prophylactic uterotonic agent and either tranexamic acid (1 g) or placebo. The primary outcome was postpartum hemorrhage, defined as a calculated estimated blood loss greater than 1000 ml or receipt of a red-cell transfusion within 2 days after delivery. Secondary outcomes included gravimetrically estimated blood loss, provider-assessed clinically significant postpartum hemorrhage, use of additional uterotonic agents, and postpartum blood transfusion.

Results: Of the 4551 women who underwent randomization, 4431 underwent cesarean delivery, 4153 (93.7%) of whom had primary outcome data available. The primary outcome occurred in 556 of 2086 women (26.7%) in the tranexamic acid group and in 653 of 2067 (31.6%) in the placebo group (adjusted risk ratio, 0.84; 95% confidence interval [CI], 0.75 to 0.94; P=0.003). There were no significant between-group differences in mean gravimetrically estimated blood loss or in the percentage of women with provider-assessed clinically significant postpartum hemorrhage, use of additional uterotonic agents, or postpartum blood transfusion. Thromboembolic events in the 3 months after delivery occurred in 0.4% of women (8 of 2049) who received tranexamic acid and in 0.1% of women (2 of 2056) who received placebo (adjusted risk ratio, 4.01; 95% CI, 0.85 to 18.92; P=0.08).

Conclusions: Among women who underwent cesarean delivery and received prophylactic uterotonic agents, tranexamic acid treatment resulted in a significantly lower incidence of calculated estimated blood loss greater than 1000 ml or red-cell transfusion by day 2 than placebo, but it did not result in a lower incidence of hemorrhage-related secondary clinical outcomes.

Induction of Labor at Term with Vaginal Misoprostol or a PGE2 Pessary: a Noninferiority RCT

Adrien Gaudineau, Marie-Victoire Senat, Virginie Ehlinger, Patrick Rozenberg, Christophe Ayssiere

American Journal of Obstetrics and Gynecology, Available online 19 April 2021: In Press

DOI: https://doi.org/10.1016/j.ajog.2021.04.226

Background: Induction of labor is among the most common procedures for pregnant women. Only a few randomized clinical trials (RCT) with relatively small samples have compared misoprostol to dinoprostone. Although their efficacy appears similar, their safety profiles have not been adequately evaluated and economic data are sparse.

Objective: To test the noninferiority of vaginal misoprostol (PGE1) (25 µg) to a slow-release dinoprostone (PGE2) pessary (10 µg) for induction of labor with an unfavorable cervix at term.

Study Design: Open-label multicenter randomized noninferiority trial at 4 university hospitals of the Research Group in Obstetrics and Gynecology (GROG) between 2012 and 2015. We recruited women with labor induced for medical reasons, a Bishop score ≤ 5 at ≥ 36 weeks, and a cephalic-presenting singleton pregnancy with no prior cesarean delivery. Women were randomly allocated to receive either vaginal misoprostol at 4-hour intervals (25 µg) or a 10-mg slow-release dinoprostone pessary. The primary outcome was the total cesarean delivery rate. Noninferiority was defined as a difference in the cesarean delivery rates between the groups of no more than 5%. Secondary outcomes included neonatal and maternal morbidity, vaginal delivery < 24 hours after starting the induction process, and maternal satisfaction.

Results: The study included 1674 randomized women. The per-protocol analysis included 790 in each group. The total cesarean delivery rate in the misoprostol group was 22.1% (n=175) and in the dinoprostone group, 19.9% (n=157), for a difference between the groups of 2.2% (with an upper-bound 95% confidence limit of 5.6%), *P*=.092. Results in the intention-to-treat analysis were similar. Neonatal and maternal morbidity were similar between groups. Vaginal delivery within 24 hours was significantly higher in the misoprostol group (59.3% vs 45.7%, *P*<.001) as was maternal satisfaction, assessed in the postpartum period by a visual analog scale: mean score: 7.1 (SD 2.4) vs 5.8 (3.1), *P*<.001.

Conclusion: The noninferiority of 25-µg vaginal misoprostol every four hours to the dinoprostone pessary for CD rates after IOL at term could not be demonstrated, although the confidence limit of the difference barely exceeded the noninferiority margin. Nonetheless, given the small difference between these cesarean rates and the similarity of neonatal and maternal morbidity rates in this large study, the clinical risk-benefit ratio justifies the use of both drugs.

