Volume 23, May 2023, Issue 1

AOGD BULLETIN

Holistic Approach to Women's Health

Theme Issue : Fetal Health & Adolescent Dilemmas

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From the AOGD Office

Dr Amita Suneja

Dr Abha Sharma

Dr A G Radhika

Very Warm Greetings from the office!

It gives us great pleasure to take over the reins of the AOGD office for the next year and we want to thank you for your tremendous trust. With more than 2500 members, it is an honor and privilege to serve AOGD. The wisdom and experience of our esteemed patrons, advisers, and executive council members will guide our efforts.

Our work will focus on three objectives i.e.

I. To project AOGD as a prime society in FOGSI

II. Uplift the health of women in all phases of life

III. Upgradation of knowledge and skills of the members

To achieve our goal of "Holistic Approach to Women's Health" for this year, we will work continuously and dedicatedly. We plan to get interesting insights on wellness and women's health from our age-old traditional system of Ayurveda.

New strategies and activities have traditionally been undertaken by each team every year to keep the members updated on the various aspects of obstetrics and Gynecology.

We are happy to announce that we will be adding a section on designated Health Day of each month to our website, as well as posting updates on recent guidelines and increasing our social media presence on Twitter and Instagram.

There are several plans for the bulletin, including the introduction of new sections such as a research hub, Medico-legal corner, procedure-related images/videos, important health days of the month, and a resident's corner. As part of the Bulletin's goal to cater to a broader audience, each issue will contain a section covering important topics in Obstetrics and Gynecology.

We will continue to hold monthly online meetings, webinars and in person CMEs/workshops ensuring inclusivity of all members. Preparations are underway for the 45th Annual AOGD Conference which is from 18-20 August 2023

We are looking forward to a fruitful and exciting year ahead, and we would be happy to receive your suggestions.

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From the Editor's Desk

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Dear seniors and friends

This year, the editorial team from the Deptt of Obstetrics and Gynaecology, UCMS & GTBH has taken up the responsibility to bring to you latest academic updates, with contribution from eminent authors. We are ready to welcome this summer with new colors and flavours!

At the outset we would like to congratulate the team from MAMC for bringing out very thought provoking and interesting issues in their tenure.

This year our aim is to cover both Obstetric and Gynaecology topics in every issue so that we have a wider reader audience. The present issue is focused on fetal health and adolescent dilemmas. Common topics have been covered including aneuploidy screening, fetal monitoring, adolescent endometriosis, adolescent surgeries to name a few. Newer sections have been introduced for a broader perspective. For medicolegal section, we have brought the topic of sexual assault in adolescents and an algorithm is added to simplify management of ambiguous genitalia. In snap shot section we have interesting images of innovation in vaginal mould in vaginoplasty. Do watch out for this section in subsequent issues as it will have interesting videos in the embedded link. The research hub has touched on new Maternal and Fetal Adverse Event Terminology: MFAET for fetal medicine research. Concurrent with AOGD theme of holistic health, the section health harmony and happiness focuses on naturopathy for common gynaecological conditions.

Besides a lot of academic information, there are lighter moments including lovely poems written by our residents 'Dil Se' and a crossword puzzle with medical jargons. Hope you will sit back and enjoy reading the bulletin over a cup of coffee!

We encourage more and more gynaecologists to join the AOGD family and membership form is attached for the same. With the motto of "Vasudhaiva Kutumbakam" meaning that the whole world is one single family, let us stay united and contribute in the progress of our fraternity!

Warm Regards

AOGD Editorial Team 2023-24

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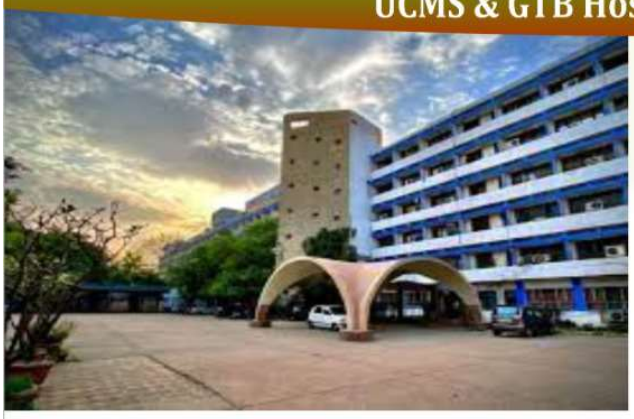

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Aneuploidy Screening in Pregnancy: From Basics to Beyond and the Questions in Between

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The topic Overview:

1. Who should be screened?
2. What are the screening approaches available?
3. What is the role of biochemistry in the era of NIPT?
4. What is the role of expanded conventional first trimester screening?
5. NIPT: Does it challenge the NT scan?
6. Is there a current role of expanded NIPT? Interpretation of test reports
7. How to counsel following a screen positive report?
8. How to counsel following a screen negative result?
9. How to interpret of Cell-Free DNA Test failures ?
10. How to interpret soft markers on second trimester anomaly scan

Additional Questions:

11. Raised NT and when to test for Rasopathies?
12. What additional information may be obtained from abnormal analyte screening?
13. Screening in twins

1. Who should be screened?

(The Rationale and the pre and post screening notes)

The recommendation:

ACOG recommends prenatal genetic screening and diagnostic testing options should be discussed and offered to all pregnant women regardless of maternal age or any other risk factors and all patients have the right to accept or decline testing after counselling

The rationale:

Although the risk of aneuploidy increases with advancing maternal age, most children with trisomy 21 are born to younger patients because a larger proportion of pregnant women are young. Unlike aneuploidies, copy number variants are independent of maternal age and occur in approximately 0.4% of pregnancies. Based on a systematic review, pregnancies in patients under 36 years of age have a higher risk for microarray abnormalities than for trisomy 21 (Table 1).

Table 1: Chromosomal Abnormalities in Second-Trimester Pregnancies Based on Maternal Age at Term[1]

Age	Trisomy 21	Microarray or Rare Chromosomal Abnormality	All Chromosomal Abnormalities
20	1 in 1250	1 in 270	1 in 122
25	1 in 1000	1 in 270	1 in 119
30	1 in 714	1 in 270	1 in 110
35	1 in 294	1 in 270	1 in 84
40	1 in 86	1 in 270	1 in 40

Table 2: Points of Pre-test and Post Test Counselling

Pre-test Counselling	Post-Test Counselling
Points in Counselling: • Inform regarding chromosomal disorders • Inform regarding specific risk of carrying a fetus with a chromosomal abnormality • Review relevant personal and family history • Discuss risks, limitations, and benefits of available tests	Test Negative : Discuss • Concept of residual risk (chance that an abnormality may still be present even if the test result is screen negative) • Consider detection rate of each test • Consider conditions targeted in screening Test Positive • Provide information on likelihood of fetal affection (PPV) • Options for additional testing

2. What are the screening approaches available ?

Table 3: Aneuploidy Screening Approaches[2]

Screening approach	POG (Weeks)	Markers	Detection rate for trisomy 21 (%)
Nuchal translucency scan	11-13 6/7	NT	70
Dual marker	11-13 6/7 (free beta HCG) 10-13 6/7 (total beta HCG)	PAPP – A and Beta HCG	70
Combined test	11-13 6/7 (free beta HCG) 10-13 6/7 (total beta HCG)	1.Maternal age 2.PAPP-A and Beta HCG 3.NT	82-87
Triple marker	15- 18 weeks	1.AFP 2.uE3 2.Beta HCG	65
Quadruple screen	15-22 weeks (best is 15-18)	1. AFP 2. uE3 3. Beta HCG 4. Inhibin A	81
Full integrated test	10-13 6/7 and then 15-22	1. NT and PAPP A 2. AFP, uE3, HCG, inhA First trimester results not provided	96
Serum integrated	10-13 6/7 and then 15-22	1. PAPP – A 2. AFP, uE3, HCG, InhA First trimester results not provided	88
Sequential stepwise	10-13 6/7 and then 15-22	1. PAPP – A 2. AFP, uE3, hCG, InhA First trimester portion of integrated screen provided High risk – offer CVS / NIPT Low risk – proceed with second trimester screening	95
Contingent screening	10-13 6/7 and then 15-22	1. PAPP – A 2. AFP, uE3, hCG, InhA First trimester portion of integrated screen provided High risk – offer CVS / NIPT intermediate – proceed with second trimester screening low risk – no further testing	88-94
NIPS	9-10 weeks to term	Cell free fetal DNA	99%

NT – nuchal translucency
HCG – Human chorionic gonadotrophin
PAPP – A – pregnancy associated plasma protein A
AFP – alpha fetoprotein
uE3- unconjugated estriol
InhA- inhibin A

As highlighted, the best approach is to offer the first trimester screening (FTS). If first trimester window is missed, second trimester quad is a reasonable option.

The use of multiple serum screening approaches performed independently (Example- A first trimester screening test followed by a quad screen as an unlinked test) is not recommended as it will result in an unacceptably high positive screening rate and could deliver contradictory risk assessments.

3. What is the Role of Biochemistry in the era of NIPT?

The following recent studies compare serum biochemistry with NIPT in the first trimester: (Table 4).

If a protocol of sequential screening is used, the detection rate of all chromosomal abnormalities is higher than for cfDNA alone[5]. This is largely due to identification of rare chromosomal abnormalities and also because some chromosomal aneuploidies (particularly trisomy 13 and 18) are not detected by cfDNA screening due to test failure. However, even if all patients with failed cfDNA screens are considered screen positive, the detection rate of

Table 4: Comparison of FTS and NIPT

	FTS	cfDNA
Nortan ME, 2015[3] (15,841 patients)		
False Positive	5.4%	0.06%
PPV	3.4%	80.9%
Hui L , 2019[4] (66,166 patients)		
Sensitivity	89.6%	100%
Screen Positivity	2.9%	2.4%
Rate of Major Chromosomal abnormality after low risk report	8.4/10,000	13/10,000

cfDNA remains lower than sequential screening. cfDNA screening would have detected 70.7% of chromosome abnormalities and 77.1% if no results cases were considered screen positive. Sequential screening, however, is not a routine practice in India

4. What is the Role of Expanded conventional first trimester screening?

First trimester expanded biochemistry with free Beta human chorionic gonadotropin, pregnancy-associated plasma protein A, alpha-fetoprotein, placental growth factor and dimeric inhibin A along with USG screening, has reported to achieve very high DRs with low FPRs

Practice Point

If a patient chooses screening for aneuploidy, only one screening approach should be used. Analyte screening and cell-free DNA screening should not be sent concurrently as this strategy is not cost-effective and simultaneous, seemingly discordant results can be more distressing to patients than screen positive analyte results followed by reassuring cell-free DNA screening .

98% at a 1.2% false positive rate[6]. Such screening fits well with proposed contingency protocols utilizing cell-free DNA as a secondary or reflex but also provides the advantages of identification of pregnancies at risk for other adverse outcomes such as early-onset preeclampsia. Studies from India[7], have reported some experience of using these tests with improved performance of screening and facilitation of screening for preeclampsia. However, more evidence is needed before incorporation into routine clinical practice.

5. NIPT: Does it challenge the NT scan?

No, NT scan is now regarded as a mini anomaly scan and provides much more information than just aneuploidy screening. Even for aneuploidy screening among the women considered eligible for cfDNA based on advanced maternal age, it was reported by Vora et al in 2017[8], that 16.1% (377/2337) had an ultrasound finding (anomaly, incorrect dating, multiple gestation, non-viable pregnancy) at the time of testing that would have altered the provider's counseling regarding the prenatal screening/testing strategy. Also in another study, by Berger et al in 2020[9], NT measurement detected 16% of rare chromosomal anomalies that would be missed on karyotype analysis. Additionally, if cell-free DNA were used as the only first trimester screening test, 34% of fetal congenital abnormalities would be missed in the first trimester of pregnancy[10].

6. Is there a current role of expanded NIPT?

In addition to screening for the common aneuploidies, some laboratories offer testing for other aneuploidies such as trisomy 16 and trisomy 22, microdeletion testing, and genome-wide screening of large copy number changes. Nonmosaic fetal trisomy 16 or 22 is associated with a nonviable gestation. Mosaic trisomy 16 and 22 can be associated with fetal survival; however, screening is not recommended because the screening accuracy with regard to detection and the false-positive rate is not established.

If a microdeletion is identified through cell-free DNA screening, it should be confirmed by diagnostic testing, as most positive results will be false-positive results because of the low prevalence of these disorders. If the diagnostic test confirms a microdeletion, the patient should be referred to a health care professional with genetics expertise to discuss the diagnosis and implications and to develop a management plan

7. How to counsel following a screen positive report?

Patients must be offered genetic counseling and a detailed ultrasound. The various options to confirm the results with a diagnostic test must be discussed. No critical decisions must be taken based on positive screening results.

7.1 Cf DNA Screen Positive:

Consider Positive predictive value (PPV) of cfDNA test while interpretation.

- PPV is the chance that a screen positive test is a true positive result,
- Affected by the population prevalence and the type of disorder studied.
- Some, but not all, laboratories report the PPV

as part of the results.

- Online calculators are available to help determine the PPV: https://www.med.unc.edu/mfm/nips-calc/

7.2 Screen Positive (Serum or cfDNA) in the presence of abnormal USG finding

- Increased possibility of chromosomal abnormality
- Confirmatory testing recommended (Trisomy or translocation)
- Implications for future pregnancy

7.3 Serum analyte Positive : Secondary

Table 5: The Effect of Maternal Age on the Positive Predictive Value of Cell-Free DNA Screening

	Age	Age related Risk	PPV
Trisomy 21	20	1:804	38-80%
	35	1:187	73-95%
	40	1:51	91-99%

Screening with NIPT

- In women who want to avoid diagnostic testing
- Informed about delay in diagnosis
- The residual risk of chromosomal abnormalities after serum screen positive and normal cfDNA has been reported be 2%[11] (44). This must be informed to the patient

8. How to counsel following a Screen Negative Result

Patients must be counselled that a screen negative result decreases the risk of the targeted aneuploidy but does not ensure that the fetus is unaffected. There could still be chance that the fetus could be affected by genetic disorders not evaluated by the screening. Even if patients have a negative screening test result, they may choose diagnostic testing later in pregnancy, particularly if some abnormal findings appear on USG.

9. How to Interpret of Cell-Free DNA Test Failures?

If the test is not reported or sent as uninterpretable the patient should be informed that :

- Patient must be informed that test failure is associated with an increased risk of aneuploidy. Norton et al 20155 reported that in a cohort 16,000 patients , with a 3% rate of a failed test, the prevalence of aneuploidy in this group to be 2.7% versus 0.4% in the overall cohort
- Further counselling for USG and diagnostic testing must be offered.
- If the USG is corroborative of aneuploidy or gestation is already advanced repeat testing is not advisable
- The chances of success on repeat testing are 75-80%, although it again depends on patient factors like BMI.

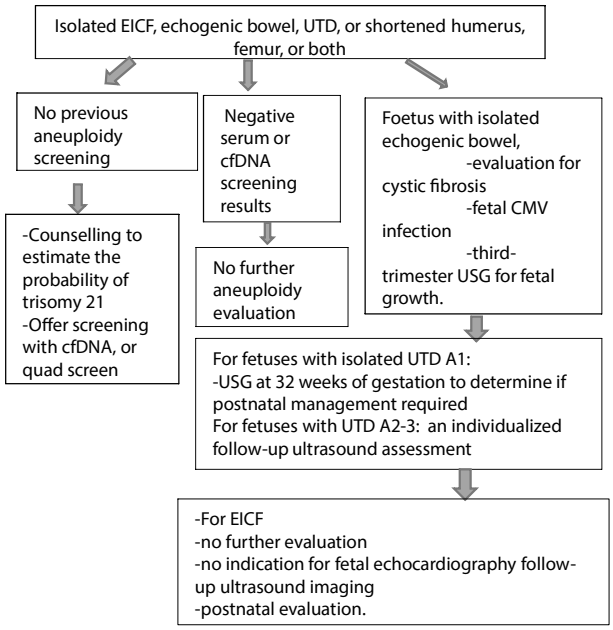
10. How to Interpret Soft Markers on Second trimester Anomaly Scan[12]

For multiple soft tissue markers, it is advisable to offer genetic and maternal fetal medicine consult for risk calculation based on likelihood ratios of several markers together.

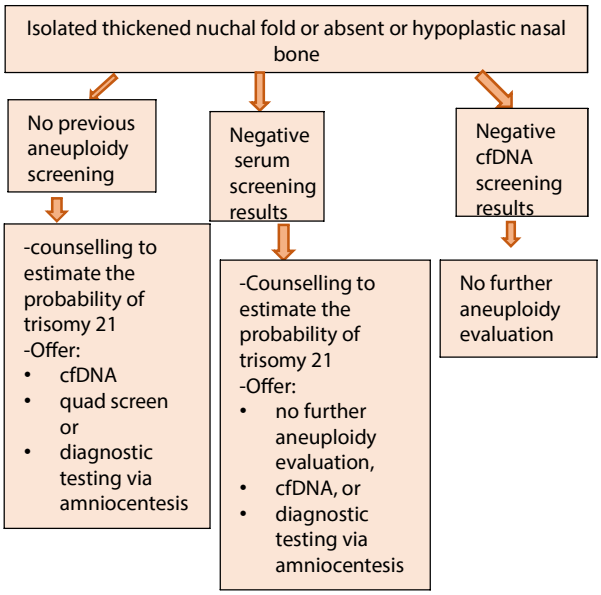
11. What is the approach to raised NT? When to look for Rasopathies?

