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AOGD BULLETIN

AOGD Theme 2017-18

'Optimizing Women's Health Through Enhanced Skills and Best Practices'

Issue:

Fetal Medicine

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President's Message

Dear Friends

Here's wishing dear AOGD members a Bright, Joyous & Prosperous Diwali! With the festival season in full swing and winter coming there's a nip in the air and hopes of snuggling into warm clothing, sipping hot chai and generally enjoying good hill station weather!

With November around the corner and being AOGD Conference month, hope you have registered for the much-awaited annual event. All of you would have received the brochure with Scientific Program of the 39th Annual Conference to be held from the 17th to 19th November 2017. The program has been carefully crafted and we have the best International & National Faculty to make it truly worthwhile. Hope you see you all in large numbers and contribute to the success of the event. Log onto www.aogdconference2017.com for workshop and conference details.

September saw teachers being felicitated grandly by Dr. Anita Sabharwal on 4th September. On 5th September, Dr. Sharda Jain and DGF conducted a spectacular ceremony felicitating teachers which was truly touching. We thank her and team DGF for the effort. September calender was also dotted by CMEs conducted by AOGD members Dr. Sushila Gupta, Dr. Nymphaea Walecha, Dr. K. Gouri Devi, Dr. Anita Sabharwal, Dr. Anjali Tempe and Dr. Nutan Agarwal. See the September events colour spread for details. The month end saw an Obstetrics Skill workshop conducted by AOGD under the leadership of Dr. AG Radhika. Dr. Renu Mishra and Dr. Rinku Sengupta gave enlightening talks on CTG Interpretation followed by Instrumental delivery by Dr. Neerja Goel and Dr. Shelly Agarwal. This was followed by hands on practice sessions on mannequins. Finally the month, as always ended, with the Clinical Meeting at Hindu Rao Hospital where interesting cases were presented.

This issue showcases the best of 'Fetal Medicine' with articles contributed by specialists in the field. All of you will agree with me that aneuploidy screening has become important with women putting careers before pregnancy! Although universal screening is recommended, it may not always be possible in the Indian context. Understanding and interpreting screening tests through case based scenarios is an interesting article and so is 'Aneuploidy screening simplified'. Twin gestation needs constant updating regarding diagnosis, monitoring, complications, timing of delivery, intrapartum issues etc. Hope you find this issue useful and all our bulletins find a special place on your desk as a ready reckoner.

Namaste and Happy Diwali once again!

Shalini Rajaram
President, AOGD (2017-18)

Vice President's Message

Dear AOGD friends!

There is celebration in air all around us. I take this opportunity to make a wish that Women - Shakti "Saraswati, Durga & Laxmi Maa" bless us all for the coming year.

Our editorial team has brought out yet another brilliant issue on Fetal Medicine; a subspecialty that has revolutionsed the pre - birth science. This issue deals with newer insight into aneuploidy screening & management, rh – isoimmunization, twin pregnancy, newer classification of FGR, fetal therapy & some interesting psychological aspects of "Life before Birth". Please spare some time to go through this issue.

After the festivities are over, please gear up for the much awaited event of annual AOGD conference coming up on 17th – 19th November 2017. I request you to register in large numbers & make this conference a great success.

Happy Diwali!!!

With Best Regards

Kiran Guleria
Vice President AOGD (2017-18)

From the Secretary's Desk.....

Dear AOGDians

Greetings and a very Happy Deepawali!!

Hope the festival of light brings you Enlightenment, Happiness and Prosperity.

Congratulations to Dr Sudha Prasad on her selection as Vice President FOGSI. Thanks to all AOGD members for voting for her.

Our editors have chosen to bring light to tricky perinatal issues; from prenatal detection of anomalies to antenatal care everything has been covered. The confounding issue of what to do about abnormal maternal serum reports has been clarified beautifully. The topic of FGR will also bring you up to date on various classifications, diagnosis and management. Hope you enjoy the issue as much as we did in bringing it out.

We are ready to welcome you at our **Annual Conference** at India Habitat Center on 18th and 19th November, I hope you will take time to go through the program. We have designed it with careful consideration, covering all essential recent topics, videos, competition papers and quiz. You can choose from six preconference workshops. Lots of prizes to be won; So in case you have not registered yet, please register at our website www.aogdconference2017.com. We promise you an exciting and memorable time.

We also have some very interesting stalls like garments to protect mothers from household radiation, newer prenatal tests etc in our exhibition area. And in a lighter vein we have also engaged sarees from Bhagalpur and jewelry from nawabi Lucknow.

Hoping to meet you at the conference!!

Abha Sharma
Secretary AOGD (2017-18)

Attection Clinical Meet date change

Monthly Clinical Meet

Monthly Clinical Meet will be held at ESI Hospital, Basaidarapur, New Delhi on **Thursday, 26th October, 2017** from 4:00-5:00pm.

From the Editorial Board

Respected Seniors & Dear Friends,

Greetings from the editorial team in the month of lights and festivities. Festivals bring hopes and laughter in our life, and so does the new life too. Therefore our October bulletin is dedicated to issues concerning our unborn patient….***Fetus in Utero….***all wrapped in the orange color….the color of rising sun and a new dawn.

Someone has beautifully said "***Treat the child as though he is already the person he is capable of becoming***'. For an obstetrician, this extends even before the child is born and managing a pregnancy, we are always managing a dear little patient sitting inside the womb too. From conception till delivery, journey of fetus inside the uterus is nothing short of a miracle. In this journey, so many things can go wrong at so many points. From conception, genetic problems can arise compromising life, development, growth and life after birth. But with knowledge, we can pick up these abnormalities even in first trimester. From the era of diagnosing aneuploidies in second trimester by invasive tests, days have come where noninvasive tests can screen in first trimester only. Along with these tests for aneuploidy screening, we have included an article on the actual case scenarios too.