Cross Word Puzzle

Niharika Guleria
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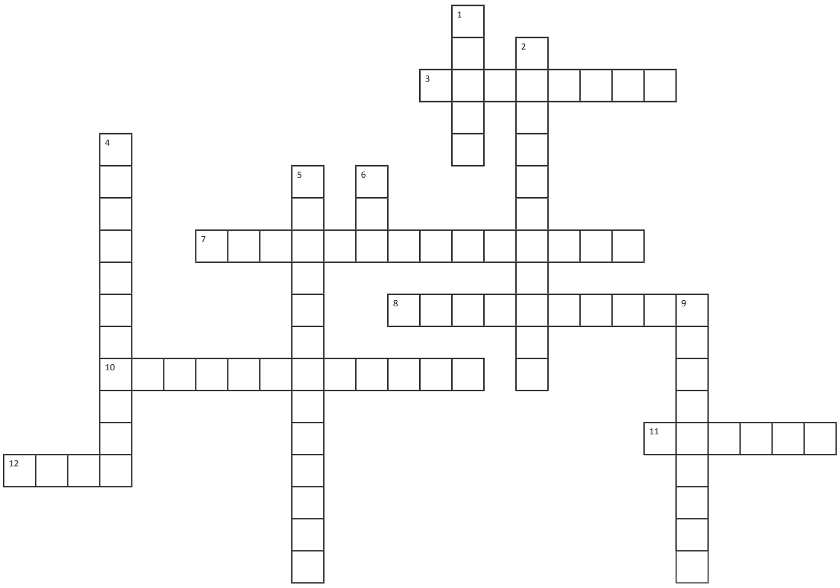

Down

1. Percentage incidence of morbid adherent placenta in placenta previa with previous 3 caesarean section
2. Tocolytic drug that can be used to manage uterine tachysystole
4. Uterotonic contraindicated in hypertension
5. Procedure found useful for the management of repetitive variable decelerations
6. Bishop score assessed after how many hours of PGE2 gel insertion
9. Pattern of increased variability >25 BPM lasting > 30 mins on CTG known as

Across

3. First graphical analysis of labour given by professor
7. WOMAN trial endorses use of this drug to reduce mortality in post part haemorrhage (PPH)
8. 2 reassuring + 1 non reassuring feature on cardiotocograph (CTG) trace categorised as
10. Drug used for patient controlled analgesia
11. Type of vertical compression suture used for PPH
12. Robson group number accounting for maximum cases of caesarean section

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Pictorial Quiz

Divya Pandey
Associate Professor, Obstetrics & Gynaecology, Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi

(Questions: Refer to picture on page 56)

Ques 1: What is the appropriate plan of action at 6:00hrs for the parturient mother as per the LCG shown?

a. Offer companion / Pain Relief/ Augment uterine contractions.
b. Offer companion/ Pain Relief.
c. Offer companion/ Pain relief/ correct hydration/ Augment uterine contractions.
d. Offer companion/ pain relief/ correct hydration/ Augment uterine contractions / arrange blood/ careful labour monitoring in view of occipetoposterior position.

Ques 2: Describe fetal parameters at 14:00hrs as per the LCG shown?

a. Late deceleration
b. Normal fetal parameters
c. Occipeto-posterior position with late deceleration
d. Occipeto-posterior position/ Late deceleration with Caput (3+)/ Moulding (3+) /Meconium (3+)

Ques 3: What is the diagnosis and appropriate management at 14:00hrs as per the LCG shown?

a. Arrest of active phase of labour → stop oxytocin / watch for progress of labour
b. Arest of active phase of labour with fetal distress → in–utero fetal resuscitation followed by routine monitoring
c. Arrest of active phase of labour with fetal distress → stop oxytocin, plan for operative vaginal delivery
d. Arrest of active phase of labour with features of Obstructed labour with fetal distress → stop oxytocin- prepare for Em LSCS

Pictorial Quiz

WHO LABOUR CARE GUIDE

Name Mrs X Parity 2 Labour onset Spontaneous, Active labour diagnosis [Date 16/4/21]