Foetuses with a rasopathy show in general multiple ultrasound findings. the larger the NT

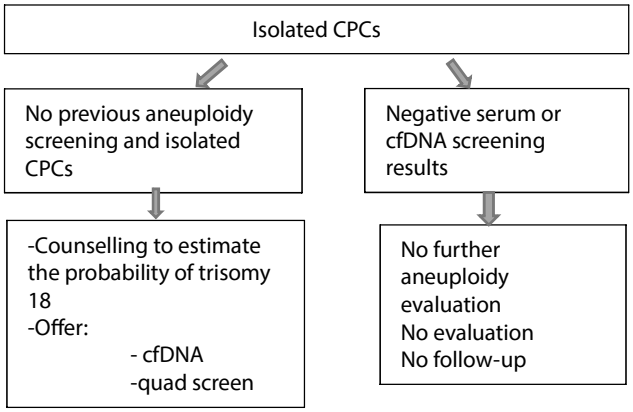
Scenario 1



Scenario 2:



Scenario 3:



and the longer it persists, the more likely it is to find a pathogenic variant. Rasopathy testing is recommended when the fetus shows an isolated increased NT ≥5.0 mm or when NT of ≥3.5 mm and at least one of the following ultrasound anomalies is present: distended jugular lymph sacs, hydrops fetalis, polyhydramnios, pleural effusion, ascites, cardiac defects and renal anomalies.

12. What additional information may be obtained from Abnormal analyte screening?

Serum analyte screening can identify pregnancies at risk for certain adverse pregnancy outcomes. In the first trimester, maternal serum levels of PAPP-A below the 5th percentile are independently associated with

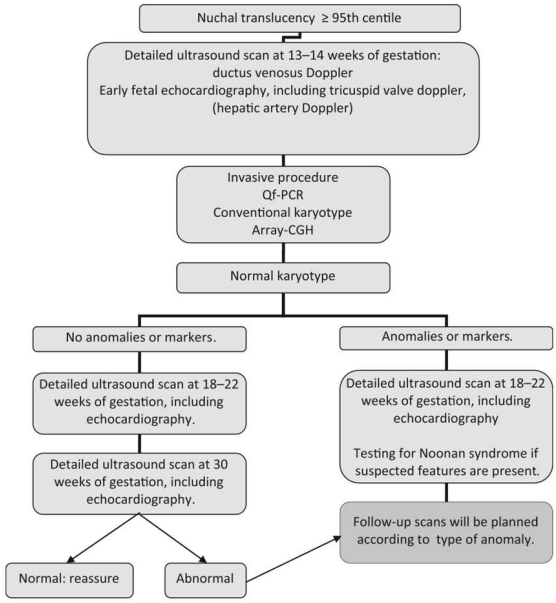


Figure 1: Flowchart for the clinical follow-up of a fetus with an increased nuchal translucency[12]

obstetric complications, such as spontaneous fetal and neonatal loss, fetal growth restriction, preeclampsia, placental abruption, and preterm delivery, although the PPV of this marker alone is poor. In the second trimester, elevated HCG, AFP, and DIA levels in pregnancies without structural anomalies are associated with an increased risk of fetal death, fetal growth restriction, and preeclampsia

13. What is the ideal method for Screening in Twins?

No method of screening for aneuploidy in twins is as accurate as in singleton pregnancies.

- A recent meta-analysis suggests that first-trimester combined screening in twins has a detection rate of 89% with a false-positive rate of 5.4%, which is similar to singleton gestations
- Second trimester screening has a detection rate of 60% with false positive rate of 5%
- NT screen has detection rate of 75% with 9% false positivity. For monochorionic, risk is same of both and hence we take average of the two NTs. For dichorionic risk is individualized for each twin and hence calculations of combined screen are made

using individual NTs

NIPT is acceptable but twin fetuses contribute different amounts of cell-free DNA into the maternal circulation. It is possible that an aneuploid fetus would contribute less fetal DNA, therefore masking the aneuploid test result.

In multifetal gestations, if a fetal demise, vanishing twin, or anomaly is identified in one fetus, there is a significant risk of an inaccurate test result if serum-based aneuploidy screening or cell-free DNA is used.

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AOGD Risk Management Support [ARMS] Group

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

Convener- Dr. Vijay Zutshi- 9818319110

Co convener- Dr. Aruna Nigam- 9868656051

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

Management of Abnormal Fetal Heart Rate Tracing

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Introduction

Cardiotocography (CTG) is a non-invasive, graphic recording of fetal heart rate (FHR) and uterine contractions by use of electronic devices indicated for assessment of fetal condition.

Baseline FHR and variability represents integrity of autonomic nervous system, accelerations represent integrity of somatic nervous system and decelerations represent sleep–activity cycle of fetus, ongoing mechanical or hypoxic stresses.

Indications of Intrapartum CTG monitoring

Women with any of the following maternal risk factors:

1. Previous LSCS or any other full thickness uterine scar.
2. Any hypertensive disorder requiring medication.
3. Prolonged ruptured membranes (unless women already in established labour at 24 hours after their membranes ruptured).
4. Any vaginal blood loss other than a show.
5. Suspected chorioamnionitis or maternal sepsis.
6. Pre-existing diabetes (type 1 or type 2) and gestational diabetes requiring medication.
7. Presence of meconium.
8. Tachysystole, Hyperstimulation.
9. Maternal tachycardia, Pyrexia.
10. Delay in the first or second stage of labour.
11. Regional anesthesia, Oxytocin usage.

Women with any of the following fetal risk factors:

1. Non-cephalic presentation (including breech, transverse, oblique and cord).
2. Fetal growth restriction (estimated fetal weight below 3rd centile).
3. Small for gestational age (estimated fetal weight below 10th centile) with other high-risk features such as abnormal doppler scan results, reduced liquor volume or reduced growth velocity.
4. Advanced gestational age (more than 42+0 weeks).
5. Anhydramnios or polyhydramnios.
6. Reduced fetal movements before the onset of contractions.

Interpreting CTG trace

Interpretation of continuous electronic fetal monitoring tracings must include comments on uterine contractions, baseline FHR, variability (fluctuations in the FHR around the determined baseline during a 10-minute segment), presence of accelerations and/or decelerations, and trends of continuous electronic fetal monitoring patterns over time. (Table-1) Intrapartum factors that must be considered before CTG interpretation are administration of neuraxial Anesthesia, use of magnesium sulfate, fetal growth restriction and meconium passage.

Categorisation of CTG trace

This is done taking into account 4 features: contractions, baseline fetal heart rate, variability and decelerations (Table 2).

Special considerations for CTG traces in the second stage of labour:

1. Interpretation is more challenging so a lower threshold is kept for seeking assistance.
2. Fetal heart rate is differentiated from maternal heart rate once every 5 minutes.
3. An increase in the baseline fetal heart rate of 20 beats a minute or more is a red feature.
4. In case of concerning features, ask the pt. to stop pushing and stop oxytocin unless birth is imminent.

Table 1: Classification of CTG trace components

Components	White	Amber	Red
Contractions	fewer than 5 contractions in 10 minutes	5 or more contractions in 10 mins or hypertonus	
Baseline fetal heart rate	110-160 beats/ min	-Increase in baseline of 20 or more beats in last hour -100-109 beats/ min -Unable to determine baseline	<100 or >160 beats/min
Variability	5-25 beats/min	<5 beats/min for 30-50mins >25 beats/min for upto 10 mins	<5 beats/ min for >50mins >25 beats/ min for > 10 mins Sinusoidal
Decelerations	-No decelerations -Early decelerations -Variable decelerations with no concerning characteristics	-Repetitive variable decelerations with any concerning characteristics for < 30 minutes -Variable decelerations with any concerning characteristics for >30 minutes -Repetitive late decelerations for < 30 minutes	-Repetitive variable decelerations with any concerning characteristics for > 30 minutes -repetitive late decelerations for > 30 minutes -acute bradycardia or a single prolonged deceleration lasting 3 minutes or more.
Accelerations	Transient increases in fetal heart rate of 15 beats a minute or more, lasting 15 seconds or more		

Table 2: Categorization of CTG trace

Normal	All 4 features are white
Suspicious	Any one feature is amber
Pathological	Two features are amber or one is red

Management of abnormal fetal heart rate tracings

Various intrauterine resuscitative measures can be adopted like maternal lateral positioning, reduction or discontinuation of oxytocin, administration of tocolytics, maternal oxygen administration and intravenous fluid administration. Use of amnioinfusion is not recommended for intrauterine fetal resuscitation. Intravenous fluids should also be used in hypotensive patients or in sepsis. The women can be encouraged to mobilize, and avoid supine position. The management of abnormal fetal heart tracings is shown in table 3.

Although,a baseline fetal heart rate between 100 and 109 beats a minute is an amber feature, continue usual care if this has been stable throughout labour and there is normal variability and no variable or late decelerations.

Table 3: Management of abnormal fetal heart tracings

Normal	Continue CTG Perform hourly full risk assessment
Suspicious with no risk factors	Full risk assessment, full set of maternal observations, document the findings If previous CTG normal, consider reasons for the change Undertake conservative measures
Suspicious with risk factors	Same as above Urgent review by obstetrician Consider fetal scalp stimulation or expedite birth (If fetal scalp stimulation leads to an acceleration, continue to monitor; if not it is a worrying sign)
Pathological	Same as above Urgent review Exclude acute events(cord prolapsed, abruption, uterine rupture)
Pathological even after conservative measures	Further review Clinical picture evaluation Consider expediting birth
Acute bradycardia/ single prolonged deceleration> 3mins	Urgent review Expedite birth in case of acute event, acute bradycardia persisting for>9mins, acute bradycardia of <9 mins with additional risk factors If fetal heart recovers within 9 mins reassess decision to expedite birth

Suggested Reading

1. The American College of Obstetricians and Gynaecologists women's health care physician practice bulletin number 116, Nov 2010.
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Monochorionic Twin Pregnancy: Diagnosis and Management of Complications

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Introduction

The incidence of multiple pregnancy is rising, mainly due to delayed childbirth and advanced maternal age at conception and the resultant widespread use of assisted reproduction techniques. Twin pregnancy is associated with a high risk of perinatal mortality and morbidity. Monochorionic twins have the highest complication rates due to placental vascular anastomoses occurring between the halves of monochorionic placentas. These include twin-to-twin transfusion syndrome (TTTS), twin anemia-polycythemia sequence (TAPS), and selective fetal growth restriction (sFGR). The risk of intrauterine fetal demise is 11.6% in monochorionic (MC) twins compared with dichorionic (DC) twins. Neurological morbidity is 4 to 5 times higher than in DC twins and consequently 25 to 30 times higher than in singletons.

Diagnosis

Chorionicity is one of the most significant parameters for prognosis in twin pregnancy. Early determination of chorionicity is of paramount importance so that appropriate surveillance can be undertaken to identify features of these MC complications allowing prompt referral and availability of treatment options to optimize outcomes.

Ultrasound is done between 11+0 weeks and 13+6 weeks of gestation (crown–rump length 45–84 mm) to assess fetal viability, gestational age and chorionicity, and to exclude major congenital malformations. In spontaneously conceived twins, gestational age can be determined at the first trimester scan by using the crown–rump length of the larger fetus to avoid the risk of estimating it from a baby with early growth pathology. Chorionicity should be determined based upon the number of placental masses, the appearance of the membrane attachment to the placenta and the membrane thickness. Monochorionic twin pregnancies have a single placental mass and a thin inter-twin membrane that inserts into the placenta at a perpendicular plane (T-sign). In contrast, dichorionic twin pregnancies have two placental masses (or adjacent placental masses forming a 'lambda sign' as placental tissue is present where the thick inter-twin membrane inserts onto the placenta.(Fig. 1)

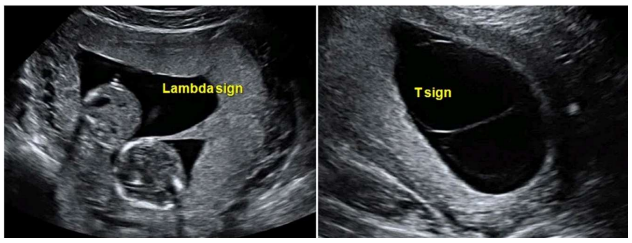

Figure 1: Ultrasonographic appearance of T sign and Lambda sign to determine chorionicity in twins

Aneuploidy screening in Twins

The risk of trisomy 21 in monochorionic twin pregnancy is calculated per pregnancy based on the average risk of both fetuses (because the twins share the same karyotype), whereas in dichorionic twin pregnancy, the risk is calculated per fetus (as around 90% are dizygotic so have different karyotypes).

Screening for trisomy can be offered between 11+0 to 13+6 weeks of gestation using the combined test or the combination of maternal age and nuchal translucency, or cell-free DNA. In case of a vanished twin, if there is still a visible fetal pole on ultrasound scan, nuchal translucency alone (combined with maternal age) should be used as serum β-human chorionic gonadotrophin (β-hCG) and pregnancy associated plasma protein A levels may be affected by the vanishing twin. In this

case, cell-free DNA might also be less accurate, can lead to a false-positive result, and is generally not recommended.

Risk of pregnancy loss following invasive testing—chorionic villus sampling or amniocentesis—is higher in twin than in singleton pregnancies (2% following chorionic villus sampling and 1.5%– 2% following amniocentesis). During amniocentesis, both amniotic sacs should be sampled in monochorionic twin pregnancies, unless monochorionicity is confirmed before 14 weeks and the fetuses appear concordant for growth and anatomy.

Screening for structural fetal anomalies in Monochorionic Twin pregnancies

The risk of fetal anomaly is greater in twin compared with singleton pregnancy. At the first-trimester scan (between 11 + 0 and 13 + 6 weeks' gestation), the fetuses should be assessed for the presence of any major anomalies. Routine second-trimester ultrasound screening for anomalies in twins should be performed by an experienced operator between 18 and 20+6 weeks of gestation which includes extended views of the fetal heart anatomy.

Abnormalities associated with twins include neural tube defects, anterior abdominal wall defects, facial clefts, brain abnormalities, cardiac defects and gastrointestinal anomalies.

Where there is a potentially lethal abnormality of one fetus, intervention should be considered to protect the healthy cotwin from harm in case the affected twin die in utero.

Fetal reduction/selective termination in twin pregnancies

The terms multifetal pregnancy reduction and selective reduction/feticide are often used interchangeably but represent different procedures with different goals. The purpose of multifetal pregnancy reduction is to reduce the number of fetuses early in gestation to optimize outcomes. The procedure is typically done when there are 3 or more fetuses in a gestation. Preprocedural considerations include relationship of gestational sacs to one another, chorionicity, fetal anatomy and aneuploidy markers, and ease of accessibility to chorionic villus sampling (CVS) and reduction procedures. CVS is generally performed in 1 or more of the fetuses before multifetal pregnancy reduction at 10 to 13 weeks as fetuses with aneuploidy can be identified. Traditionally, potassium chloride (KCL) is used for multifetal pregnancy reduction, but cannot be used in monochorionic placentation because of fetal vascular connections within the placenta.

Selective reduction is reduction in the number of fetuses so as to interrupt a pathologic disease process (TTTS, sIUGR, TAPS, fetal anomalies) to improve the prognosis of unaffected twin in cases of monochorionic placentation. In monochorionic twins, feticide is performed by cord occlusion, radiofrequency ablation (RFA), or laser ablation of the cord of the affected twin after counselling the parents of the potential risks to the surviving co-twin. This causes the demise of the affected twin and also isolates its circulation from that of its co-twin. Survival of the co-twin is around 80%, but there is an increased risk of adverse neurological sequelae.

Ultrasound Regimen for detecting complications in Monochorionic Pregnancies

Fetal ultrasound assessment should take place every 2 weeks in uncomplicated monochorionic pregnancies from 16+0 weeks onwards until delivery. Ultrasound examinations between 16 and 26 weeks of gestation focus primarily on the detection of TTTS. After 26 weeks, when first presentation of TTTS is relatively uncommon, the main purpose is to detect sFGR or concordant growth restriction, and rarely TAPS or late-onset TTTS.

At every ultrasound examination, liquor volume in each of the amniotic sacs should be assessed as deepest vertical pocket (DVP) and recorded, as well as the umbilical artery pulsatility index (UAPI). Fetal bladders should also be visualised. Fetal biometry should be done and estimated

fetal weight (EFW) of each twin should be recorded. The percentage EFW discordance is calculated using the formula: ([larger twin EFW – smaller twin EFW]/larger twin EFW) x 100. If at any point in time there is evidence of significant growth discordance or a suspicion of TTTS, then UAPI, middle cerebral artery peak systolic velocity (MCA PSV) and pulsatility index, and ductus venosus Dopplers should be performed.

Complications Unique to Monochorionic Twin Pregnancy

Twin to Twin Transfusion Syndrome (TTTS)

Vascular anastomoses exist in essentially all MC placentas and comprise of arterioarterial anastomoses (AA), venovenous anastomoses (VV), and arteriovenous anastomoses (AV). AA and VV anastomoses are capable of bidirectional flow. The AV anastomoses can result in unidirectional flow from one twin to the other. This net flow from one to the other then leads to the characteristic volume shifts resulting in volume depletion with oliguria and oligohydramnios in the donor and volume overload with polyuria and polyhydramnios in the recipient.