Multiple pregnancy with its unique challenges is becoming more common with the rise in assisted reproduction rates. Doppler studies have advanced so much that it has totally revolutionized the management of growth restricted babies. Preterm birth continues to be a challenge, but with advancements, managing periviable birth has become an important and complex clinical and ethical dilemma. Considering fetus as an unborn patient, therapies have evolved to manage many conditions in utero including medication and several procedures. Another interesting article is on the complex problem of ambiguous genitalia. Ready reckoners on hemoglobinopathies and SOP on Rh iso-immunization are presented for your referral. Hope, this basket of varied articles will interest you all. We would like to specially thank Dr Aparna Sharma who has helped a lot with her knowledge and experience, in planning this issue on fetal medicine. We are also immensely thankful to all our authors for their knowledge and writing skills.

Don't miss the article on Prenatal Bonding in Mind, Body, Soul section …. A step going beyond the traditional science. Patience and faith go a long way along with knowledge and science.

"God has perfect timing, Never early, Never late;
It takes a little patience & Faith, But, it is worth the wait"

Hope you all will find this issue informative and helpful in clinical practice. Do attempt the quiz in the end. Your feedbacks are always welcome.

The Editorial Team
AOGD (2017-18)

Aneuploidy Screening in Pregnancy

K Aparna Sharma[1], Sumita Agarwal[2]

[1]Associate Professor, [2]Reseach Officer, Department of Obstetrics and Gynecology, All India Institute of Medical Sciences, Delhi

Introduction

Chromosomal abnormalities affect approximately 0.4% of births (1/250) according to population-based registries that include live births, fetal deaths, and pregnancy terminations. Out of all these cases, trisomy 21 accounts for more than 50% of cases, trisomy 18 for 15%, and trisomy 13 for 5%[1]. Due to its profound social and economic impact on the family, there is a great emphasis on early detection of these anomalies during pregnancy. The availability of high definition ultrasound and serum markers for the detection of aneuploidies has revolutionized the concepts of prenatal care with respect to aneuploidy screening.

Prenatal Screening versus Diagnosis

The screening tests are done to assess whether a pregnant woman is at increased risk of having a fetus affected by aneuploidy. In contrast, prenatal diagnosis is intended to determine, with as much certainty as possible, whether a specific condition is present in the fetus.

Who should be screened?

It is a common misconception that only elderly mothers should be offered screening for aneuploidies. However, it is now generally accepted that **all women should be offered screening for aneuploidies** and based on the results further diagnostic testing should be made available.

Screening Modalities

- Biochemical Markers (First and second Trimester)
- Ultrasound (First and second trimester)
- Cell free fetal DNA

A. Biochemical Markers

There are five analytes (commonly referred to as markers) measured by the laboratory that are used to calculate the likelihood of a pregnancy being affected by Down's, Edwards' or Patau's syndromes – six if human chorionic gonadotropin (hCG) and its free beta subunit are considered as two separate analytes[2].

a) **Pregnancy Associated Plasma Protein A(PAPP-A):** PAPP-A is a large zinc glycoprotein produced by the placenta. First trimester PAPPA levels increase by 30 to 50% per week between 10 and 13 weeks of gestation.

b) **Human Chorionic Gonadotropin (hCG):** hCG is a glycoprotein of 244 amino acids produced by the developing embryo and later by the placenta.

c) **Alpha fetoprotein (AFP):** AFP is a glycoprotein of 591 amino acids produced by the yolk sac and the fetal liver.

d) **Unconjugated oestriol (uE3):** Oestriol in maternal circulation undergoes conjugation with glucuronides or sulphate but about 10% remains as the unconjugated form.

e) **Inhibin-A (Inh A):** Inhibin-A is a dimeric molecule produced by corpus luteum and placenta during pregnancy.

Changes in levels of biochemical markers in pregnancy are shown below in Fig 1:

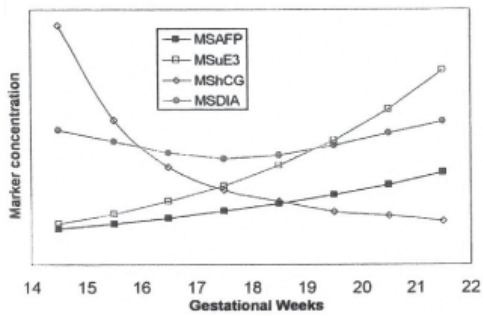

Fig 1: Changes in levels of biochemical markers in pregnancy

Quantifying Analyte levels

Analyte values are initially measured as standardized mass units. Each mass value is converted to the screened woman's gestation specific multiples of the median (MoM). Patient data are usually expressed as MoM values after population based medians are established, thereby eliminating the effects of assay differences and gestational age. Multiples of the median also provide a relatively simple way to compare an individual to the entire population being screened. Table 1 shows changes in markers in each of the aneuploidies.[3] Various factors affecting levels of serum markers are shown in Table-2.