Ruptured membranes [Date 16/4/21 Time 5:00] Risk factors moderate anemia

		ALERT	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00
	Hours		1	2	3	4	5	6	7	8	9
			ACTIVE FIRST STAGE								
SUPPORTIVE CARE	Companion	N	N	Y	Y	Y	Y	Y	Y	Y	Y
	Pain relief	N	N	Y	Y	Y	Y	Y	Y	Y	Y
	Oral fluid	N	N	Y	Y	Y	Y	Y	Y	N	Y
	Posture	SP	MO	SP	SP	SP	SP	SP	SP	SP	SP
BABY	Baseline FHR	<110, ≥160	142 / 144	132 / 134	140 / 130	140 / 138	128 / 140	132 / 140	130 / 132	140 / 130	100
	FHR deceleration	L	N / N	N / N	V / N	N / N	N / N	N / N	V / N	N / N	L
	Amniotic fluid	M+++, B	C				C				M+++
	Fetal position	P, T	P				P				P
	Caput	+++	0				+				+++
	Moulding	+++	0				+				+++
WOMAN	Pulse	<60, ≥120	98				108				128
	Systolic BP	<80, ≥140	120				128				110
	Diastolic BP	≥90	80				82				88
	Temperature °C	<35.0, ≥37.5	36.5°				37°				39°
	Urine	P++, A++	-/-				-/-				-/-
	Contractions per 10 min	≤2, >5	2 / 3	3 / 3	3 / 3	3 / 3	3 / 4	3 / 3	4 / 3	3 / 3	3
	Duration of contractions	<20, >60	15 / 30	35 / 40	40 / 40	40 / 40	40 / 40	40 / 40	40 / 45	45 / 50	45
LABOUR PROGRESS	Cervix [Plot X] 10										
	9	≥ 2h									
	8	≥ 2.5h									
	7	≥ 3h					X				X
	6	≥ 5h	X								
	5	≥ 6h									
	Descent [Plot O] 5										
	4		O								
	3						O				O
	2										
	1										
	0										
MEDICATION	Oxytocin (U/L, drops/min)		2 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min	4 mIU/min
	Medicine		N	N	N	N	N	N	N	N	N
	IV fluids		N	N	N	N	N	N	N	N	Y
SHARED DECISION-MAKING	ASSESSMENT		PAIN RELIEF NEEDED	NORMAL PROGRESS (NP)	NORMAL PROGRESS (NP)	NORMAL PROGRESS (NP)	NP	NP	NP	NP	FEATURES OF OBSTRUCTED LABOUR WITH FETAL DISTRESS
	PLAN		OFFER COMPANION Inj PCM 500mg iv infusion CORRECT HYDRATION	AUGMENT UT. CONTRACTIONS ARRANGE BLOOD	CONTINUE ROUTINE	MONITORING (RM)	RM		RM	ENCOURAGE ORAL FLUIDS	STOP OXYTOCIN PREPARE FOR EM LS
	INITIALS		DP	DP	DP	DP	DP	DP	DP	DP	DP

ALERT ← ACTIVE FIRST STAGE → ← SECOND STAGE →

In active first stage, plot 'X' to record cervical dilatation. Alert triggered when lag time for current cervical dilatation is exceeded with no progress. In second stage, insert 'P' to indicate when pushing begins.

INSTRUCTIONS: CIRCLE ANY OBSERVATION MEETING THE CRITERIA IN THE 'ALERT' COLUMN, ALERT THE SENIOR MIDWIFE OR DOCTOR AND RECORD THE ASSESSMENT AND ACTION TAKEN.IF LABOUR EXTENDS BEYOND 12H, PLEASE CONTINUE ON A NEW LABOUR CARE GUIDE.

Abbreviations: Y – Yes, N – No, D – Declined, U – Unknown, SP – Supine, MO – Mobile, E – Early, L – Late, V – Variable, I – Intact, C – Clear, M – Meconium, B – Blood, A – Anterior, P – Posterior, T – Transverse, P+ – Protein, A+ – Acetone

Mail the answers to editorsaogd2021@gmail.com. The correct answers and names of the three winners will be announced in the next issue.

Association of Obstetricians & Gynaecologists of Delhi

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