In 80% of cases, there are mainly AA and VV vascular anastomoses which rarely lead to haemodynamic imbalance between the fetal circulations. In TTTS, which complicates up to 15% of monochorionic pregnancies, the placentas have a predominance of unidirectional AV anastomoses.

Serial sonographic examination of MC twins is key to diagnosing TTTS. The TTTS staging system is presented in Table 1

Endoscopic laser coagulation of anastomotic vessels using the Solomon technique is considered in the treatment of all stages of TTTS presenting before 26 weeks of gestation to improve neurodevelopmental outcomes in the child. Following treatment, weekly ultrasound assessment (including examination of the fetal brain, heart and limbs) and serial measurements of UAPI, MCA PSV and ductus venosus Doppler velocities should be performed. After 2 weeks post treatment, the ultrasound interval can be increased to every 2 weeks (noting UAPI, MCA PSV and DVP) with documentation of adequate fetal growth (by calculating EFW).

Table1: Quintero staging: Twin to Twin Transfusion Syndrome

I.	A significant discordance in amniotic fluid volumes. This is defined as oligohydramnios with deepest vertical pocket (DVP) < 2 cm in donor sac and polyhydramnios in the recipient sac (DVP > 8 cm before 20 weeks of gestation and > 10 cm after 20 weeks of gestation). Donor bladder visible and Doppler normal.
II.	Bladder of the donor twin not visible and severe oligohydramnios due to anuria. Doppler studies are not critically abnormal.
III.	Doppler studies are critically abnormal in either the donor or recipient, with typically abnormal umbilical arterial Doppler velocities in the donor and/or abnormal venous Doppler velocities in the recipient (reversed flow during atrial contraction within the ductus venosus and/or pulsatile umbilical vein velocities).
IV.	Ascites, pericardial or pleural effusion, scalp oedema or overt hydrops present usually in the recipient.
V.	One or both babies have died (not amenable to therapy).

Amnioreduction can be considered as a treatment option for those situations where the expertise for laser coagulation is not available, pending transfer to a unit where such treatment can be obtained, or when the condition is diagnosed after 26 weeks of pregnancy and laser is no longer an option. Amnioreduction is typically performed only for stage I or II disease, when maternal symptoms associated with the polyhydramnios are significant. 1 to 2 L of amniotic fluid is removed to bring the DVP from >8 cm to 4 to 6 cm.

Selective termination of pregnancy using bipolar diathermy of one of the umbilical cords or using radiofrequency ablation, with inevitable sacrifice of that baby. This may be appropriate if there is evidence of cerebral damage in either twin.

Septostomy involves the iatrogenic puncture of the intertwin membrane to allow fluid to freely flow between the sacs. This can also be performed in an outpatient setting with minimal risk, but can result in the creation of

monoamniotic twins. This procedure has not shown benefit and is not typically performed.

Recurrent TTTS can occur in up to 14% of pregnancies treated with fetoscopic laser ablation and occurs because of missed anastomoses.

Twin Anemia-Polycythemia Sequence (TAPS)

TAPS is an important association in monochorionic pregnancies, affecting 2% of uncomplicated monochorionic diamniotic (MCDA) twins and up to 13% of monochorionic twins post laser ablation for TTTS. The pathogenesis of TAPS is evidenced by postnatal placental injection studies demonstrating 'miniscule' artery–vein anastomoses (less than 1 mm) allowing very slow transfusion of blood from the donor to the recipient, allowing more time for haemodynamic compensatory mechanisms to take place.

TAPS is characterised by a significant discordance in haemoglobin level between twins without significant amniotic fluid discordance. Donor has increased middle cerebral artery peak systolic velocity (MCA PSV) (> 1.5 multiples of the normal median) and recipient has decreased MCA PSV (< 1.0 multiples of the normal median). Postnatal haematological criteria include an inter-twin haemoglobin difference greater than 80 g/l and a reticulocyte count ratio greater than 1.7. Proposed staging for TAPS based on USG findings and hemoglobin difference is presented in Table 2.

Screening of monochorionic twins for TAPS using serial MCA PSV measurements is not recommended routinely and should be offered in the high-risk monochorionic pregnancies complicated by sFGR, after treatment for TTTS by fetoscopic laser ablation, or when there are signs of possible advanced-stage TAPS (cardiac compromise) noted during fetal ultrasound monitoring.

The management of TAPS is dependent upon the severity of the findings and the gestational age at diagnosis. Options include expectant management, delivery, intrauterine blood transfusion (intravenous and/or intraperitoneal, with or without partial exchange transfusion), selective feticide or fetoscopic laser surgery.

Table 2: Staging of TAPS based on USG findings and Hemoglobin difference

Stage	Antenatal TAPS Staging Ultrasound Findings	Postnatal TAPS Staging Intertwin Hb Difference (g/dL)
1	MCA-PSV>1.5 MOM in donor and MCA-PSV in recipient<1.0 MOM without other signs of fetal compromise	>8.0
2	MCA-PSV donor>1.7 MOM and MCA-PSV recipient<0.8 MOM without other signs of fetal compromise	>11.0
3	Stage 1 or 2, with cardiac compromise of donor defined as critically abnormal flow: absent or reversed end diastolic flow in the umbilical artery, pulsatile flow in the umbilical vein, increased pulsatility index, or reversed flow in the ductus venosus	>14.0
4	Hydrops of donor	>17.0
5	Intrauterine demise of 1 or both fetuses preceded by TAPS	>20.0

'selective fetal growth restriction' (sFGR)

'selective fetal growth restriction' (sFGR), occurs in up to 15% of monochorionic twins in the absence of TTTS and in over 50% of monochorionic twins complicated by TTTS. The criterion for sFGR twins is shown in Table -3.

When selective fetal growth restriction is diagnosed, a detailed anatomy scan, screen for viral infections (TORCH), and amniocentesis if chromosomal anomaly is suspected should be done to find the underlying cause.

sFGR is classified into 3 types based on the pattern of end-diastolic velocity at umbilical artery Doppler (Table 4).

In sFGR, fetal growth surveillance should be undertaken at least every 2 weeks with fetal

Table 3: Delphi consensus criteria for sFGR in twin pregnancy

Dichorionic Twins	Monochorionic Twins
The following two out of three criteria have to be met : EFW of one fetus <10th centile The disproportion between fetal weight ≥25% UAPI of smaller fetus >95th centile	The following two out of four criteria have to be met: EFW of one fetus <10th centile AC of one fetus <10th centile The disproportion between fetal weight ≥25% UAPI of smaller fetus >95th centile

Table 4: Classification of sFGR in monochorionic twins

Type of sFGR	Umbilical artery Doppler findings
Type I	Growth discordance but positive diastolic velocities in both fetal umbilical arteries.
Type II	Growth discordance with absent or reversed end-diastolic velocities (AREDV) in one or both fetuses.
Type III	Growth discordance with cyclical umbilical artery diastolic waveforms (positive followed by absent then reversed end-diastolic flow in a cyclical pattern over several minutes [intermittent AREDV]

doppler assessment (umbilical artery and middle cerebral artery PI and PSV). If umbilical artery Doppler velocities are abnormal, the Doppler of ductus venosus should be undertaken. Abnormal ductus venosus Doppler waveforms (absent or reversed a-wave) or computerised CTG short-term variation should trigger consideration of delivery.

In type I sFGR, planned delivery should be considered by 34–36 weeks of gestation if there is satisfactory fetal growth velocity and normal umbilical artery Doppler waveforms. In cases in which ductus venosus Doppler is normal, early delivery at or beyond 32 weeks, after a course of steroids, is indicated in Types-II and -III sFGR. In cases in which ductus venosus doppler is abnormal before 26 weeks of gestation, the option of selective termination should be considered in order to protect the normally grown fetus from serious harm should the smaller twin die in utero. Delivery is indicated if the gestation is above 26 weeks.

Twin reversed arterial perfusion (TRAP) sequence

TRAP sequence, or acardiac twinning, is a rare complication (1%) in multifetal pregnancies.

A detailed anatomic scan of the pump twin is indicated and amniocentesis should be considered as the rate of aneuploidy as a result of trisomy is 9%. Estimation of the weight ratio of the acardiac twin to the pump twin is necessary to determine optimal management strategies. Intervention to disrupt the flow to the acardiac twin include umbilical cord coagulation, coagulation of placental anastomoses, intra fetal laser or RFA and are typically performed in the second trimester after 16 weeks.

Monochorionic Twin Pregnancies complicated by single twin demise

After a single fetal death in a monochorionic pregnancy, the risks to the surviving twin of death or neurological abnormality is very high (Table 5).

Table 5 : Perinatal outcome of 2nd Twin after single twin demise

Perinatal outcome	Dichorioinc	Monochorionic
Second twin IUD	3%	15%
Preterm labour before 32 weeks	54%	68%
Abnormalities in CNS imaging of survivor	16%	34%
Neurodevelopment retardation of survivor	2%	26%

Damage to the surviving monochorionic twin after the death of its co-twin is believed to be caused by acute haemodynamic changes around the time of death, with the survivor losing part of its circulating volume into the circulation of the dying twin. This may cause transient or persistent hypotension and low perfusion, leading to the risk of ischaemic organ damage, particularly, to the watershed areas of the brain.

The live twin should initially be assessed for immediate compromise using cardiotocography or middle cerebral artery doppler to assess for fetal anaemia. Immediate delivery seems reasonable if the death occurs

later in the third trimester. Rapid delivery is usually unwise as fetal brain injury of the surviving twin occurs at the time of demise of the co-twin. Therefore, immediate delivery only adds prematurity to the possible hypotensive cerebral injury, the surviving twin may have already sustained. Serious compromise of the surviving fetus may be anticipated and this should be discussed with parents, including the significant risk of long-term morbidity.

A conservative management policy is often appropriate, with serial fetal brain ultrasound imaging and a fetal cranial MRI scan planned, commonly 4 weeks after the 'sentinel event'. Fetal MRI provides earlier and more detailed information about brain lesions (haemorrhagic or ischaemic) in the surviving fetus than ultrasound and its use should be considered. Fetal biometry and assessment of umbilical and MCA Doppler of the surviving cotwin should be scheduled every 2–4 weeks, and delivery should be considered at 34–36 weeks, after a course of maternal steroids.

Conjoined Twins

Conjoined twins are very rare, occurring in approximately 1 in 100 000 pregnancies (1% of monochorionic twin pregnancies). Conjoined twins are always monochorionic monoamniotic twin pregnancies.

The classification of conjoined twins depends on the site of the union the most common being thoracopagus. The pregnancy must be delivered at a centre with expertise in the postnatal medical and surgical management of such cases.

Suggested Reading:

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SNAPSHOT

Improvising Vaginoplasty Using Fibrin Glue with Vacuum Expandable Condom Mold

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Learning and innovation go hand in hand. The arrogance of success is to think that what you did yesterday will be sufficient for tomorrow

Wiiliam Polard

Mc Indoe Vaginoplasty is a boon for sexually compromised otherwise normal females. Success largely depends on adequate dissection of neovagina and graft uptake. From time to time, modifications such as skin graft techniques, amnion graft, use of intestinal segment, interceed absorbable adhesion barrier etc. have been done.

Innovations in vaginoplasty aim at creating a cosmetically and functionally near normal vagina with minimal patient morbidity. A desirable mold should be widely available, reproducible, cost effective, easy to make and should enhance graft uptake. There should be easy insertion and removal for better graft stabilization. Patient discomfort should be minimal along with complications such as graft loss, fibrosis, contracture, and pressure-related bladder or rectum perforations. A vacuum expandable mold has all of these qualities and leads to good outcome. Another innovation is the use of fibrin glue to fix the graft in a neovagina. It is simple, effective and leads to better hemostasis and tissue apposition.

Fibrin Glue is USFDA approved tissue adhesive since 1998 and has been used in skin graft, bone grafts, nerve repairs, craniofacial surgery and aesthetic surgery. It contains highly concentrated human fibrinogen and Thrombin and quickly sets to form a white, elastic mass which firmly adheres to the tissue or wound surface. It achieves hemostasis, gluing of tissues and wound healing. It has been used in gynaecological surgeries like tuboplasty, small VVF repair, ART for embryo adherence, premature rupture of membranes etc. Literature has one study of its use in seven patients undergoing vaginoplasty. We did 6 cases using the modified technique and achieved good patient outcomes.

Case No.	Age (yrs)	Symptoms	Diagnosis
1	23	Married, primary amenorrhea, coital difficulty	MRKH Syndrome (Type 1 Mullerian anomaly)
2	20	Unmarried, primary amenorrhea	MRKH Syndrome (Type 1 Mullerian anomaly
3	23	Unmarried, hysterectomy, ureteroneocystostomy done	Type III Mullerian anomaly with single pelvic kidney
4	18	Unmarried, primary amenorrhea	MRKH Syndrome (Type 1 Mullerian anomaly)
5	14	Pain abdomen , cryptomenorrhea	Type IV Mullerian anomaly
6	20	Unmarried, primary amenorrhea	MRKH Syndrome (Type 1 Mullerian anomaly

The Technique: McIndoe vaginoplasty is done using split thickness skin graft from the thigh or buttock area. A vaginal mold is created by using sterile foam with a rubber tube in the center and covered by condom. After spreading the graft over the mold, the edges of graft are approximated using fibrin glue, instead of conventional use of sutures, and glue is applied over rest of the graft. The diameter of the mold can be decreased by creating negative pressure in the rubber tube, which helps in its easy placement in the neovagina. The mold is removed on the 7th postoperative day. The cavity is inspected for uptake of the graft.

Conclusion:

The use of fibrin glue with a vacuum

expandable mold in vaginoplasty appears to be promising novel technique.

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Integrative Naturopathic Approaches for Adolescent Gynaecological Disorders: An Evidence-Based Review of Treatment Options

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Naturopathy is a system of healing that propagates and believes in body's natural ability to heal itself. It uses non-invasive, natural therapies to treat the root cause of disease, educate patients, and prevent illness. Dr. Henry Lind Lahr argues that the violation of nature's laws leads to disease by lowering vitality, causing abnormal blood and lymph composition, and the accumulation of waste matter and poisons. Naturopathy views disease and treatment as one, where disobedience to nature's laws causes disease and removing morbid matter is the treatment.

Naturopathy offers various therapies such as fasting therapy, mud therapy, acupuncture, yoga, hydrotherapy, and heliotherapy, promoting natural healing and disease prevention. Naturopathy acts as a strong complement to conventional medical interventions by providing a holistic approach to disease management and healing. This article discusses how naturopathic treatments can help manage gynaecological disorders in adolescents and presents evidence-based treatment options for different conditions.

1 Polycystic Ovarian Syndrome (PCOS)

- **Hydrotherapy** benefits PCOS in various ways. Cold hip bath improves blood circulation to the pelvic area, while a hot foot bath can stimulate involuntary muscles of the uterus and other pelvic viscera, causing dilation of blood vessels and an increased supply of blood to the uterus and ovaries.
- **Mud therapy:** Cold abdominal mud pack, which has anti-inflammatory effects, reduces pro-inflammatory factors such as interleukin-1 and tumour necrosis factor-alfa, as well as decreasing levels of radical-mediated peroxidation, nitric oxide and myeloperoxidase.
- **Diet and Fasting therapy:** Consuming raw vegetables and fruits which are rich in anti-inflammatory compounds, vitamins, and minerals, to reduce inflammation and prevent metabolic diseases and PCOS by decreasing insulin resistance.
- **Fasting therapy** is another treatment protocol in which patients are given fruit juices/ lemon-honey water/ tender coconut water for 1or 2 days in an IPD setup. Fasting enhances and tender coconut water treatment increases the activity of enzymes superoxide dismutase and catalase, which protect cells from damage caused by free radicals.
- **Heliotherapy:** uses sunlight to promote healing, may regulate menstrual cycles and improve fertility in women with PCOS by stimulating vitamin D production.
- **Acupuncture** involves inserting thin needles into specific points on the body. Studies have shown the potential advantages of using acupuncture as a treatment for PCOS. It regulates the hormones (lower levels of testosterone and higher levels of follicle-stimulating hormone (FSH) and luteinizing hormone (LH)). It also reduces insulin resistance.

2 Endometriosis

While naturopathic treatments like dietary changes, herbal remedies, and supplements are suggested, scientific evidence supporting their effectiveness is limited. However, yoga has been studied more extensively as a complementary therapy, significantly reducing pain, anxiety,

and depression in women with endometriosis. Acupuncture is also a potential treatment.

3 Dysmenorrhea

Naturopathic procedures like hip baths and mud packs enhance blood circulation and alleviate congestion while yoga practices improve circulation, balance hormones, and relieve uterus congestion. Studies show that both are effective treatments for dysmenorrhea.

4 Ovarian Cyst

Naturopathy can help manage cysts by addressing underlying causes, reducing symptoms, and preventing recurrence. A diet rich in fruits and vegetables and supplements like vitamin D and omega-3 fatty acids may reduce the incidence and size of ovarian cysts due to their anti-inflammatory properties. Insulin resistance is associated with ovarian cyst formation and a low glycemic index diet can improve insulin sensitivity.