Table 1: Changes in levels of biochemical markers in aneuploidies in first trimester

	β-hCG	PAPP-A
Trisomy 21	↑ **2.2**	↓ **0.5**
Trisomy 18	↓ **0.3**	↓ **0.2**
Trisomy 13	↓ **0.5**	↓ **0.3**
Turners	↔	↓ **0.5**
Triploidy	↑ **8.0**	↓ **0.8**

Table 2: Variables affecting serum markers

Variable	PAPP-A	βhCG	AFP	uE3	Inhibin A
Vaginal bleeding	Does not significantly alter levels	-	-	-	-
Diabetes			Decreased (20%)	Decreased (5-10%)	
IVF	Decreased (10-20%)	increased		Decreased	increased
Smoking	Decreased	Decreased	increased	Decreased	increased
Increasing maternal weight	Decreased	Decreased	Decreased	Decreased	Decreased

B. Ultrasound in screening

First trimester scan- aneuploidy markers

The various parameters used in first trimester USG to detect aneuploidy are:

- Nuchal Translucency(NT)
- Nasal Bone (NB)
- Ductus Venosus Flow/PI (DV)
- Tricuspid Regurgitation(TR)

1. **Nuchal translucency (NT):** NT is the description given to the ultrasonic appearance of the fluid filled space between the fetal skin and the soft tissue overlying the cervical spine. It is measured between **11 to 13 weeks and 6 days** period of gestation. Figure 2 shows the procedure of assessment of nuchal translucency.

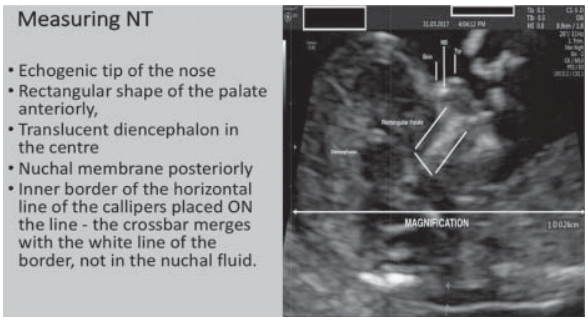

Figure 2: Assessment of nuchal translucency

Several studies have confirmed that an increased nuchal translucency is associated with aneuploidy. It can also indicate many fetal complications including congenital defects and association has been found with cardiac anomalies, congenital diaphragmatic hernia and skeletal dysplasia. The risk of congenital anomaly increases from 5% (NT 95th centile 3.4mm) to 80% for NT greater than 5.5mm[4].

2. **Nasal bone (NB):** Absent or hypoplastic nasal bone is a feature of trisomy 21. Prerequisites for assessment of nasal bone are shown in figure 3.

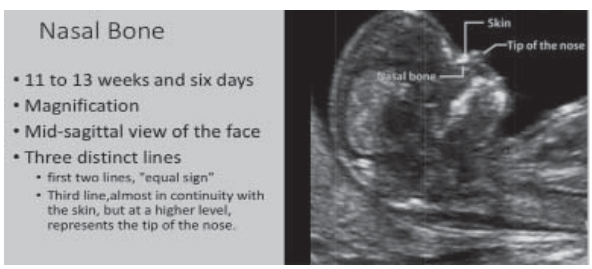

Figure 3: Assessment of nasal bone

Absence of nasal bone has been reported in 60-73% cases of trisomy 21, 57% in trisomy 18, 32% trisomy 13, Turner syndrome (8.8%) and 0.2-1% of normal fetuses[5].

3. **Ductus venosus flow(DV):** The ductus venosus is a fetal venous structure which connects the hepatic portion of the umbilical vein and the inferior vena cava. Normally there should be forward flow in DV throughout the cardiac cycle. However, in a small number of normal fetuses as well as many aneuploid fetuses the **a-wave** is seen **reversed.** Abnormal DV flow velocities have been reported in 59-93% of aneuploid fetuses[6]. Assessment of ductus venosus flow is shown in figure 4.

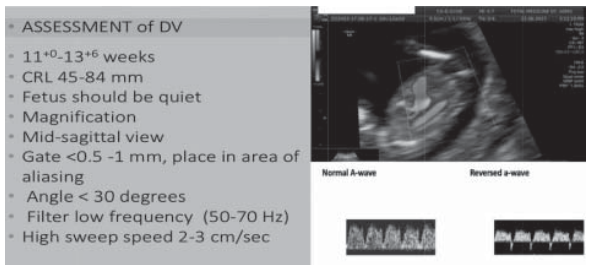

Figure 4: Assessment of ductus venosus

4. **Tricuspid regurgitation**: Congenital cardiac defects are common findings in aneuploid fetuses. In the first trimester, Tricuspid Valve can be used for evaluation using pulsed Doppler (Figure-5). Tricuspid Regurgitation is commonly found in aneuploid fetuses. Around 55% of fetuses with trisomy 21 have tricuspid regurgitation as compared to 1% of chromosomally normal fetuses between 11 to 13^{+6} weeks' gestation[7].

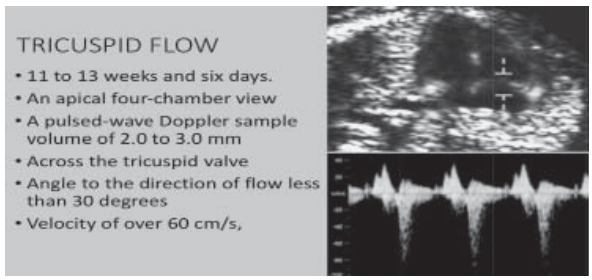

Figure 5: Assessment of Tricuspid flow

C) The Screening Protocols

A combination of ultrasound and biochemical markers has been used to achieve the maximal detection rate with a minimum false positivity. Table 3 shows the commonly available screening protocols.