Conclusion

Naturopathic treatments offer a non-invasive and promising option for managing gynaecological disorders in adolescent girls. Dietary modifications and herbal therapies have shown effectiveness in reducing ovarian cysts, regulating menstrual cycles, and preventing recurrence. Dietary modifications include reducing dairy, sugar, and processed foods while increasing whole foods, vegetables, and healthy fats. Herbal therapies such as chasteberry, dong quai, and black cohosh have also shown promise. Further research is needed, but the low risk and potential benefits make naturopathic treatments a worthwhile option for those seeking non-invasive treatments.

Suggested reading

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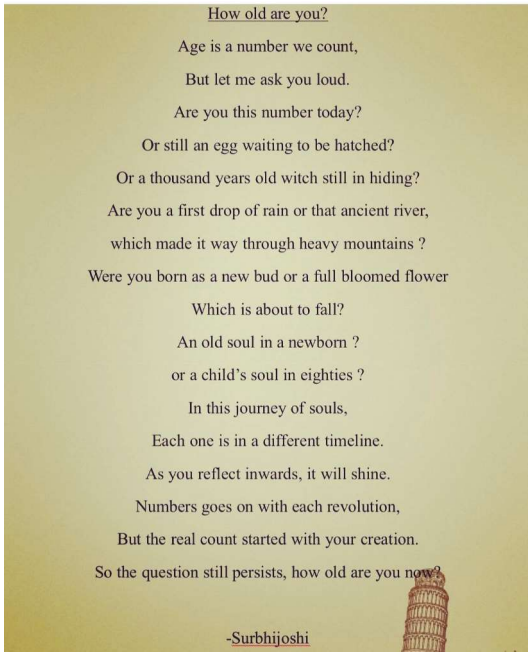
Resident's Corner "Dil se"



How old are you?

Age is a number we count,
But let me ask you loud.
Are you this number today?
Or still an egg waiting to be hatched?
Or a thousand years old witch still in hiding?
Are you a first drop of rain or that ancient river,
which made it way through heavy mountains ?
Were you born as a new bud or a full bloomed flower
Which is about to fall?
An old soul in a newborn ?
or a child's soul in eighties ?
In this journey of souls,
Each one is in a different timeline.
As you reflect inwards, it will shine.
Numbers goes on with each revolution,
But the real count started with your creation.
So the question still persists, how old are you now?

-Surbhijoshi

Adolescent Endometriosis: Diagnosis and Management

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Introduction

Endometriosis is defined as the presence of endometrial glands and stroma outside the pelvic cavity and musculature. About 1/4th to 2/5th of the adolescent population with chronic pelvic pain have endometriosis and lesions can be identified in almost 2/3rds of adolescents undergoing laparoscopy for pelvic pain refractory to medical management.[1, 2] Contrary to previous assumptions, endometriosis can be present even prior to menarche.[3] Endometriosis remains under-recognized in adolescent age group due to hesitance on the part of the child to seek timely medical attention owing to menstrual stigma and normalization of symptoms by the parents and their peers. There is usually an average delay of 9.8 years between symptom onset and definitive diagnosis according to the data from the Endometriosis Association.[4] This in turn can have deleterious effects on the mental, physical and social development of the young adult.

Risk factors of endometriosis identified are prematurity, mullerian anomalies, first-degree relative with endometriosis, low body mass index, early menarche, prolonged menstruation >5 days, menstrual cycle interval <28 days, white race (compared with black race) and higher caffeine or alcohol consumption

Long-term sequelae include intractable pain, pelvic masses, infertility and malignant progression. As such, an early diagnosis is imperative to preserve the young women's quality of life and future fertility.

Pathogenesis

The origin of endometriosis is multifactorial. Coelomic metaplasia theory as proposed by Meyer helps explain the presence of endometriosis in pre-menarchal girls with breast development. The peritoneal cells are capable of dedifferentiation into endometrial tissue. Embryonic mullerian rests or residual cells from mullerian duct migration and mesenchymal stem cells can also be the contributors of this ectopic endometrial tissue. The mesenchymal stem cells can get activated by estrogen in early puberty before menarche or in response to maternal exposure to steroids and in turn stimulate VEGF leading to angiogenesis in ectopic implants.

The concept of neonatal uterine bleeding (NUB) can also be explained by the retrograde menstruation and implantation theory of Sampson. The neonatal cervix is twice the length of the uterine corpus and is filled with debris and mucin and as such there is a predilection of menstrual blood to flow into the peritoneum rather than traverse the longer cervix leading to peritoneal implants.

Congenital uterine malformations like unicornuate uterus with non-communicating horn, obstructed vagina, uterine didelphys are also associated with endometriosis due to obstruction to menstrual flow. Halban's theory of metastasis through lymphatic and vascular channels elucidates the presence of endometriosis in lungs, liver, brain.

Diagnosis

History and examination

The initial evaluation should focus on history suggestive of chronic pelvic pain, dysmenorrhea, dyspareunia and pelvic masses. The nature and character of the pain should be evaluated. In relation to menstrual cycles, adult endometriosis generally presents with cyclical pain while in adolescents the pain can be either cyclical or acyclical thus confounding the diagnosis. Maintaining a menstrual and pain diary should be advocated to document the

character of the pain, its relation to the menstrual cycle and association with bowel and bladder function. Association with bowel and bladder function like dyschezia, constipation, dysuria and hematuria needs special attention.

Past medical or surgical history should be elicited for any symptoms suggestive of pelvic inflammatory disease, sexually transmitted infections, previous treatments or psychiatric illness. History of endometriosis in family is important as endometriosis has a familial predisposition with a prevalence of 6.9% in the female relatives of affected patients as compared to the controls.[5]

Following a detailed general physical and systemic examination, abdominal palpation should be done to look for masses. Rectal examination is more convenient than bimanual examination in adolescents who are not sexually active to rule out genital outflow tract anomalies as they are present in 1 in 20 patients with endometriosis. Unlike adults, uterosacral nodularity or thickening in adolescents is not present.

Imaging

A pelvic ultrasound is a non-invasive and easily accessible modality to identify/exclude structural causes of pelvic pain, such as ovarian torsion or hemorrhage, tumors, genital tract anomalies, and appendicitis. Imaging has limited utility in the diagnosis of endometriosis, as it lacks adequate resolution to identify adhesions or superficial peritoneal implants. Small endometriomas are difficult to detect on ultrasonography but any masses persisting beyond three menstrual cycles should arouse suspicion (Fig 1).

Transvaginal ultrasound in sexually active adolescents can help diagnose endometriomas, bladder lesions, and deep nodules such as those in the rectovaginal septum. Site specific probe tenderness, reduction in ovarian mobility can be indirect markers for adhesions otherwise detected on laparoscopy.[6] Sliding sign can help detect obliteration in the pouch of douglas. The cervix is pressed with the transvaginal probe

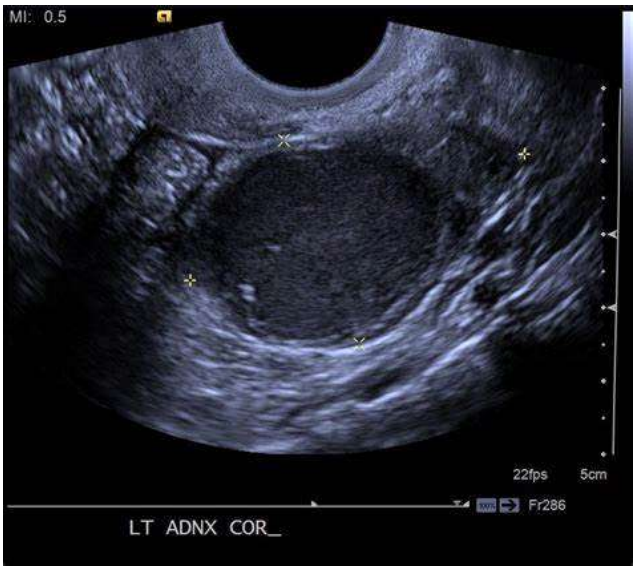

Figure 1: TVS showing ground glass appearance of an endometrioma

while the uterus is palpated abdominally by the hand to assess the mobility of the rectosigmoid over the posterior uterine wall. A transrectal approach may be considered in adolescents with an intact hymen, it also helps in detecting rectal involvement in endometriosis and the lesions on posterior bladder wall.

CT scan is usually not necessary except in cases of acute abdomen to rule out appendicitis. MRI has poor sensitivity as regards detection of peritoneal lesions but is highly accurate in the evaluation of deep infiltrating endometriosis especially involvement of the rectum and the ureters due to its better soft tissue resolution.

Treatment

Medical management[7,8]

Goal of therapy includes symptoms relief, suppression of disease progression and protection of future fertility. First line therapy includes a continuous combined hormonal contraceptive or progestins only methods.

Non-steroidal anti-inflammatory drugs

If initial evaluation suggests primary dysmenorrhea or endometriosis, a trial of non-steroidal anti-inflammatory (NSAIDS) drugs is recommended. NSAID is started before expected onset of severe pain. It may be given alone or in combination with low dose OCPs to decrease menstrual flow and hormonal

stimulation suppression associated with ovulation. If pain persists after 3 months of cyclical OCPs, then laparoscopy should be offered to the patient to rule out endometriosis[2,8].

Oral Contraceptive Pills

Continuous hormonal therapy is typically well-tolerated, and appears to be safe and effective although long- term utilization data is lacking. Combined pills low dose oral contraceptive pills improve symptoms of dysmenorrhea by suppressing ovulation, decreasing menstrual flow and creating a hormonal "pseudopregnancy" state in which endometrial implants are relatively inactive.

Progestins

Norethindrone acetate 15 mg oral daily, medroxyprogesterone acetate (MPA) 30-50mg orally or injection depot MPA intra muscular every 1-3 months are effective. It has more side effects like weight gain, bloating, headache, acne, irregular menses. Because of these side effects, it is reserved only for those candidates who cannot tolerate continuous combination hormone therapy or have contraindications.

Dienogest or *19-nortestosterone*, lacks androgenic effects, has good bioavailability and is selective for progesterone receptors. When given continuously, dienogest induces a hypoestrogenic, hypergestagenic local endocrine environment, causing decidualization of endometrial tissue followed by atrophy of the endometriotic lesions. An oral dose of 2 mg for at least 6 months reduces pain scores comparable to GnRH analogs. The intensity of pain decreases progressively, adverse events are predictable and associated with low discontinuation rates, and bleeding irregularities are reduced in intensity and frequency over time. Dienogest may also be associated with reversible bone loss.

Levonorgestrel intrauterine system (LNG IUS) can be used in adolescents who are sexually active. It induces amenorrhea and significantly decreases menstrual pain by making the endometrium atrophic although ovulation is not suppressed. This has clinical results even in cases of recto-vaginal lesions. Also, there is reduction in deep dyspareunia and dyschezia. It also serves as a contraceptive method in sexually active adolescents.

Gonadotropin-Releasing Hormone (GnRH) agonist therapy

It is also reasonable, for those patients who are 18 years old who continue to have intolerable pain and bleeding with combination OCPs and wish to avoid surgery, to offer a trial of empiric GnRH agonist therapy. Due to concern for the effects of the GnRH agonist on bone density, the empiric use of GnRH agonist with add-back therapy for those younger than 18 years of age is not recommended. It is also useful to give GnRH agonists post laparoscopic surgery to suppress microscopic residual disease.

Depot leuprolide acetate 11.25 mg IM every 3 months can be given. After 2 doses, greater than 90% of patients will become amenorrheic. After 6 months of therapy, the patient may return to continuous combination OCPs. If the patient wishes to continue on the GnRH agonist, a baseline bone density assessment should be obtained after the initial 6-9 months of therapy and, if normal, repeated every 2 years while the patient is maintained on GnRH agonist therapy. Patients are instructed to take 1200 mg calcium and vitamin D daily in addition to their add-back therapy.

Nafarelin is an alternative GnRH agonist; the dosing is one puff twice daily intranasally. However, compliance with a nasal spray is often unpredictable in the adolescent population. The most common side effects of GnRH agonist therapy that affect the adolescent population include hot flashes, headaches, and difficulty in sleeping.

Danazol

It is a derivative of 17α ethnyl testosterone. It is equally effective as GnRH agonist. It has more side effects like weight gain, muscle cramps, depression, decreased breast size, acne, hirsutism, etc. Because of its side effects, not a preferable drug for adolescent.

Surgical management [7,8]

Laparoscopy

With failure of medical therapy, a definitive diagnosis should be established before proceeding with further treatment. Laparoscopy with histopathological examination remains the gold standard for diagnosis and should be performed by an experienced gynecologist. Cosmetic considerations are particularly important in young patients.

Adolescents generally present with stage 1 to stage 2 endometriosis according to the revised ASRM classification. The lesions in adolescents are usually red flame shaped or vesicular which are more inflammatory and painful. This is in contrast to the characteristic powder burn or blue-black lesions seen in adults suggestive of chronic scarring and fibrosis. Peritoneal pockets or Alan Masters syndrome are more prominent in adolescents. These are defects or windows in the peritoneum which harbor endometriosis deep within and are also often overlooked as congenital defects within peritoneum. It is imperative to turn the pocket inside out and excise the defect to ensure complete excision. Ovarian endometriomas are less frequent.

Staging should be performed at the time of laparoscopy according to the revised ASRM Classification of Endometriosis, to facilitate comparison if future surgery is performed. Lesions suspicious of endometriosis should be sampled and biopsied and visible lesion should be destroyed, ablated or excised at the time of initial laparoscopy. Laparoscopic excision for ovarian endometriosis is preferred over ablation where possible to minimize symptoms recurrence. Cystectomy should be performed rather than drainage and coagulation for endometriomas. For fertility preservation, care is taken to spare the hilum of the ovary. Chances for recurrence are high and there is no consensus regarding the timing of surgery.

If there is no evidence of endometriosis at the time of laparoscopy, a cul-de-sac biopsy may be performed to exclude the presence of microscopic disease. It is important to counsel the patient post operatively that the extent of disease does not correlate with severity of symptoms. In adolescents with congenital outflow obstruction, endometriosis is treated by surgical correction of outflow obstruction. Surgery relieves the pain and reduces chances of recurrence decrease in these girls.

Surgical ablation or resection alone is not adequate treatment for endometriosis; microscopic residual disease may remain, and must be suppressed with medical therapy. Post surgery, dienogest or combined pill can be given for 3- 6 months depending on the severity of endometriosis.

Follow up

Regular follow-up visits should be planned every 3 to 6 months initially, and then once annually, to evaluate the disease progression with clinical and sonographic examination and to reconsider hormonal therapy in case of side effects or changes in patient compliance. Behavioural modification techniques (biofeedback, relaxation, hypnosis), cognitive therapy, and complementary therapies (acupuncture) may be used in a multi-disciplinary approach.

Conclusion

Adolescent endometriosis is a common entity that presents a diagnostic challenge. The clinical presentation is atypical as well as the lesions seen on laparoscopy are quite different from those seen in adults. Medical therapy is the mainstay of treatment in adolescents which has to be continued for long, since the disease is progressive in nature. Although laparoscopy remains the gold standard for diagnosing endometriosis, surgical treatment should be offered only once the girl is not responding to medical management.

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Forthcoming Events

1. **A CME is being organized collaboratively by the AOGD Endoscopy and Endometriosis committee on 20th May 2023 from 1 to 5 pm at LHMC.**
2. **AOGD - FOGSICON 2023: 45th AOGD Annual Conference & FOGSI PG Conference, on 18 -20 August 2023 at Leela Ambience Hotel, Gurugram.**
3. **AOGD invites you to Delhi PG Forum on 15.5.23 at 7:00 -8:30 pm for a Case discussion on "Vulval diseases" by post graduates of Maulana Azad Medical College, Delhi.**
4. **A webinar public forum on 'Understanding Menopause 'will be organised on 22.5.23 at 5-6.30pm by AOGD rural health and public awareness committee, AOGD Delhi.**
5. **AOGD in association with Indian Fertility Society and SPECTRA is organising a Symposium on "Recent advances in luteal phase support" and "Translating scientific evidence into clinical practice" on 30th May 2023, 2:30 -4:30pm at Hotel Le Meridian, New Delhi.**

ALGORITHM

Ambiguous Genitalia In Adolescents

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Presentation

- Primary amenorrhea
- Absence of breast development
- Increasing virilization in puberty
- Development of intra-abdominal gonadal tumor

Important Differentials

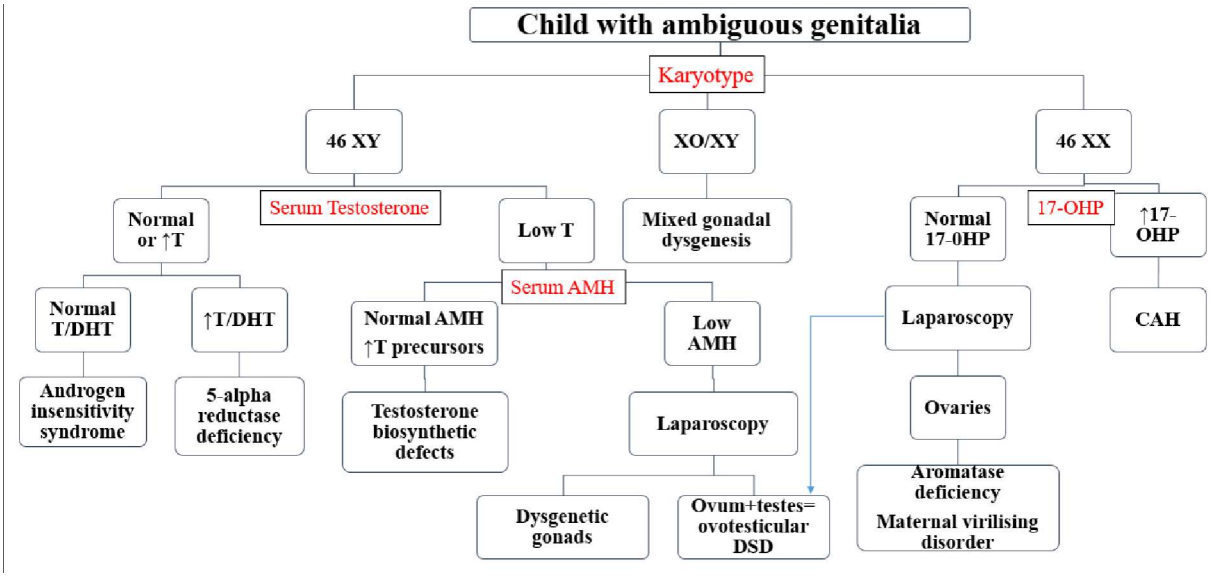
- Adult onset Congenital Adrenal Hyperplasia (CAH)
- Androgen Insensitivity Syndrome (AIS)
- Androgen secreting tumors
- Gonadal dysgenesis – Partial (PGD), Complete (CGD), Mixed (MGD)

Guiding Principles Of Management

Reasons For Delayed Presentation

- Excessive or even complete virilization in a genetically female child may lead to a male sex of rearing.
- Genital ambiguity may not be very obvious or it is missed due to home delivery by a midwife.
- Parents may be aware of ambiguity but still do not seek early medical care for reasons of taboo.
- Development of an intra-abdominal gonadal cancer in adult life is sometimes the first indication of an underlying DSD.
- Girls with complete Androgen Insensitivity Syndrome (cAIS) have a normal female appearance and develop breasts at puberty, but fail to develop pubic hair and do not menstruate.