Table 3: Screening Protocols

Test	Marker	Time (POG)
Nuchal Translucency (NT) scan	NT	• 11-13.6 weeks
Combined Test	1. PAPP-A and beta-hCG 2. NT scan 3. Maternal age	• 10 to 13.6 weeks: (with free beta hcg) • 11 to 13.6 weeks: (with total beta hcg)
Double marker test	AFP and hCG (either free or total) with maternal age	• 11 - 13.6 weeks
Triple marker test	1. AFP 2. uE3 3. beta- hCG	• 15 to 18 weeks
Quadruple marker test	1. AFP 2. uE3 3. beta- hCG 4. InhA	• 15 to 18 weeks
Full integrated test	NT and PAPP-A : 10-13 weeks AFP, uE3, hCG, inhA: 15-18 weeks	First and second trimester biochemistry integrated to give a risk score
Step-wise sequential testing	First trimester portion of integrated screen Offer CVS if high risk (eg, ≥1 in 50) Low risk: scond trimester portion of the integrated test.	
Contingent screening	First trimester portion of integrated screen performed Offer CVS if high risk (eg, ≥1 in 50) Screen negative or low risk: no further testing Intermediate group: second trimester portion of the integrated test.	

*HCG: human Chorionic gonadotropin, Inh A: Inhibin A, PAPP-A: Pregnancy associated Plasma Protein A, AFP: Alpha Fetoprotein, uE3: Unconjugated Estriol

D) Interpretation of prenatal screening tests

A woman's a priori risk is determined based on her chronological age at the estimated date of delivery and history of previous Down syndrome pregnancy. This risk is then increased (or decreased) by a factor called the "likelihood ratio" (LR). The LR is determined by comparing each of her serum marker MoM values with the reference distributions, after accounting for the degree of independence between each pair of markers (measured as an R value after log transformation of the MoMs). The final reported risk is her calculated patient specific risk of having a fetus affected by Down syndrome in that pregnancy.

1) Screen positive test results

A screen positive test result indicates that the woman's risk of having a child with Down syndrome is equal to, or exceeds, a specific cut-off level that was predetermined by the laboratory based on the performance characteristics of the chosen screening test. A typical cutoff for the combined test for Down syndrome is ≥1 in 250-300 with a false positive rate (FPR) of about 5 percent, for the integrated test typical cutoff is ≥1 in 100 with FPR of 1 to 2 percent.

2) Screen negative first trimester or Integrated test results

A negative test result means the patient's risk of having a baby with Down syndrome is less than a specified cut-off level; it does not exclude the possibility of Down syndrome. Regarding Down syndrome screening, no further testing is recommended[8].

3) Efficacy of Screening Methods

Figure 6 shows the detection rate of each of the screening methods given a fixed false positive rate of 5%.[9] Increasing the detection rate will increase the false positivity of the tests. By using a combination of first and second trimester markers like the integrated or serum integrated tests, detection rate is increased at a remarkably lower false positive rate.

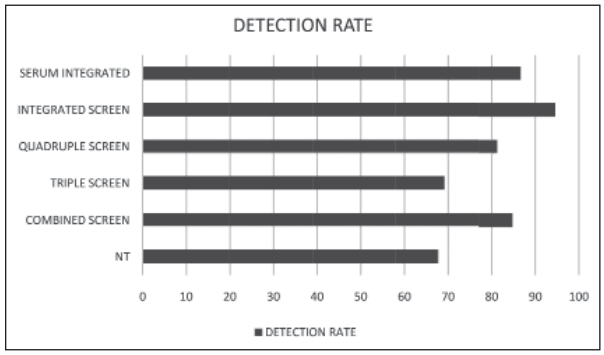

Figure 6: Detection rates of various screening protocols for a fixed false positive rate of 5%

Second Trimester Scan (Genetic Sonogram)

An ultrasonographic evaluation of fetal anatomy between 18-22 weeks of gestation is a part of routine antenatal care. The scan provides an opportunity for evaluation of fetal anatomy as well as uncovering major congenital malformations. Also, the so called 'soft markers' can be assessed which may indicate fetal aneuploidies. A systematic evaluation for major anomalies and soft markers in the second trimester is known as the ***Genetic sonogram or the targeted scan*** originally intended at high risk pregnancies but now being used for low risk pregnancies as well. Figure 7 depicts a checklist for a second trimester routine anomaly scan.

isuog

Date of birth (DD/MM/YYYY):
Referring physician:

Date of exam (DD/MM/YYYY):
Sonographer / Supervisor:
Indication for scan and relevant clinical information:

Gestational age (W + D):
Based on: *LMP / Previous US / Other* :

Technical conditions: *Good / Limited by:*
Singleton / Multiple (use 1 sheet/fetus)
=> Chorionicity:

PLACENTA: Position:
Relation to cervical os: ☐ clear ☐ covering ____ mm from os
Appearance ☐ Normal ☐ Abnormal*

AMNIOTIC FLUID: ☐ Normal ☐ Abnormal*
FETAL MOVEMENT: ☐ Normal ☐ Abnormal*

MEASUREMENTS	mm	Percentile (References)
Biparietal diameter		
Head circumference		
Abdominal circumference		
Femur diaphysis length		
Other:		
Other:		
Other:		

SONOGRAPHIC APPEARANCE OF FETAL ANATOMY: (N=Normal; Ab=Abnormal*; NV=Not visualized) Gray=optional	N	Ab*	NV
Head			
Shape			
Cavum septi pellucidi			
Midline falx			
Thalami			
Lateral ventricle			
Cerebellum			
Cisterna magna			
Face			
Upper lip			
Median profile			
Orbits			
Nose			
Nostrils			
Neck			
Thorax			
Shape			
No masses			

Heart			
Heart activity			
Size			
Cardiac axis			
Four-chamber view			
Left ventricular outflow			
Right ventricular outflow			
Abdomen			
Stomach			
Bowel			
Kidneys			
Urinary bladder			
Abdominal cord insertion			
Cord vessels (optional)			
Spine			
Limbs			
Right arm (incl. hand)			
Right leg (incl. foot)			
Left arm (incl. hand)			
Left leg (incl. foot)			
Gender (optional): ☐M ☐F			
Other :			

Figure 7: Second trimester anomaly scan

A) Soft markers

During a routine anomaly scan minor sonographic abnormalities or 'soft markers' may be identified which are associated with but not diagnostic of fetal problems such as aneuploidy. (Figure 8)

1. **Nuchal fold**: Normal measurements in the second trimester are ≤5mm. Values of 6mm or more are associated with increased risk of trisomy.
2. **Choroid plexus cysts:** An isolated cyst does not increase the risk of trisomy 21 but appears to increase the risk of trisomy 18 in women more than 36 years of age.
3. **Echogenic bowel:** It may be a normal finding or maybe associated with fetal growth restriction, cystic fibrosis, placental insufficiency and aneuploidy.
4. **Renal pelvis dilatation**: It is frequently a normal variant but may be associated with trisomy and neonatal renal problems such as reflux.
5. **Ventriculomegaly:** The lateral ventricles of the brain normally measure less than 10 mm in AP diameter. In fetuses with diameters >10 mm there is increased risk of trisomy.
6. **Two vessel cord:** Single umbilical artery may be present in 0.5 to 1.5% of normal pregnancies. As an isolated finding it does not increase the risk of trisomy 21.
7. **Echogenic foci in the heart:** They may be seen in 10% of normal pregnancies and occur more frequently in Asian mothers. As an isolated marker, they do not increase the risk of trisomy.
8. **Short humerus and Short femur:** Defined as an observed to expected length of <0.9. These have been identified as markers of trisomy 21.
9. **Other minor markers** like widened iliac angle, clinodactyly, sandal gap toe deformity, short ear length, cerebellar hypoplasia, amniodecidual separation have been described in literature.

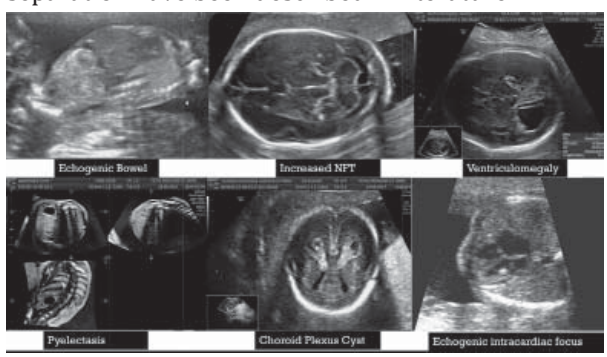

Figure 8: Soft markers for aneuploidy in anomaly scan

Noninvasive Prenatal Diagnosis

The non-invasive prenatal test (NIPT) refers to detection of cell free fetal DNA in maternal blood for diagnosing various fetal conditions. All techniques use massive parallel genomic sequencing (MPS) or NGS, which refers to the high-throughput DNA sequencing technology that can sequence millions of DNA molecules in parallel.

What is cell free fetal (cff)DNA?

This is circulating free DNA which comes from the dead cells and is normally found in all individuals in

a concentration of 10-100ng/ml. They have a rapid turnover with a half-life of 15 minutes. When a woman is pregnant, a significant proportion (5-40%) of the free DNA fragments are of fetal origin (usually placental). These result from the apoptosis of the syncytiotrophoblasts leading to release of DNA fragments. It can be reliably detected after 7 weeks of gestation.

Three different methods of assaying cell-free DNA are currently in use for aneuploidy screening:

- Whole-genome sequencing, also termed massively parallel or shotgun sequencing
- Chromosome selective (or targeted) sequencing
- Single nucleotide polymorphism analysis.

Screening can be performed at any point in pregnancy after 9–10 weeks of gestation, and results are usually available within 7–10 days. In a meta-analysis of autosomal aneuploidy performance, Gil et al concluded that the detection rate (DR) for Trisomy 21 is 99% with a false positive rate (FPR) of 0.07% while the DR and FPR for trisomy 18 are 96.8% and 0.15 and for Trisomy 13 are 92.1% and 0.19% respectively[10].

Interpretation of test results

Test reporting

Most tests are reported positive or negative; aneuploidy detected or not detected; high risk or low risk for aneuploidy or no result.

Negative test

A negative test is reassuring and the woman can be counselled about a very low probability of her fetus having aneuploidy. However, the routine fetal morphology scan should still be offered to the woman at 18 -20 weeks' gestation. It is important to convey that cfDNA only rules out aneuploidy in the fetus. If there is some other indication for a further genetic testing (like raised NT, congenital malformations, etc.) it should proceed as planned.

Positive test

A positive test should prompt a post-test counselling. NIPT is only a screening test. There is significant amount of false positivity and thus definitive management decisions should not be taken based only on abnormal results of NIPT. A confirmatory test like amniocentesis or chorion villus sampling should be done before considering termination of pregnancy.

No result

cfDNA test can report a no yield in some situations like early gestation or maternal obesity. Further options include repeat testing or definitive testing. There could be more than one argument against repeat testing. As the testing takes 7-10 days and a positive result would eventually require further confirmatory tests, a repeat testing proves to be more time consuming and a financially invalid option. Also, one of the reasons for test failure is the low fetal fraction in aneuploidy foetuses. Hence a no-call on the test should lead towards a definitive invasive testing.