Imaging	Abdomino-pelvic ultrasonography	To locate gonads and presence/absence of uterus
Genetic Testing	Karyotype	To determine the chromosomal sex
	FISH	To determine the presence or absence of SRY
Endocrine testing	17-OHP, 17-hydroxypregnenolone	Increased levels clearly suggest 21-hydroxylase deficiency in CAH
	ACTH, Cortisol, DHEA, 11-deoxycortisol	To rule out other less common causes of CAH
	FSH, LH	↑ suggests gonadal cause, ↓ suggests hypothalamic/pituitary cause
	Testosterone, Dihydrotestosterone	For Leydig cell function
	AMH (or Inhibin B)	Marker of Sertoli cell mass in males
	Androgen receptor levels	For suspected Androgen Insensitivity syndrome
	5-alpha reductase levels	For suspected 5—alpha reductase deficiency



	Preferred sex of rearing	Spontaneous Puberty	Hormone Replacement	Surgical options	Potential for fertility	Risk of gonadal malignancy/Need for gonadectomy at diagnosis
46 XX CAH	Female	Yes, virilising	Hormone replacement with fludrocortisone and hydrocortisone for life	Feminising genitoplasty Clitoral Reduction Vaginoplasty	Yes	No/No
46 XY Complete AIS	Female	Yes	After gonadectomy, Estrogen replacement	Gonadectomy Vaginoplasty/dilatation if required	No	Low in childhood/Yes after puberty*
46 XY Partial AIS	Male – most common	Yes	Incremental doses of testosterone from age 13 years	Gonadectomy	Has been occasionally reported, Azoo-oligospermia	Yes 15-20%//Yes
	If female -	Yes, virilising	Estrogen replacement	Clitoral Reduction	No	Yes/Yes
Mixed gonadal dygenesis	Depends on external and internal genitalia, most identify as male**	Yes	If being raised as a girl - Estradiol replacement from 11 years of age. Progesterone if presence of uterus	Gonadectomy	Azoospermic 82% Microscopic focal spermatogenesis 25%	Yes 70%/Yes
Ovo-testicular DSD	Depends on external and internal genitalia	Possible if tissue preserved	Yes		Normal uterus in 31%	Testicular tissue dysgenetic over time Ovarian often viable

*The risk of malignancy is extremely low in childhood but it increases after puberty (6% at 25 years and 33% at 50 years). Testes secrete large amounts of testosterone after the onset of puberty and this is aromatized to oestrogen in the circulation, sufficient to bring about natural breast development and a female body shape, which is beneficial for boosting self-esteem. Androgen receptors are absent, so there is no risk of masculinization. So women who wish to retain testes may do so with strict surveillance and retained testes should be repositioned in inguinal region or anterior abdominal wall to allow ease of surveillance.

- **relevant question is whether someone identifying as male in adult life would be happier with surgically-created female genitalia than with small male genitalia? Also the presence of a well-developed uterus would enhance the possibility of child bearing in the adult life with in-vitro fertilization, and hence help in decision making for rearing as a girl.

Suggested Reading:

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Surgical decision making in adolescent gynaecology

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Introduction

Adolescence is the phase of life between 10-19 years of age and can be divided into early adolescence (10-14 years) and late adolescence (15-19 years). Surgical decision making in adolescents with gynaecological problems is a complex process. It is important for the gynaecologists to first have a thorough knowledge of various presentations of common gynaecological issues in this age group and have all the differential diagnoses in mind. It is equally important to address the concerns and fear of the patient as well as her guardians.

Adolescents usually present to the gynaecologists with complaints of pain abdomen (including dysmenorrhea), menstrual problems or discharge per vaginum. Each symptom requires a thorough evaluation in order to pin-point the pathology and includes a detailed history combined with general physical as well as pelvic (in cases of sexually active adolescents) or per-rectal examination (if indicated). The common gynecological conditions requiring surgical intervention in this age group include adnexal masses, anomalies of reproductive tract and pregnancy related complications and their surgical management approach will be briefly discussed in this article.

Adnexal masses

Adnexal masses in adolescent may originate from ovary, fallopian tube or broad ligament. Most masses are benign in nature and nearly 10% of all are malignant.[1] Differential diagnosis include functional ovarian cysts, paratubal cysts, endometrimas, tubo ovarian abcess, ectopic pregnancy, hydrosalpix, benign and malignant ovarian tumours. Mature cystic teratoma or dermoid are the most common benign ovarian tumours while germ cell tumours are the most common malignant ovarian masess. Rarely non tubo- ovarian masses like broad ligament fibroids, para ovarian cysts, appendicular mass, etc may present as adnexal masses.

Common signs and symptoms include abdominal pain, palpable mass, abdominal distension, menstrual irregularity, hormonal signs and symptoms including hirsutism, virilisation and precocious puberty. Occasionally these girls may present in emergencies with acute pain abdomen with adnexal masses and the important differential diagnosis include ovarian/adnexal torsion, Ruptured T-O abscess and ectopic pregnancy. 2-5% of all ovarian masses may present as ovarian torsion in adolescents and it accounts for up to 30% of ovarian surgeries in this age group.[2,3] Rarely, these may be diagnosed incidentally on ultrasound.

Trans-abdominal ultrasonography is the gold standard for diagnosing the nature of adnexal mass. The size, origin of mass, nature of mass, consistency, laterality, presence of ascites or lymph nodes can be assessed and management decided accordingly. Various scoring systems like IOTA B and M rules, IOTA ADNEX model, ORADS can help in triaging adolescent ovarian masses. In suspicious cases of endometriosis, a trans-rectal or a transperineal scan may be done to support the diagnosis. Tumor markers: aid in differentiating benign from malignant lesions. Alpha-fetoproteins (AFP), beta- human chorionic gonadotropin (beta Hcg), lactate dehydrogenase (LDH) and CA125 may be elevated in germ cell tumours. CA125, CEA and CA19.9 may be elevated in epithelial malignancy, though rare in this age group. Inhibin may be elevated in granulosa cell tumours while androgen secreting tumours may present with high levels of testosterone.

Higher imaging may be required depending on the size and nature of the cyst. MRI is preferable

to contrast enhanced CT scan in this age group as the latter as higher exposure to ionizing radiation. MRI has a high sensitivity (90-95%) in ascertaining the nature and origin of the mass especially in cases of indeterminate masses. In cases of suspected malignancy contrast enhanced MRI and diffusion weighted MRI may give additional information regarding the nature of mass and are useful in radiological staging to assess extra ovarian spread.

Physiological ovarian cysts

The management in cases of physiological ovarian cyst should primarily be conservative. Either observation for 3-6 months for symptom improvement or prescription of oral contraceptive pills (Ethinyl estradiol > 35 micrograms) are the available options. OCP's do not decrease the size of existing cyst but suppress hypothalamic pituitary ovarian axis and prevents formation of new cysts.

Surgical management in the form of minimally invasive approach i.e., laparoscopic ovarian cystectomy is recommended in following cases:

- Cyst size > 7 cm and persistent for > 3 months or increasing in size on follow up ultrasounds[4]
- Symptomatic cyst of any size presenting with pain abdomen suggestive of either torsion or rupture. Follicular or corpus luteum cyst can rupture intra-abdominally and lead to hemoperitoneum. Ovarian conservation is of paramount importance. Despite the blue black appearance of ovary due to venous engorgement, arterial perfusion is still preserved for several days, preserving the physiological function of the ovary.[5] Torsed ovary can be salvaged by untwisting the vascular pedicle followed by cystectomy. In rare cases, oophorectomy may be required where extensive necrosis has happened.

Surgical management of these cysts is best done with the use of minimally invasive surgery. To minimize visible scarring, the laparoscope trocar can be placed through a vertical incision directly in the umbilicus. Additional operative ports should be placed symmetrically 1 to 2 cm above the pubic symphysis so that the pubic hair will grow over the incision site(s).

Care should be taken to rule out malignancy before delving on route of surgery as spillage is inevitable in laparoscopic surgery which may be catastrophic in cases of malignancy.

Endometriosis

Ovarian endometriomas have a detrimental impact on follicle reserve in young patients, may result in ovarian adhesions and pseudocysts and secondly, it causes mesenchymal cell metaplasia in the interstitial ovarian tissue, sclerosis, and follicle loss.

All efforts should be made to avoid surgery for endometriosis in adolescent girls as it is a recurrent condition and surgery can lead to pelvic adhesions as well as decreased ovarian reserve which can impair fertility later in life. Even with big endometriomas, medical management should be considered irrespective of the size of the size of the lesion as long as the patient is symptom free. Surgical treatment should be planned in the patient later on in life when patient desires fertility.

Surgical treatment in the form of laparoscopy is recommended only if pain persists despite medical treatment for 6 months. The patient and her guardians should be explained in detail about the procedure, treatment, the need of postoperative medical treatment and the risk of recurrence. They should also be counselled regarding the decrease in ovarian reserve as a result of cystectomy which may impact future fertility.

In adolescents atypical endometriotic lesions are seen more commonly as compared to adults. Thin, clear or red lesions are predominant, blue or brown lesions are rare. Powder-burn lesions are less common in adolescents. Superficial lesions can be either ablated or excised while deep lesions require excision. Endometriomas will require cystectomy and drainage followed by fulguration should be avoided.

In cases associated with obstructive congenital anomalies of female genital tract, it is important to relieve the obstruction at the earliest to

prevent advancement of endometriosis grade.

Tubo-ovarian abscess

Tubo-ovarian abscess are usually seen in sexually active females secondary to pelvic inflammatory disease or can also be seen in non-sexually active females most commonly secondary to genital tuberculosis. Other causes can be ascending infection following urinary tract infection, gastrointestinal tract infection as in appendicitis, diverticulitis etc. Presenting signs and symptoms include abdominal pain, fever, vomiting and foul smelling discharge per vaginum. Treatment is intravenous antibiotics (piperacillin/ tazo-bactam is preferred) followed by laparoscopic drainage if no relief is obtained even after 48 hours of antibiotic cover. Anti-tubercular drug is started in case of suspected or confirmed pelvic tuberculosis. Care should be taken to avoid over dissection of the bowel adhesions as the tissue is very fragile and can lead to bowel injury and risk of colostomy. In tuberculosis it may lead to persistent sinus formation.

Benign Ovarian masses

Most common are the dermoid cysts, benign epithelial masses including serous or mucinous cystadenomas. Surgery is indicated in symptomatic patients, increase in size or if the size is more than 7 cms.[4] Laparoscopic route is preferred and cystectomy is the surgery of choice. Care should be taken to remove the cyst intact followed by in bag cyst retrieval.[6] In case of intra-operative accidental spillage, it is important to ensure complete clearance of spilled contents from the paracolic gutters, especially in dermoids to prevent post operative chemical peritonitis. Thorough saline lavage should be done in order to reduce post operative adhesions.

Malignant ovarian tumors

The incidence of malignant ovarian tumors is around 10% of all operated ovarian masses in adolescents.[7,8] Management of malignant masses involves a multi disciplinary approach with gynaecologists, oncologists, fertility experts, medical oncologist, psychologist, social worker and counsellors. Key issues to be addressed include the details of malignancy with plan of management, prognosis, possibility of infertility, fertility preservation options if available, possibility of completion surgery including removal of uterus and ovaries in advanced cases and need for further adjuvant treatment

Surgical management is the mainstay of treatment in suspected malignancy. A staging laparotomy is performed using midline vertical incision which includes thorough inspection of the abdomen and pelvis. Procedures include peritoneal cytology, unilateral salpingo oophorectomy, infracolic omentectomy, peritoneal biopsies and removal of all gross visible disease. Role of systematic lymphadenectomy in germ cell tumor is controversial and it is advisable to remove enlarged lymph nodes. In early stage epithelial ovarian cancer, systematic lymphadenectomy is a part of comprehensive staging.

Reproductive tract anomalies

Mullerian anomalies encompass a wide variety of conditions, ranging from subtle anatomic changes without concurrent anomalies to complex conditions associated with anomalies of kidney and spine. Common reproductive tract anomalies seen are imperforate hymen, transverse vaginal septum, OHVIRA syndrome (obstructed hemi- vagina and ipsilateral renal anomalies) and vaginal agenesis. Common symptoms include primary amenorrhea, cyclical pain abdomen, chronic pelvic pain, palpable mass per-abdomen, irregular or prolonged bleeding and vaginal discharge. Treatment is individualised depending on age and symptoms and addressing fertility concerns and quality of life are the major factors to guide management. Majority of cases can be managed by vaginal route or hysteroscopy; however minimally invasive approach should be adopted for abdominal approach wherever required.[9]

Imperforate hymen

The treatment entails hymenectomy in which an elliptical incision is made in hymenal

membrane close to hymenal ring followed by evacuation of obstructed material. Excess hymenal tissue is excised to create a normal size orifice. Vaginal mucosa is sutured to hymenal tissue using fine vicryl suture (3-0,4-0). Care should be taken not to introduce infection at the time of hymenectomy.

Transverse vaginal septum

Treatment is septal resection followed by anastomosis of upper and lower vagina. Post-operatively use of vaginal dilators is recommended to prevent vaginal stenosis.

OHVIRA (Obstructed hemi vagina ipsilateral renal anomaly also known as Herlyn-Warner-Wunderlich Syndrome)

OHVIRA is characterised by a triad of uterine didelphys, obstructed hemivagina and ipsilateral renal agenesis. Patient may present with pain abdomen or cyclic dysmenorrhea and/or purulent vaginal discharge. Surgical treatment is required in cases at the time of diagnosis to prevent development of endometriosis and infection due to obstruction. Hemivagina septal resection is the treatment of choice. Minimally invasive techniques such as vaginoscopy may be utilized for the same.

Vaginal agenesis

The goal of treatment is to create an unscarred, properly placed vagina of adequate length, to enable the woman to have sexual intercourse. Treatment is commenced when the patient is physically and emotionally mature enough to understand and carry out self-dilatation. Counselling is very important for the girl and the family as diagnosis of mullerian agenesis is psychologically devastating for both. Besides addressing all the queries, patients are also motivated to get in touch with peer support groups which help them in understanding their situation better and allow them to come to terms with the diagnosis.

Treatment options including the timing and techniques for neo-vagina creation are explained in detail to the patient, so that she can take an informed decision and participate actively in her treatment. Surgery can help in achieving normal sexual function, but the patients may not be able to have a reproductive career. In centers using autologous skin grafts, the patient should be mentally prepared regarding scarring at the graft site. Options for having children in the future are discussed. It is explained to the patients that they can become mothers with their own eggs through artificial reproductive techniques along with gestational surrogacy. Adoption is also elucidated as an option to these patients. Uterine transplantation as a treatment is still in experimental stages and yet to become commonly available.

Treatment in cases of MRKH syndrome is either non-surgical or surgical development of vaginal length for sexual activity. Non-surgical treatment involves self-dilatation by increasing sizes of vaginal dilators gradually. Vaginoplasty is the surgical treatment required in cases where either non-surgical treatment fails or is not feasible. It should always be carried out by an experienced surgeon as the first time gives the best outcomes. Options available are Mc Indoe Vaginoplasty or laparoscopic modified Davidov technique as per surgical expertise available. The timing of start of treatment must be decided at around 17-20 years of age when the patient is emotionally mature and intellectually reliable enough to manage without difficulty the vaginal mould that will be used to maintain the neovaginal space. Alternatively, vaginoplasty may be planned a few months prior to marriage in order to initiate regular sexual activity for maintenance of vagina patency. In cases of AIS syndrome however, surgical removal of gonads (gonadectomy) is warranted after puberty to mitigate the risk of malignancy.