Position of NIPT in aneuploidy screening algorithm

NIPT has opened new alternatives in the aneuploidy screening algorithm. The position of NIPT has not been irrefutably fixed and can be utilised as a secondary screen, contingent screen, primary screen. (Figure 9):

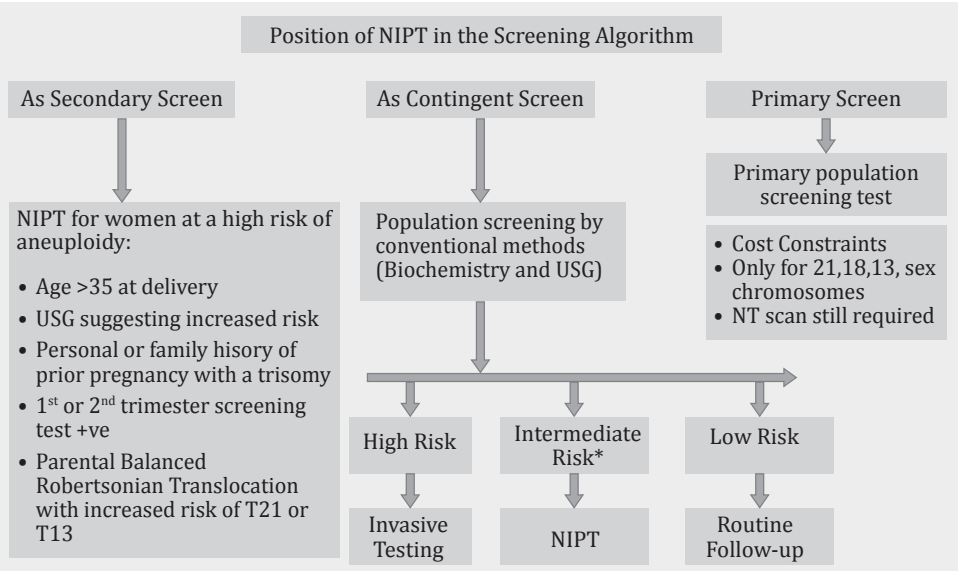

Figure 9: NIPT in screening for aneuploidies

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Attention: Call for Volunteers

Cervical cancer screening and prevention (Vaccination) camp is being organized on 5th November 2017 by Okti foundation under aegis of AOGIN India and AOGD.

Interested doctors please contact
Dr Sonal Bathla
Dr Priti Arora Dhamija (M. 9811558290)

Management of Abnormal Maternal Serum Screening: Case Scenarios

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Introduction

Approximately 3% to 5% of pregnancies are complicated by birth defects or genetic disorders. Chromosomal abnormalities are present in approximately 1 in 150 live births, and congenital malformations remain the leading cause of infant and childhood deaths.

The most common chromosomal disorder is trisomy 21 (Down syndrome), with an incidence of 1 per 800 live births. Trisomy 13 and 18 can also result in live births though with a significantly lower incidence. Sex chromosome aneuploidies are less common than autosomal aneuploidies. Screening for trisomy 21 in pregnancy by measurement of maternal serum biochemical markers has become an established part of obstetric practice in many countries. Trisomy 21 is used as a benchmark as this is compatible with life.

In this article, we will discuss some cases of aneuploidy and NTD's detected during pregnancy through maternal serum screening and their management and propose an algorithm for screening strategy in India.

Trisomy 21

Compared to unaffected pregnancies, levels of second trimester AFP and uE3 are, on average, 0.70-0.75 MoM in Down syndrome, and the levels of first trimester PAPP-A are, on average, 0.4 MoM. Second trimester levels of beta-hCG and inhibin A are about 2.0 MoM, the first trimester levels of free and total beta-hCG are about 1.8 MoM and 1.4 MoM respectively.

Case 1: Trisomy 21 in first trimester

32 years old primigravida at 13-14 weeks was referred for genetic counseling in view of abnormal nuchal translucency.

Ultrasound suggested single live fetus, of 13 weeks & 3 days. Nuchal translucency- 3.00 mm at CRL 73 mm (>95th percentile). (Fig 1) The nasal bone was 2.44 mm long & normal. Intracranial translucency was 2.40 mm and normal. The fetal fronto-maxillary facial angle was 83 degrees. There was no tricuspid regurgitation. Ductus venosus flow was normal.

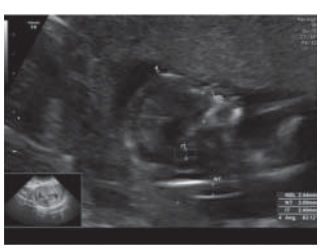


Fig 1a: Raised NT of Case 1

Combined screen was then done at 13.2 weeks which showed risk of Trisomy 21= >1:50

– PAPP-A- 0.33 MoM, Fβ hCG 1.45 MoM, NT – 1.66 MoM

Patient was counseled about Down syndrome and option of CVS/Amniocentesis or NIPT was discussed. In view of procedure related risk of abortion, couple opted for noninvasive tests (NIPT) first which suggested increased risk for trisomy 21.