Conclusion

To conclude, only very essential surgery should be done in adolescents. Any pelvic surgery entails the risk of adhesions and impairment of future fertility. Surgical decision making in adolescents involves a multidisciplinary team approach with lot of empathy and care. The decision for surgery should always be made in

consultation with the guardians/ parents as the emotional maturity of adolescents may vary. Even if the teen is above legal consenting age, parental supervision is preferred. Appropriate pre-operative counselling and support should be provided to the adolescent so that she is able to make an informed choice. It is important that the adolescent patient completely understands the procedure, possible complications and likelihood for additional surgery at a later date if needed.

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MEDICOLEGAL ISSUES

Sexual Assault in an Adolescent: What's New

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Introduction

In India the Protection of Children from Sexual Offences (POCSO) Act, 2012 defines a person below 18 years of age as 'children' and regards any sexual activity with a person below 18 years a crime. Under the Criminal Law (Amendment) Act, 2013, the age of consent for sex has been increased to 18 years from 16 years in India, which means any sexual activity irrespective of the presence of consent with a girl below the age of 18 years will constitute statutory rape. However in June 2018, The Honorable Madras High Court , "Any consensual sex after the age of sixteen or bodily contact or alleged acts could be excluded from the rigorous provisions of POCSO Act and sexual assault could be tried under more liberal provisions which can be introduced in the act, differentiating sexual assault and teenage relationship." This verdict has suggested that the minimum age of consent for sexual intercourse should be made 16 years again; and therefore, it would decriminalize the consensual sex for adolescents of the age group 16 to 18 years.

Standard Operating Procedure When Adolescent Patient with Sexual Assault Reports to Hospital

Every hospital must have a Standard Operating Procedures (SOPs) for management of cases of adolescent sexual violence. The SOPs must be printed and made available to all staff working in the emergency area and designated area like One Stop Centre for Sexual assault cases of the hospital.

- Any registered medical practitioner can conduct the examination and it is not mandatory for a gynecologist to examine such a case. In case of female victim, every possible effort should be made to find a female doctor but absence of availability of lady doctor should not deny or delay the treatment and examination.
- Police personnel should not be allowed in the examination room. If the survivor requests, her guardian/relative/or the person with whom she feels comfortable may remain present while the examination is being done. One should always keep in mind that the victim can be accompanied by the abuser when they come for medical treatment.
- The history should be carried out in complete privacy in the special room set up in the hospital for examination of sexual violence survivor. We should also take help of dolls and body charts while eliciting history. Special points to be noted include details about the culprit, familiar person or not, whether first or multiple encounters, details of physical contact, verbal threats, use of any drugs or weapons, injuries inflicted, history of penetration and ejaculation and any change of clothes, brushing, bathing, wiping or douching.
- The room should have adequate space, sufficient lighting, a comfortable examination table, all the equipment required for a thorough examination, and the sexual assault forensic evidence (SAFE) kit for collecting and preserving physical evidence. Consent should be obtained for such examination, from the victim if she is more than 12 years of age and guardian if less than 12 years of age. The following points are noted during examination:
  - *General examination* includes mental status, signs of intoxication, vitals and

extent of injuries. After ruling out any urgent need for stabilization, proceed to detailed general examination. Details of clothing should be noted.

- *Examination for injuries:* The entire body surface should be inspected carefully for signs of bruises, physical torture injuries, boils, lesions, discharge specially on the scalp, face, neck, shoulders, breast, wrists, forearms, medial aspect of upper arms, thighs and buttocks. Description regarding type of injury, site, size, shape, color, signs of healing and should be documented by marking on body charts. Any grievous injury if present should be mentioned separately. Note the type of stain (blood, semen, lubricant, etc).
- *Local examination of genital parts/other orifices:* External genital area and perineum is observed carefully for evidence of injury, seminal stains and stray pubic hair. Pubic hair is examined for any seminal deposits/ stray hair. Combing is done to pick up any stray hair or foreign material, and sample of pubic hair, and matted pubic hair is taken and preserved. If pubic hair is shaven, a note is made. In case of female survivors, the vulva is inspected systematically for any signs of recent injury such as bleeding, tears, bruises, abrasions, swelling, or discharge and infection involving urethral meatus & vestibule, labia majora and minora, fourchette, introitus and hymen.
- *More extensive examination in adolescent should only be done when warranted*. The examination and treatment as needed may have to be performed under general anesthesia in case of minors and when injuries inflicted are severe. A note should be made of any vaginal discharge, its texture, color, odor. Per-vaginum examination should also be conducted only if indicated and should not be conducted routinely for establishing rape/sexual violence and the size of the vaginal introitus as it has no bearing on a case of sexual violence. The status of hymen is irrelevant because the hymen can be torn due to several reasons such as cycling etc. All the genital findings should be marked on body charts and numbered sequentially.
- *Per-rectal examination* to detect any tears/stains/fissures/hemorrhoids in the anal canal should also be carried out and relevant swabs from these sites should be collected. Oral cavity should also be examined. If the victim reports within 96 hours (4 days) of assault Sexual assault forensic evidence kit (SAFE Kit) should be opened. The spermatozoa can be identified only for 72 hours after assault, so if the time lapsed since assault is more than three days, swabs for spermatozoa should not be taken. In such cases swabs should only be sent for tests for identifying semen. Evidence on the outside of the body and on materials such as clothing should be collected even after 96 hours.

- Survivors under 18 years, are likely to be accompanied by parents / guardians. If a health professional finds out that the perpetrator is the parent, it is critical to involve social worker/counselor from the hospital to discuss safety of the child. As per POCSCO Act, 2012 social worker would have to speak with the child to assess whom the child trusts and can be called upon in the hospital itself. Simultaneously social worker would also have to contact police, who in communication with social worker should assess whether the child needs protection and care. Likewise, the child may be admitted to the hospital for a period of 24 hours till a long-term strategy for shelter or child welfare home is made available.
- The collected samples for evidence may be preserved in the hospital till such time that police are able to complete their paper work for dispatch to forensic lab test including DNA.

- After the examination is complete the survivor should be permitted to wash up, using the toiletries and the clothing provided by the hospital if her own clothing is taken as evidence.
- Admission should not be insisted upon unless the survivor requires indoor stay for observation/treatment.
- Survivors of sexual violence should receive all services completely free of cost.
- A copy of all documentation (including that pertaining to medico-legal examination and treatment) must be provided to the survivor free of cost.

Managing an Adolescent Sexual Assault Victim

- If clinical signs are suggestive of STD, collect relevant swabs and start PEP (post exposure prophylaxis). If there are no signs wait for lab reports. NAATs for C. trachomatis and N. gonorrhoeae at the sites of penetration or attempted penetration should be performed. POC or wet mount with measurement of vaginal pH and KOH application for the whiff test from vaginal secretions should be performed for evidence of BV and candidiasis, especially if vaginal discharge, malodor, or itching is present.
- For patients of age group more than 18yrs of age recommended regimen is Injection Ceftriaxone 250 mg IM or Tab Cefixime 400 mg stat with Tab Doxycycline 100 mg bd for 7 days OR Tab Azithromycin 1 gm single dose and Tab Metronidazole (40 mg/kg) 2 gm single dose OR Tab Metronidazole 400 mg BD for 7days with antacid. If the victim is a pregnant female Azithromycin 1 gm OD single dose is given . If the victim has known sensitivity to Azithromycin than Tab Amoxycillin 500 mg TDS for 7 days should be given along with tab Metronidazole 400 mg BD for 7days along with antacid. Metronidazole should not be given in first trimester.
- For victim of age group less than 18 years of age, recommended dosage is Inj ceftriaxone 125 mg IM or Tab cefixime 8 mg/kg body weight should be given orally in a single dose along with Tab Azithromycin single doses according to body weight (20 mg /Kg) and Tab Metronidazole (40 mg/kg) for 7 days OR Tab Metronidazole (20 mg/kg) single dose.
- Victim should receive tab levonorgestrel 0.75mg 2 tab stat or 1.5 mg 1 tablet stat and if vomiting occurs repeat the dose within 3 hours OR Tab Mala-N 2 tab stat followed by 2 tab after 12 hours . Emergency contraception can be given upto 5 days but preferably within 72 hours.
- Serum samples should be obtained for baseline testing for hepatitis B, syphilis, and HIV. HIV prophylaxis should be considered and recommended as per the HIV post exposure prophylaxis (PEP) guidelines from the CDC when there is genital or anal penetration with known ejaculation, especially if trauma occurred or if the patient has a known genital infection. If HIV PEP is started, it should be given within 72 hours of sexual assault cases including pregnant women for four weeks.
- According to immunization status of Hepatitis B infection. If patient is non immunized / status unknown: give HB vaccine. First dose of Hepatitis B vaccine will be given at the time of first examination and further doses at one month and six month. If assailant is HBS antigen positive then injection hepatitis B immunoglobulin to be given immediately or any time up to 72 hrs (dose 0.06 ml/kg). Tetanus toxoid vaccination should also be given if earlier not immunized.
- HPV vaccination is recommended for sexual assault victims.

Pregnancy after sexual assault

When a pregnancy resulting from an assault, she is to be given the option of undergoing an abortion, and protocols for MTP are to be followed. The products of conception (PoC) may be sent as evidence to the forensic lab (FSL) for

establishing paternity / identifying the accused.

Follow-Up Care

Follow-up usually includes a visit after 1 to 2 weeks to assess physical, mental status and for counselling especially for posttraumatic stress disorder. At 2 weeks, pregnancy testing can be performed. The CDC recommends that syphilis and fourth-generation HIV testing be repeated at 4 to 6 weeks and at 3 months, and only HIV testing at 6 months after the assault if initial test results were negative and infection in the assailant could not be excluded. Repeat Hepatitis B testing at 6 weeks, 3 months & 6 months.

Suggested reading

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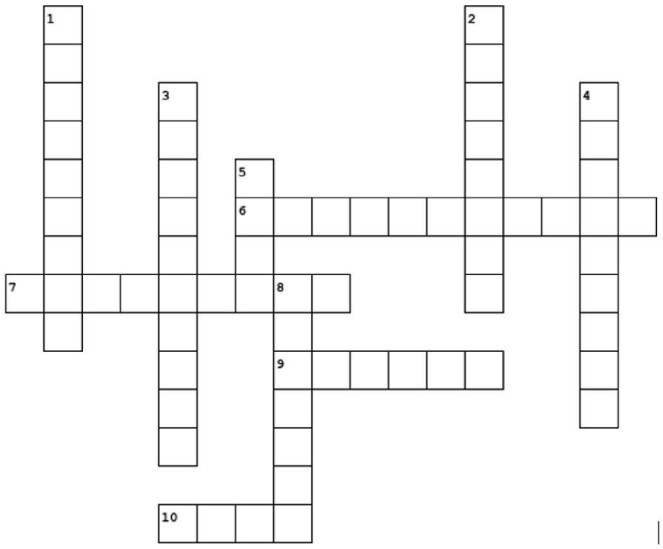
2. CDC Sexually transmitted infection treatment guidelines 2021 Sexual Assault and Abuse and STIs – Adolescents and Adults https://www.cdc.gov/std/treatment-guidelines/sexual-assault-adults.htm

It's Cross word time ....

Bindiya Gupta, Sandhya Jain



Across	
6.	Occurs due to immature HPO axis
7.	Progestin for endometriosis
9.	Improper sexual advances
10.	Carry oxygenated blood to fetus

Down	
1.	Cause of STI
2.	Abnormal gland in ambiguous genitalia
3.	Cause of early onset fetal growth restriction
4.	Fetal stethoscope
5.	Deceleration due to uteroplacental insufficiency
8.	Retrograde menstruation

Word bank:
Adrenals • Anovulation • Chlamydia • Chromosome • Dienogest • Fetoscope • Late • Molest • Sampson • Vein

Teenage pregnancy

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Introduction

Teenage pregnancy also known as adolescent pregnancy has been identified as a universal problem in all cultures across the world resulting in social, health and economic consequences to individuals, families and communities. 1 Teenage pregnancy has a direct or indirect bearing on the number of social development indicators eg. education, gender, health and nutrition. Preventing adolescent pregnancy and childbearing as well as child marriage is part of the SDG agenda with dedicated indicators, including indicator 3.7.2, "Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1000 women in that age group," and 5.3.1, "Proportion of women aged 20–24 years married before the age of 18 years." [1] According to NFHS-5 6.8% of women, aged between 15 to 19 years were already mother or pregnant at time of survey with prevalence being higher in rural areas (7.9%) compared to urban (3.8%). [2]

Risk factors

Teenage pregnancy in India has lifelong and intergenerational health costs, which substantially affect the lives of an adolescent girl highlighting the necessity for an in-depth examination of the factors determining adolescent pregnancy and pregnancy outcomes. Multiple factors lead to teenage pregnancy which are clearly corroborated by the NFHS data.[1, 2] These include:

1. Early marriage
2. Low literacy rate
3. Poor access to health care and contraception
4. Low socio-economic status
5. Sexual abuse
6. Mental health problems

These factors are not only associated with increase incidence of teenage pregnancy but also have a bearing on the multiple negative outcomes both for the mother and fetus including poor growth and nutritional status, anemia, mental and emotional issues, preterm delivery, low birth weight, fetal growth restriction and increase in maternal and neonatal morbidity and mortality. Adolescent mothers (aged 10–19 years) face higher risks of eclampsia, puerperal endometritis and systemic infections than women aged 20–24 years, and babies of adolescent mothers face higher risks of low birth weight, preterm birth and severe neonatal condition.[1]

Prevention

In India, teenagers have poor access to comprehensive and correct information on family planning and contraceptives whether married or unmarried. Females often have limited say in the timing and spacing of children. All these factors increase the likelihood of adolescent getting pregnant. Therefore, multi-pronged approaches like comprehensive sex education, spreading awareness by involving community and leaders, providing safe access to contraception and setting up adolescent friendly clinics will be helpful interventions.[3]

Primary prevention

Primary prevention targets on preventing pregnancy by development of responsible sexual behaviors by influencing cultural values, teaching about sexuality in the clinical environment, and teaching the subject in school. In order to ensure holistic development of adolescent population, the Ministry of Health and Family Welfare launched Rashtriya Kishor Swasthya Karyakram (RKSK) on 7th January 2014 to reach out to 253 million adolescents - male and female, with special focus on marginalized groups.[4] Key drivers of the program are community based interventions

like outreach by counsellors; facility based counselling; social and behaviour change, communication; and strengthening of Adolescent Friendly Health Clinics across levels of care.[4]

Adolescent friendly health clinic

Rashtriya Kishor Swasthya Karyakram (RKSK) highlights the need for strengthening Adolescent Friendly Health Clinics (AFHC) under its facility based approach. This approach was initiated in 2006 under RCH II in the form of Adolescent Reproductive Sexual Health (ARSH) Clinic to provide counselling on sexual & reproductive health issues.

Now under RKSK, AFHC entails a whole gamut of clinical and counselling services on diverse adolescent health issues ranging from Sexual and Reproductive Health (SRH) to Nutrition, Substance abuse, Injuries and Violence (including Gender based violence, Non Communicable Diseases and Mental Health. Adolescent Friendly Health Services are delivered through trained service providers- MO, ANM and Counsellors at AFHCs located at Primary Health Centers (PHCs), Community Health Centers (CHCs) and District Hospitals (DHs) and Medical Colleges.

The key 'friendly' component of AFHC mandates facility-based clinical and counselling services for adolescents, which are:

- Equitable—services are provided to all adolescents who need them.
- Accessible—ready accessibility to AFHCs by adolescents i.e. AFHC should be established where adolescents can go without hesitation for example: it should not be placed near labour rooms, integrated counselling and treatment centres, Sexual and Reproductive Transmitted Infections (STI/RTI) centre etc.
- Acceptable—health providers meet the expectation of adolescents who use the services.
- Appropriate—the required care is provided and any unnecessary and harmful practices are avoided.
- Effective—healthcare produces positive change in the status of the adolescents; services are efficient and have high quality. The right health services are provided in the right way, and make a positive contribution to their health.
- Comprehensive—care provision covers promotive, preventive and curative aspects.

Benchmark for AFHC

- Infrastructure- clean, bright and colourful
- Can be easily accessed by the adolescents (distance and convenient working hours)
- Awareness about the clinic and range of service it provides (IEC, Proper Signages)
- Non-judgmental and competent health service providers
- Maintains privacy and confidentiality
- Community members are aware of the services provided and understand the need of the same
- Referral from the periphery/community and further referral linkages with the higher facilities and specialty clinics

Secondary Prevention

Secondary prevention focuses on prevention of pregnancy by encouraging contraception for sexually active young people. In a sensitive and developmentally appropriate way, explore pregnancy intentions and contraceptive beliefs. Do this over time to accommodate changes in social situation.