Amniocentesis was then done at 16 weeks and Trisomy 21 was confirmed on FISH and culture. Couple was counselled about Down syndrome. They underwent termination of pregnancy. Fetus as seen after termination. (Fig 1b)

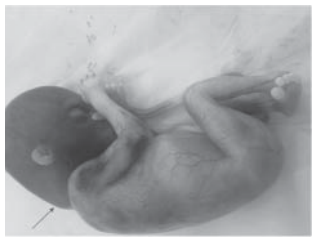


Fig 1b: NT as seen in fetus

Genetic Counseling

Down syndrome is a commonest genetic cause of mild to moderate mental retardation. There may be associated malformations in other body organs in 40-50% of cases. This is caused by the presence of one extra chromosome 21. Pregnancy can be terminated if the couple wants. Risk of recurrence depends upon the karyotype of index case. Risk of recurrence is 1% above the age-related risk in free trisomy 21. Karyotyping of parents is not indicated in free trisomy 21. Prenatal diagnosis is indicated if a

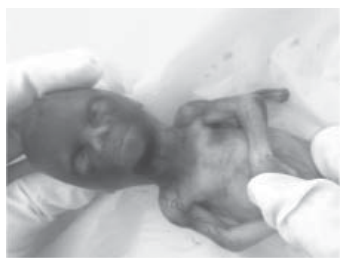


Fig 2 a: Facial features of a fetus with Down syndrome

couple has previous child with Down syndrome. Option of noninvasive testing in first trimester or invasive testing should be discussed with the couple.

Case 2- Trisomy 21 in Second Trimester

32 years old, G2P1L1 at 16 weeks of pregnancy was referred for amniocentesis to exclude Down syndrome in view of positive triple test as below:

- AFP 0.61 mom, E3 0.55 mom, hCG 1.93 mom
- Risk for Down sydrome– 1 in 81, Age 1 in 696, NT was 1.4 mm at 12 weeks.

Amniocentesis was then done at 16 weeks and Trisomy 21 was confirmed on FISH and culture. (Fig 3). Pregnancy was terminated.

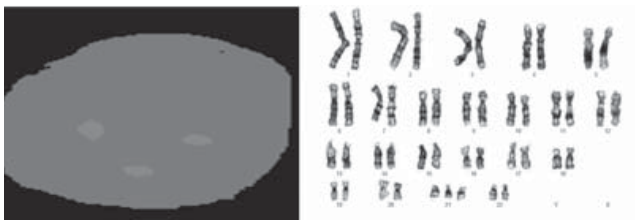


Fig 3: Case 2: Trisomy 21 on FISH & Karyotype on amniotic fluid

Trisomy 18

The first trimester analyte pattern of trisomy 18 is very low PAPP-A (median 0.1 - 0.2 MoM) and very low beta-hCG (median 0.2 - 0.4 MoM). In the second trimester, the analyte pattern suggestive of trisomy 18 is low levels of AFP, uE3, and beta-hCG. The reduction in analyte levels is, on average, 40% for AFP, 60 % for uE3, and 70 % for beta-hCG. The concentration of inhibin A is only slightly reduced (by 12 to 16 percent).

Case 3- Trisomy 18 in first trimester

38 years old G2P1 was referred at 13-14 Weeks

- Combined screen at 11.6 weeks – Tr 18: >1:50
- PAPP-A- 0.15 MoM, F β-hCG 0.23 MoM, NT 0.97 mm, CRL 55mm

Patient was counselled about trisomy 18 and options and limitations of NIPT and CVS or amniocentesis were discussed. She decided for CVS, and FISH and karyotype suggested trisomy 18. (Fig 4).

Fig 4: Case 3- Trisomy 18 on FISH and Karyotype

Genetic counseling

Trisomy 18 is also known as Edwards syndrome. This is caused by three copies of chromosome 18. It occurs in 1/5000 births. Postnatally 60% of trisomy 18 children die within 2 months and more than 95% within a year. This is characterised by multiple organ system malformations such as spina bifida, omphalocoele, heart defects, clubfeet and radial aplasia. The recurrence risk, for a family with a child with complete trisomy 18 is usually stated as 1%.

Case 4- Trisomy 18 in second trimester

Primigravida at 19 weeks was referred in view of abnormal quadruple test

- AFP 1.11, E3 0.26, HCG 0.12, Inhibin 0.64

Risk of trisomy 18- 1 in 10; Risk for Down sydrome– 1 in 1300, age risk 1 in 357.

Level II USG was done which showed increased amniotic fluid and growth lag of about 2 weeks. Umbilical cord was normal. Fetal skull was strawberry shaped. The fetus showed bilateral multiple choroid plexus cysts. These measured 8.0-10.2 mm across. There was unilateral club foot and bilateral club hands. Both radius were hypoplastic and corresponded to a size of 12 weeks & 4 days. Nasal bone was absent. The nuchal skin fold was 3.95 mm thick & normal. The cerebellar transverse diameter was 18 mm & normal. The cisterna magna was 4.45 mm deep & normal. (Fig 5a, b, c)

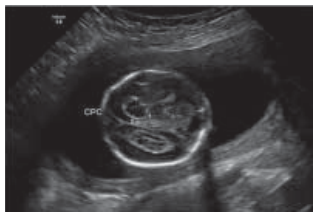


Fig 5a: USG of Case 4 showing CP cyst

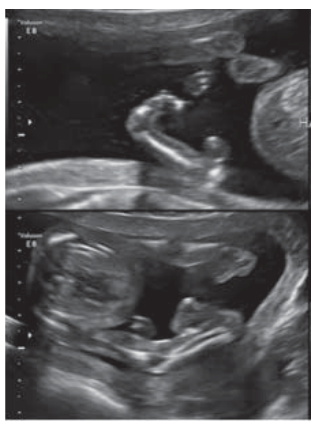


Fig 5b: USG of Case 4 showing bilateral radial aplasia

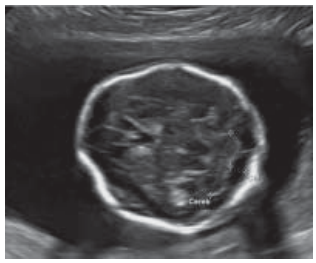


Fig 5c: USG of Case 4 showing strawberry skull

Amniocentesis was done and FISH and karyotype suggested trisomy 18. Couple was counseled about trisomy 18 and pregnancy was terminated.