Health care workers should offer a broad range of birth control options to teenagers, including long acting reversible contraceptives (LARC), and discuss the pros and cons of each. Adolescents who engage in frequent intercourse may opt for barrier methods for prevention of sexually transmitted infections (STI's) and HIV. American College of Obstetricians and Gynecologists (ACOG) recommends:[5]

- Regardless of a patient's age or previous sexual activity, the obstetrician–gynecologist routinely should address her

contraceptive needs, expectations, and concerns.

- Discussions about contraception should begin with information on the most effective methods first.
- Emergency contraception should be routinely included in discussions about contraception, including access issues.
- Long-acting reversible contraceptive (LARC) methods have higher efficacy, higher continuation rates, and higher satisfaction rates compared with short-acting contraceptives. LARC methods are a safe and excellent contraceptive choices for adolescents.
- Obstetrician–gynecologists should be aware of and be prepared to address the most common misperceptions about contraceptive methods in a way that is age appropriate and compatible with the patient's health literacy.
- The initial encounter and follow-up visits should include continual reassessment of sexual concerns, behavior, relationships, prevention strategies, and testing and treatment for sexually transmitted infections (STIs) per the Centers for Disease Control and Prevention's (CDC) guidelines. Check that young men and women know how to obtain and use condoms for sexually transmissible infection prevention.

Tertiary prevention

Tertiary prevention addresses the prevention of morbidity in young mothers and their children through adequate prenatal care and follow-up. Although most professionals agree that abortion is not a desirable form of pregnancy prevention, it should be included in discussions of tertiary prevention. Based on 2019 data, 55% of unintended pregnancies among adolescent girls aged 15–19 years end in abortions, which are often unsafe in LMICs.[6] There is growing attention being given to improving access to and quality of maternal care for pregnant adolescents.

Management

In order to improve the pregnancy outcome for both mother and fetus, it is imperative that the teenage mother receive positive and supportive care throughout their pregnancy and during puerperium. The management is summarised in Table-1.

Table 1: Management of teenage pregnancy (adapted from Marino et al, Mann L et al)[7,8]

When unintended adolescent pregnancy occurs • Provide nonjudgmental support and counselling, and involve social worker support • Screen for sexual abuse and exploitation, and be aware of the possibility of coercive relationships when the adolescent is pregnant to an older partner.
Antenatal care • Refer to the tertiary care centre under high risk pregnancy clinic • Recognize that teenagers may have less anatomical knowledge and will be less likely to understand what is happening to their bodies so may benefit from explanations at all stages. • Assess nutritional adequacy. • Use the local protocols for antenatal care, with special consideration of fetal growth. • Screen for chlamydia if available • Screen routinely for alcohol use, substance use, violence and mood disorders each trimester. • Provide access to smoking cessation support. • Teach about signs and symptoms of preterm labour and the importance of noting fetal movements. • Discuss contraceptive options before delivery. • Encourage and facilitate breastfeeding. • Include fathers where possible.
Postpartum and beyond • Ensure psycho social support at home • Contraceptive counselling • Encourage return to school, education or training and continuing healthy lifestyle changes made during pregnancy. • Encourage continuity of breastfeeding, direct education on safe use of formula • Advice about infant nutrition. • Assess nutritional adequacy, particularly of breastfeeding mothers. • Provide access to smoking cessation support and substance abuse

Antepartum period

Teenage mothers are at an increased risk of nutritional deficiencies, pregnancy induced hypertension, pre-eclampsia, eclampsia , substance abuse and poor support from their

families. Hence, adolescent attending clinics should be made aware of the importance of timely antenatal visits. Antenatal visit should also be taken as an opportunity to offer advice regarding nutrition and counselling about spacing and contraception.

Intrapartum and Postpartum

Like every pregnancy, effort should be made to provide a positive birthing experience for the mother. However, teenage mothers are at increased risk of preterm labour, obstructed labour and birth injuries and hence extra care and vigilance is advocated during delivery.

During postnatal period, the importance of nutrition and exclusive breastfeeding should be highlighted for the patient as well as the caregiver. We should also be careful to look for postnatal depression and any other difficulty that the patient might face.

Conclusion

Prevention of adolescent pregnancy is important as it causes serious health, social and economic consequences to individuals, families and communities. Both the national government stakeholders and non governmental organizations should show commitment to preventing child marriage and adolescent pregnancy and childbearing.

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Calendar of Virtual Monthly Clinical Meetings 2023-24

Date	Name of Institution
28th April, 2023	LHMC & Smt. Sucheta Kriplani Hospital
26th May, 2023	Sitaram Bhartia Institute of Science and Research - SBISR
30th June, 2023	Apollo Hospital
28th July, 2023	Army Hospital (Research & Referral)
25th August, 2023	Deen Dayal Upadhyay Hospital
29th September, 2023	All India Institute of Medical Sciences
27th October, 2023	ESI hospital, Basai Darapur
24th November, 2023	MAMC& LNJP Hospital
29th December, 2023	Sir Ganga Ram Hospital
30th January(Tuesday) , 2024	Dr RML Hospital
23th February,2024	VMMC & Safdarjung Hospital
28th March, 2024	UCMS & Guru Teg Bahadur Hospital
19th April, 2024	LHMC & Smt. Sucheta Kriplani Hospital
31st May, 2024	B L Kapoor Hospital

RESEARCH HUB

Maternal and Fetal Adverse Event Terminology: MFAET

Sruthi Bhaskaran

Professor

Department of Obstetrics & Gynecology, UCMS/GTBH

Introduction

An Adverse event (AE) is 'any untoward medical occurrence in a patient or clinical trial participant administered a medicinal product and which does not necessarily have a causal relationship with this product'. AEs are important signals in clinical trials, facilitating swift and responsible communication of safety data between study investigators, sponsors and regulators.

Severity of AEs should be recorded using standard grading criteria. Standardization in reporting AE is important since decisions around dose adjustments and the Maximum Tolerated Dose (MTD) are based on observation of Adverse Reactions (ARs) of given severity. The most widely used system, the Common Terminology Criteria for Adverse Events (CTCAE) (Version 5.0) comprises 837 potential AE, of which only 4 relate to 'pregnancy, the puerperium and perinatal conditions'. Some condition specific severity grading for pregnancy specific events have been developed (e.g., in HIV AIDS and surgery). However, there remain no standard general severity grading criteria.

Spencer et.al (2022) an international multidisciplinary group identified and filled gaps in definitions and severity grading using Medical Dictionary for Regulatory Activities (MedDRA) terms and severity grading criteria7 based on Common Terminology Criteria for Adverse Event (CTCAE) generic structure. The draft criteria underwent two rounds of a modified Delphi process with international fetal therapy, obstetric, neonatal, industry experts, patients and patient representatives. This novel set of 12 maternal and 19 fetal AE definitions and severity grading criteria (MFAET version 1.0) has been developed through an international modified Delphi consensus process.

Adverse Event Terms and Grades

The terms used in these criteria reference the corresponding Lowest Level Terms (LLTs) from the Medical Dictionary for Regulatory Activities (MedDRA).

Grade is the severity of the Adverse event. The grading of defined maternal AEs (Table 1) is based on the generic criteria from the NCI Common Terminology Criteria for Adverse Events (CTCAE), adapted for pregnancy. The grading of defined fetal AEs is based on the 'generic grading criteria for fetal adverse events'.

Guidance on the use of these severity grading criteria:

- If an adverse event fulfils the criteria for more than one grade of severity, the highest applicable grade should be used.
- A semicolon indicates 'or' within the description of a grade.
- Maternal procedural complications, such as pain and infection, should be identified by the appropriate MedDRA preferred term and graded according to CTCAE criteria.
- Maternal thromboembolic events during pregnancy and the puerperium should be identified by the appropriate MedDRA preferred term ('venous thrombosis in pregnancy', 'postpartum venous thrombosis', or 'obstetrical pulmonary embolism') and graded according to the CTCAE criteria 'thromboembolic event'.

Maternal and Fetal Adverse Events Terminology

The Steering Group divided the AEs with potential to differentially affect the pregnant woman and her fetus into separate maternal and fetal grading criteria. The common maternal conditions include heamorrhage in

Table 1: Maternal and Fetal Adverse Events Grading

	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Maternal AE	Mild; asymptomatic or mild symptoms; clinical or diagnostic observations only; intervention not indicated	Moderate; minimal, local or non-invasive intervention indicated; limiting age appropriate instrumental activities of daily living	Severe or medically significant but not immediately life threatening; hospitalisation or prolongation of hospitalisation indicated; disabling; limiting self-care activities of daily living	Life-threatening consequences; urgent intervention indicated	Death related to AE
Fetal AE	Clinical observation of uncertain significance; resolves spontaneously with low risk of longterm consequences	Likely to resolve spontaneously with low risk of longterm consequences; requires increased frequency of monitoring, but less than once a week; requires additional tests	Requires increased frequency of monitoring, once a week or more; likely to lead to significant neonatal morbidity	Likely to lead to fetal injury or permanent disability; likely to lead to neonatal death; requiring a substantive change in management including changing the course of an interventional procedure or necessitating delivery	Fetal death

Table 2: Examples of maternal AE terms with definitions and severity grading criteria

Maternal adverse event	Grade 1 (mild)	Grade 2 (moderate)	Grade 3 (severe)	Grade 4 (life-threatening)
Haemorrhage in pregnancy: maternal	Staining, streaking of blood spotting noted on underwear or sanitary protection; blood loss < 50mL that has settled	Blood loss of 50 to <250mL with no signs of clinical shock	Blood loss of 250-1000mL with no signs of clinical shock	Blood loss >1000mL; signs of clinical shock
Definition: Bleeding from or in the genital tract during pregnancy, prior to the birth of the baby				
Postpartum haemorrhage	Estimated blood loss 501-1000mL without haemodynamic instability	Estimated blood loss 1001-2000mL; estimated blood loss 501-1000mL with haemodynamic instability	Estimated blood loss >2000mL; transfusion <5 units packed red cells; balloon tamponade; surgical intervention (excluding hypogastric or uterine artery ligation or hysterectomy); interventional radiology	Hysterectomy; hypogastric or uterine artery ligation; shock; transfusion of 5 units or more of packed red cells; coagulopathy
Definition: The loss of 500mL or more of blood from the genital tract within 24 hours of the birth of a baby				

Table 3: Example fetal AE terms with definitions and severity grading criteria

Fetal adverse event	Grade 1 (mild)	Grade 2 (moderate)	Grade 3 (severe)	Grade 4 (life-threatening)
Fetal fluid collection	-	New onset isolated pericardial, pleural, or peritoneal fluid collection or skin oedema, which is not life-threatening	New onset accumulation of fluid in at least two fetal compartments (hydrops) which resolves spontaneously	New onset accumulation of fluid in at least two fetal compartment (hydrops) which is sustained; life-threatening isolated pericardial, pleural, or peritoneal fluid collection
Definition: The collection of non-haemorrhagic fluid in one or more fetal compartment (pericardial space, pleural space, peritoneal cavity, and/or skin oedema)				
Fetal bradycardia: non-labor	-	A decrease in the FHR of >30 bpm to a level below the lower limit of normal for gestation according to local criteria, lasting for < 3 minutes	-	A decrease in the FHR of > 30 bpm to a level below the lower limit of normal for gestation, according to local criteria, lasting for > 3 minutes; a decrease in the FHR of > 30 bpm*
Definition: A decrease in the FHR of > 30 bpm to a level below the lower limit of normal for gestation according to local criteria, lasting for > 1 minute				

pregnancy, post partum hemorrhage, anemia, hypertensive disorders, premature membrane rupture etc. The fetal conditions included fetal bradycardia, fetal tachyarrythmias, fetal fluid collection, abnormalities of fetal imaging etc. An example of the adverse event terminology of maternal and fetal condition is shown in table 2. For complete table the article can be accessed as reference no 1. mentioned in the suggested reading section. (Table 2, 3)

Conclusion

The MFAET version 1.0 system is one of the most comprehensive set of maternal and fetal AE definitions and severity grading criteria available, which can guide investigators and clinicians in assessing the severity of AEs so as to increase the quality of safety information. The approach of grading the severity of AEs separately for the pregnant woman and the fetus allows for greater detail and nuance in AE reporting.

This terminology should however not be considered final or exhaustive. Future refinement and expansion, will continue to improve these criteria with revised versions to be released in the future.

Suggested reading

1. Spencer RN, Hecher K, Norman G, et al. Development of standard definitions and grading for Maternal and Fetal Adverse Event Terminology. Prenat Diagn. 2022;42(1):15 26
2. Medical dictionary for regulatory activities. Available at: https://www.meddra.org

Journal Scan

Priyanka Mathe
Assistant Professor
Department of Obstetrics & Gynaecology, University College of Medical Sciences & Guru Teg Bahadur Hospital, Delhi

Predictors of ovarian preservation after ovarian torsion: A Retrospective Chart Review.

Schmidt EM, Boniface E, Baldwin MK, Riordan J.

Journal of Pediatric and Adolescent Gynecology. 2023;36(2):184.

BACKGROUND

Ovarian torsion is a gynecologic emergency that requires surgical intervention to avoid functional loss of the ovary. Our objective was to determine predictors of ovarian preservation in the setting of torsion, primarily time from initial presentation to surgery.

METHODS

We conducted a retrospective cohort study of women aged 12- 40 who presented to the Emergency Department (ED) at a single institution between 2008 and 2021 and had surgical confirmation of torsion. Cases were identified using diagnosis codes for ovarian torsion, and we performed chart review to confirm inclusion criteria. We compared ovarian preservation by time to surgery after ED presentation. Covariates included age, parity, sonographic doppler flow, presence of ovarian mass, intraoperative attempt at detorsion, intraoperative concern for necrosis, and night or weekend presentation. We considered the potential effect of COVID-19 pandemic on time to surgery. We assessed predictive factors for ovarian preservation based on preoperative sonographic findings and patient characteristics using multivariable logistic regression. Institutional IRB approved a waiver of consent.

RESULTS

We identified 60 surgical cases of confirmed ovarian torsion, of which 25 underwent oophorectomy (42%). The median time from initial presentation in ED to surgery was 8.6 hours (IQR: 5.9-12.9; 8.3 hours in preserved versus 8.7 in removed; p=0.68). When time to surgery was < 4 hours (n=6), the ovary was preserved in 83% of cases, compared to 56% when time to surgery was ≥ 4 hours (n=54; p=0.39). When time to surgery was < 8 hours (n=28), 61% had ovarian preservation compared to 56% at ≥ 8 hours (n=32; p=0.73). The COVID-19 pandemic was not associated with a longer time to surgery (n=7). Ovarian preservation was significantly more likely with present doppler flow on sonographic exam (60% vs 27%; p=0.02). Preservation was less likely with necrosis suspected intraoperatively (20% vs 84%; p< 0.01). Detorsion was attempted in 64% of cases, resulting in preservation of 35% of necrotic-appearing ovaries. 76% of cases underwent oophorectomy based on intraoperative concern for necrosis; however, only 48% of ovarian specimens had necrosis confirmed on pathology. Age, parity and night or weekend ED admission were not associated with ovarian preservation.

CONCLUSIONS

Predictors with the greatest likelihood of ovarian preservation after torsion include surgical goal time of < 4 hours after ED presentation, present doppler flow on sonographic exam, and attempt at detorsion intraoperatively despite necrotic appearance. Intraoperative methods to confirm ovarian viability would reassure surgeons. The surgical decision for oophorectomy may be based on factors unrelated to functional loss of the ovary.

Author comments

Ovarian torsion refers to the complete or partial twist of the ovary on its ligamentous supports, often resulting in partial or complete obstruction of its blood supply. Prompt diagnosis is essential for ovarian and/or tubal function preservation and to prevent other associated morbidity. It is one of the most common gynaecologic surgical

emergencies and should be undertaken as soon as possible. Duration of ovarian torsion and presence of blood supply has been proposed to be a possible predictor for histological preservation. Ovarian ischemia is the main pathophysiological change, accompanied by necrosis and infection which is directly related to the duration of torsion. In young females preservation of ovarian tissue should be aimed as much as possible. This study aimed at predictors of ovarian preservation which concluded that early intervention with surgical goal time of < 4 hours after ED presentation alongwith other predictive markers like presence of doppler flow on sonographic exam, and attempt at detorsion intraoperatively despite necrotic appearance helps in better outcomes.

Abnormal uterine bleeding during pubertal induction with transdermal estrogen in Turner Syndrome individuals.

Shim S, Streich-Tilles T, Gutmark-Little I, Yao M, Shafer J, Breech L, et al.

Journal of Pediatric and Adolescent Gynecology. 2023

STUDY OBJECTIVES

Incidence of abnormal uterine bleeding (AUB) during pubertal induction among individuals with Turner syndrome (TS) has not been described previously. We estimated the incidence and characterize factors associated with AUB among TS individuals. A secondary objective was to evaluate the management of AUB among this patient population.

DESIGN, SETTING, PARTICIPANTS, AND INTERVENTION

We conducted a retrospective chart review to evaluate TS individuals undergoing hormone replacement therapy (HRT) for pubertal induction with transdermal estrogen (TDE). A total of 45 participants were identified between January 2007 and June 2019.

RESULTS

Of the 45 TS individuals included, 16 (35%) experienced AUB. Individuals with AUB most commonly experienced prolonged (44%), prolonged and heavy (25%), and intermenstrual (19%) bleeding. Individuals who experienced AUB were more likely to experience spontaneous bleeding (69% vs. 28%) and a duration of unopposed estrogen greater than 18 months (63% vs. 41%), undergo progestin cycling less often than monthly (69% vs. 0%), use a micronized progestin dose of less than 200 mg (25% vs. 14%), and be noncompliant with HRT (19% vs. 0%) compared to those who did not experience AUB.

CONCLUSIONS

There is a relatively high incidence of AUB among TS individuals undergoing pubertal induction with TDE. Care providers should consider the clinical factors examined to guide monitoring and management of TS individuals on HRT.

Author comments

More than 80% of girls with Turner syndrome experience primary ovarian failure prior to the onset of menarche. Hormone replacement therapy (HRT) is recommended to start between 11-12 years of age, followed by titration to adult dosing over 18-24 months. Current guidelines recommend the initiation of HRT with transdermal estradiol, followed by the addition of oral progesterone once breakthrough bleeding occurs or after 18-24 months of unopposed estrogen therapy, whichever occurs first. This study aimed to identify risk factors associated with abnormal uterine bleeding and evaluate the management practices of AUB during pubertal induction among females with Turner syndrome. The following was concluded to prevent AUB during pubertal induction with transdermal estrogen in Turner syndrome girls: 1) Cycle with progestins monthly, 2) Introduce progestins at the onset of breakthrough bleeding or at 18 months, whichever occurs first, 3) Use progestin dosing at the upper end of the recommended range (e.g. 200 mg for micronized progesterone) 4) Counsel all patients regarding the risk of AUB, 5) Monitor all patients regularly during pubertal induction, 6) Monitor with heightened surveillance those patients who show rapid development of secondary sex characteristics on low dose estrogen.

AOGD President & Vice President Election (2024-25)
Call for nominations

Nominations are invited from eligible AOGD members for the following posts

- President (2024-25)
- Vice President (2024-25)

Last date for submission of nominations is 22nd May 2023

- Applications by desirous candidates should be submitted on the prescribed form available on AOGD website (www.aogd.org) / bulletin / office, with due entry in the office register.
- The nomination shall be proposed by one regular member and seconded by two regular AOGD members.
    - The candidate, his/her proposer and seconder should have cleared all their dues towards the membership subscription in full. Noncompliance with this condition shall render the nomination invalid.
- Nominations as per the eligibility criteria should reach AOGD secretariat: 7th floor MCH Block, department of Obst. & Gynae UCMS & GTB Hospital, New Delhi- 110095 (Phone no. 9717392924) by _22nd May 2023.
- Last date for withdrawal of nomination is 2nd June 2023.

Accepted nomination(s) will be displayed on AOGD website by 22nd May 2023.

NOTE:

- The new members joining AOGD after the date of call for nominations willl not be eligible for voting.
- Associate members are not eligible to vote.

Dr. A G Radhika (Secretary AOGD , 9818065527)

Eligibility Criteria for PRESIDENT AOGD

1. He/she shall be a senior and active member of faculty in a multidisciplinary hospital of Delhi in the public or the private sector, with such hospital having clinical and para-clinical departments and having post graduate courses, duly recognized by the National Medical Commission and/or the National Board of Examination.
2. He/she must have held the post of professor/ senior consultant/ an equivalent thereof with such hospital for more than 10 years.
3. He/she must have the experience of having completed at least one tenure as the chairperson of a sub-committee of the AOGD or the experience of having completed at least one tenure as Vice President or Secretary or member of the Executive Committee of the AOGD.
4. He/she must be a life member of the AOGD with more than twenty years of experience after post graduation in the specialty of obstetrics and gynaecology.
5. He/she should have experience of conducting academic conferences, seminars or workshops.
6. A person who has held the post of President of the AOGD in the past shall be ineligible to hold the post of President of the AOGD again.
7. Faculty from the institution that fields the President shall be ineligible to apply for election to the post of President for a period of five years from the date of start of the tenure of that President.

Eligibility Criteria for VICE PRESIDENT AOGD

1. He/she shall be a senior member of faculty in a multidisciplinary hospital of Delhi in the public or the private sector, with such hospital having clinical and para-clinical departments and having post graduate courses, duly recognized by the National Medical Council / National Board of Examination.
2. He/she must have held the post of professor / senior consultant / or an equivalent thereof with such hospital for more than seven years.
3. He/she must have the experience of having completed at least one tenure as the chairperson of a sub-committee of the AOGD or the experience of having completed at least one tenure as Secretary orTreasurer or Editor or member of the Executive Committee of the AOGD having attended at least 75% of the meetings of the Executive Committee during his/her tenure as member ofthe Executive Committee
4. He/she must be a life member of the AOGD with more than fifteen years of experience after post graduation in the specialty of obstetrics and gynaecology.
5. He/she should preferably, have experience of conducting academic conferences, seminars or workshops.
6. A person who has held the post of Vice-President of the AOGD in the past shall be ineligible to hold the post of Vice-President of the AOGD again.

AOGD President & Vice President Election (2025-26)
Call for nominations

Nominations are invited from eligible AOGD members for the following posts

- President (2025-26)
- Vice President (2025-26)

Last date for submission of nominations is 22nd May 2023

- Applications by desirous candidates should be submitted on the prescribed form available on AOGD website (www.aogd.org) / bulletin / office, with due entry in the office register.
- The nomination shall be proposed by one regular member and seconded by two regular AOGD members.
    - The candidate, his/her proposer and seconder should have cleared all their dues towards the membership subscription in full. Noncompliance with this condition shall render the nomination invalid.
- Nominations as per the eligibility criteria should reach AOGD secretariat: 7th floor MCH Block, department of Obst. & Gynae UCMS & GTB Hospital, New Delhi- 110095 (Phone no. 9717392924) by _22nd May 2023.
- Last date for withdrawal of nomination is 2nd June 2023.

Accepted nomination(s) will be displayed on AOGD website by 22nd May 2023.

NOTE:

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- Associate members are not eligible to vote.

Dr. A G Radhika (Secretary AOGD , 9818065527)

Eligibility Criteria for PRESIDENT AOGD

1. He/she shall be a senior and active member of faculty in a multidisciplinary hospital of Delhi in the public or the private sector, with such hospital having clinical and para-clinical departments and having post graduate courses, duly recognized by the National Medical Commission and/or the National Board of Examination.
2. He/she must have held the post of professor/ senior consultant/ an equivalent thereof with such hospital for more than 10 years.
3. He/she must have the experience of having completed at least one tenure as the chairperson of a sub-committee of the AOGD or the experience of having completed at least one tenure as Vice President or Secretary or member of the Executive Committee of the AOGD.
4. He/she must be a life member of the AOGD with more than twenty years of experience after post graduation in the specialty of obstetrics and gynaecology.
5. He/she should have experience of conducting academic conferences, seminars or workshops.
6. A person who has held the post of President of the AOGD in the past shall be ineligible to hold the post of President of the AOGD again.
7. Faculty from the institution that fields the President shall be ineligible to apply for election to the post of President for a period of five years from the date of start of the tenure of that President.

Eligibility Criteria for VICE PRESIDENT AOGD

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2. He/she must have held the post of professor / senior consultant / or an equivalent thereof with such hospital for more than seven years.
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4. He/she must be a life member of the AOGD with more than fifteen years of experience after post graduation in the specialty of obstetrics and gynaecology.
5. He/she should preferably, have experience of conducting academic conferences, seminars or workshops.
6. A person who has held the post of Vice-President of the AOGD in the past shall be ineligible to hold the post of Vice-President of the AOGD again.

EVENTS HELD

1. DGF in collaboration with AOGD organized a physical meeting on "Recurrent Pregnancy Loss" on 5th April, 2023 at The Park Hotel, Connaught Place, New Delhi.

2. FEMTEK 2 :Modern Approaches to Gynaecology & Obstetrics was organised by FOGSI in association with AOGD on 14th April 2023 at Hotel Le Meridien, Delhi

- FOGSI Luminary Award - Dr Kamal Buckshee, Dr Alka Kriplani
- FOGSI Achiever Award - Dr Pratima Mittal, Dr Neerja Bhatla, Dr Ashok Kumar, Dr Abha Singh, Dr Asmita Rathore, Dr Achla Batra, Dr Manju Puri, Dr Anita Sabharwal, Dr Mala Srivastava, Dr Amita Suneja, Dr A.G.Radhika
- Appreciation certificate to AOGD as a host Society

This was followed by the FOGSI Managing Committee Meeting on 15th April 2023 at Hotel Le Meridien, Delhi.

4. Multidisciplinary committee of AOGD and AEPI organized a workshop on "Point of Care Ultrasound" (POCUS) to learn skills necessary for all those imparting critical care in any field of medicine on 16th April, 2023 at Fortis Hospital, Sector 62, Noida.

EVENTS HELD

5. Delhi PG Forum was held on 17.4.23 by AOGD and Case discussion on PPH was done by Post Graduates of Kasturba Hospital, Delhi.
6. Delhi Gynecologist Forum Dwarka in association with AOGD organised a CME on cardio tocograph - Interpretation and Management at Hotel Welcome, Dwarka on 21st April 2023, 2-4 pm.
7. AOGD Infertility Committee in association with DGF conducted a CME on Infertility Updates on 23 April, 2023 at Hotel Radisson Blue, Paschim Vihar, Delhi.
8. Max Institute of Cancer care in association with AOGD organised Max Cancer Congress on 29th and 30th April 2023, 2-5 pm at Hotel Taj Palace, New Delhi.

9. A CME on Cervical Cancer Mukt Bharat was organised by AOGD breast cervical cancer prevention sub-committee with DGFSW on 29 April 23, for 2.30 to 5.30 pm.
10. FOGSI-AOGD organised a workshop Karyashala in association with FOGSI Sexual Medicine Committee, FOGSI Urogynaecology Committee and FOGSI MTP Committee on 22nd April.

PROCEEDINGS OF CLINICAL MEETING

AOGD Monthly Clinical Meeting Held at LHMC & SSKH on 28th April 2023

Post caesarean sepsis- an unthinkable eye opener

Dr Kiran Aggarwal, Dr Anuradha Singh

Caesarean delivery is the single most important risk factor for puerperal infection in immediate postpartum period. Current global prevalence is 3.7% to 24.2% of women globally. Although technology has rendered LSCS safe nowadays , Caesarean section as a mode of delivery is not as safe as it is perceived and associated with several life threatening complications such as Abnormal placentation. Post caesarean sepsis with occasionally severe debilitating consequences and risk of anesthesia.

We reported a rare case of 35 year old Primigravida who was admitted with diagnosis of 39 weeks POG with Gestational hypertension with Gestational Diabetes for induction of labour. She had past history of cervical tuberculosis and had high myopia in right eye. Patient had to undergo emergency LSCS for failed induction. Postoperatively patient developed sudden onset right side orbital cellulitis along with involvement of Chest with septic emboli , abdominal wall and left upper arm cellulitis. Patient has SSI and stitch line gape as well.

Despite aggressive antibiotic therapy and development of panophthalmitis , right eye had to be eviscerated and implant was placed 1 month post LSCS. The intravitreal and stitch line culture showed growth of very rare organism Aeromonas hydrophila. It is a Gram-negative anaerobic bacilli which had diverse clinical manifestation ranging from Diarrhoea and soft tissue infections to serious fulminant soft tissue infection and meningitis, OM, myonecrosis, endocarditis , peritonitis, cholecystitis, and septicemia in immunocompromised and those with underlying liver disease.. This organism is known for its virulence, genetic predisposition to antibiotic resistance. The extensive and indiscriminate use of antibiotics has given rise to many resistant varieties of bacteria like aeromonad. Multidrug resistance genes have also been identified in this group of bacteria which is of serious health concern. To the best of our knowledge this is first reported case of Aeromonas Hydrophila associated Orbital cellulitis and pan ophthalmitis . History of high myopia associated with severe scleral thinning was probably responsible for preferential right eye involvement through endogenous route.

Conclusion- Any infection during pregnancy, especially among women in developing countries, should be promptly diagnosed and treated to prevent life threatening complications to prevent other infective foci especially in and around the eye. Proliferative Increase in rates of CS especially primary caesareans should be curbed. Avoiding un-indicated Caesarean sections and also the delay in indicated Caesarean sections will have long term benefits.Promoting rationale and responsible use of antibiotics including the importance of single dose prophylactic antibiotic within 1 hour of incision in indispensable.

Solitary synchronous vaginal metastasis in early stage endometrioid endometrial carcinoma-an unusual presentation

Dr Sharda Patra Dr Manju Puri, Dr Soni , Dr Prateeksha

Dept of Obstetrics & Gynaecology , Lady Hardinge Medical College & Smt SK Hospital, New Delhi

we present a case of poorly differentiated endometrial carcinoma FIGO Stage IA that metastasized directly to the lower part of vagina. Her histopathology from endometrium and from vaginal lesion showed poorly differentiated adenocarcinoma. Based on IHC biomarkers , the vaginal lesion was confirmed as secondary from the endometrial carcinoma The patient was discussed in the tumor board for

management options and with the pt choice a decision for Neoadjuvant chemotherapy followed by surgery was taken. The patient received 3 cycles of neoadjuvant chemotherapy followed by interval debulking surgery. The response to chemotherapy was complete with complete regression of lesion from the vagina and endometrial cavity as well based on imaging and post surgery HPE .Post operative period was uneventful.

The patient completed her adjuvant chemotherapy . Pt refused to further chemoradiation and is now being followed up 3 monthly . Her disease-free interval is 8 months. This case is one of the few reported cases in the literature where early stage carcinoma endometrium is diagnosed synchronously with an isolated vaginal metastasis, however there are few reports of early stage endometrioid adenocarcinoma of uterus metastasizing to rare site synchronously to breast, femur, clavicle, spleen and few reports on synchronous solitary vaginal mets from other sites like colon, rectum, breast .Due to paucity of data on solitary synchronous vaginal metastasis in early stage endometrioid endometrial carcinoma , there are no consensus for the management of such cases. However, upfront surgery, radiation or systemic therapy can be advocated on an individual basis as was done in the present case, due to the unresectable location of the lesion upfront neoadjuvant chemotherapy was chosen, and the outcome was satisfactory.

Conclusion : Any vaginal lesion should be subjected to a comprehensive work up to look for primary both gynecological and non gynecological malignancy . In case of doubtful histology further diagnosis based on IHC biomarkers should be done to differentiate it from primary vaginal malignancy before proceeding for any surgical intervention.

Placental biometry/ uterine artery pi ratio: a promising marker for prediction of preeclampsia

Dr. Manisha Kumar

Objective: The objective of the study was to perform placental biometry and Doppler assessments and measure biomarkers in each trimester from healthy and preeclamptic (PE) pregnancies Method: This prospective cohort study was carried out after ethical clearance. Placental length, thickness and volume, biomarkers PAPP-A, sFLT-1, PlGF along with the uterine, middle cerebral and umbilical artery blood flow evaluation was done serially at 11-14, 20-24, and 28-32 weeks of gestation. Pulsatility index (PI) was the difference between the peak systolic flow and minimum diastolic flow velocity, divided by the mean velocity. The above parameters were compared between women with normal outcome and PE. **Results:** Out of 1008 women who were followed till delivery, 135/1008(13.4%) had hypertensive disorders of pregnancy (HDP) and 44/1008(4.4%) had PE. The placental length (PL) and volume were significantly less with HDP ($p<0.001$) and PE ($p=0.005$) compared to controls. PAPP-A in the first trimester and PlGF and uterine artery PI (Ut A PI) in all trimesters were significantly lower in PE compared to healthy pregnancies ($p<0.001$). Two novel parameters, PL/Ut A PI and PV/Ut A PI ratio, were significantly low in cases compared to controls ($p<0.001$). In the first trimester the area under curve (AUC), sensitivity and specificity of PV/Ut A PI for PE prediction was 0.801, 81.8% and 70.5%. At 20-24 weeks and 28-32 weeks of gestation the AUC, sensitivity and specificity of PL/Ut PI ratio was 0.806, 81.8%, 70.5% and 0.799, 73.3%, 70.7% respectively. **Conclusion:** Placental length or volume and uterine artery pulsatility index ratio can be promptly calculated and proved to be a useful marker for prediction of PE.

Association of Obstetricians & Gynaecologists of Delhi

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Date of Birth: Date.....**Month** ..... **Year**.....

Member of Any Society:.....

Proposed by ....

Cheque/DD / No: .....

Cheque/Demand Draft should be drawn in favour of**: AOGD 2023**

FOR ONLINE TRANSFER THROUGH NEFT/RTGS

Name of Bank: Canara Bank

Branch: GTB Hospital, Residential Complex, Dilshad Garden, New Delhi -95

Name of Account: AOGD 2023

Account no: 110112345909

IFSC code: CNRB0003009

MICR code: 110015088

Life Membership	: Rs. 11,000 + Rs. 1,980 (18% GST applicable) = Rs. 12,980
New Annual Membership*	: Rs. 2,000 + Rs. 360 (18% GST applicable) = Rs. 2,360
Old Renewal Membership+	: Rs. 1,200 + Rs. 216 (18% GST applicable) = Rs. 1,416

Encl.: Attach Two Photocopies of All Degrees, DMC Certficate and Two Photographs (Self attested)

***-Annual Membership is for the calendar year January to December.**

+ - In case of renewal, mention old membership number. Note: 18% GST will be applicable as FOGSI requires it.

Send Complete Membership Form Along With Cheque / DD and Photocopy of required documents.

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