Triploidy

Triploidy (69,XXX; 69,XXY; 69,XYY) can affect analytes measured in Down syndrome screening. The two types of triploidy are based upon the parental origin of the extra set of chromosomes.

Type I triploidy (diandric) originates from an extra set of paternal chromosomes and is characterized by a large cystic placenta and fetal loss early in gestation. In one study, first trimester median levels were 8.7 MoM for free beta-hCG and 0.74 MoM for PAPP-A. If a pregnancy affected by triploidy continues to the second trimester, screening results for cases of Type I triploidy (diandric) will often indicate a high risk of Down syndrome because of low uE3 and elevated beta-hCG and inhibin A concentrations in maternal serum. AFP levels in triploidy are not predictable; they may be high, low, or unremarkable.

Type II triploidy (digynic) originates from an extra set of maternal chromosomes and is characterized by a small fetus, small placenta, and intrauterine survival late into pregnancy. In first trimester, median levels are extremely low, 0.16 MoM for free beta-hCG and 0.06 MoM for PAPP-A. Maternal serum levels of uE3 are extremely low (usually less than 20 percent of normal values) in Type II triploidy (digynic) and beta-hCG and inhibin A are also reduced. AFP levels are not predictable. These cases may be identified by second trimester trisomy 18 screening protocols.

Case 5: Triploidy in second trimester

30 years old primigravida, at 20 weeks presented with Level II USG showing severe oligoamnios, IUGR and mild ventriculomegaly. Her Triple test was positive for trisomy 18 >1:50: AFP-1.15, HCG-0.12, E3-0.09

Amniocentesis was done which showed Triploidy on FISH and culture (Fig 6).

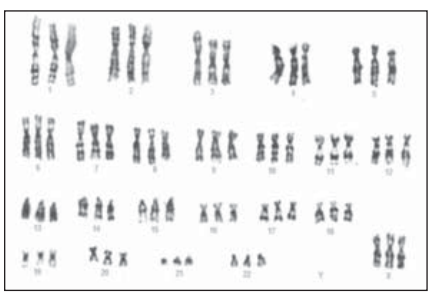


Fig 6: Karyotype of Case 5 showing triploidy

Genetic counseling: Triploidy is a lethal chromosomal numeric abnormality, characterized on extra haploid set of chromosomes. Majority of cases of triploidy are sporadic and risk of recurrence is small.

Klinefelter Syndrome

Klinefelter syndrome is a sex chromosome abnormality. Incidence is 1 in 500. IQ is usually normal and is mainly characterized by hypogonadism.

Case 6: Klinefelter syndrome

36 years old primigravida with combined screen positive for Down syndrome. (1:157)

- PAPP-A- 0.34 MoM, FBHCG 1.90 MoM, NT – 1.11 mm

Genetic counseling was done and patient was offered amniocentesis or NIPT. Patient opted for amniocentesis and FISH and Karyotype suggested Klinefelter syndrome. (Fig 7)

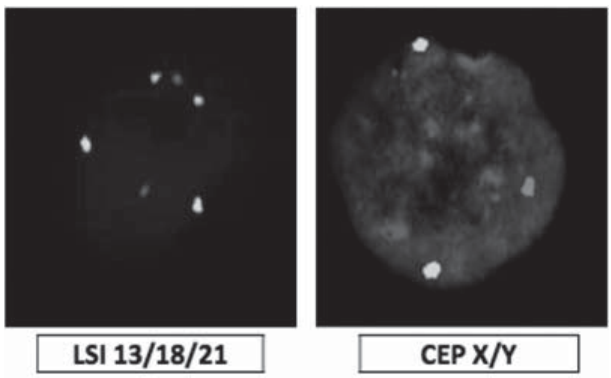


Fig 7: FISH of Case 6 showing Klinfelter syndrome

Patient was counseled about Klinefelter syndrome. Couple decided to terminate the pregnancy after genetic counseling.

Genetic counseling: Klinefelter syndrome is the most common sex chromosome abnormality causing primary hypogonadism. The 47,XXY karyotype results from nondisjunction of the sex chromosomes and can be maternal or paternal in origin. Most cases are detected postnatally and are diagnosed during evaluation for infertility, incomplete virilization, gynecomastia, cryptorchidism, or neurodevelopmental disorders.

Male newborns with the 47,XXY karyotype are phenotypically normal, with normal male external genitalia and no apparent dysmorphic features. The major clinical manifestations of Klinefelter syndrome include tall stature, small testes, and infertility (azoospermia) that become noticeable after puberty. Patients with Klinefelter syndrome are at increased risk for psychiatric disorders, autism spectrum disorders, and social problems. Risk of recurrence is small.

Neural tube defects

Neural tube defects include anencephaly, meningomyelocele, encephalocele and open neural tube defects. Survivors of spina bifida have a poor prognosis for mental function, motor function of limbs and bladder and bowel control.

Case 7: Neural tube defect

Primigravida at 16 weeks with triple test positive for NTD

- AFP- 3.23 MoM, E3 1.48 MoM, HCG 0.93 MoM

NTD Risk >1:50, Trisomy 21 <1:8394, Trisomy 18 <1:10000

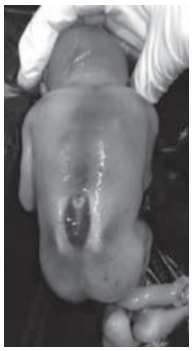


Fig 8: Case 7 showing thoracolumbar NTD after termination

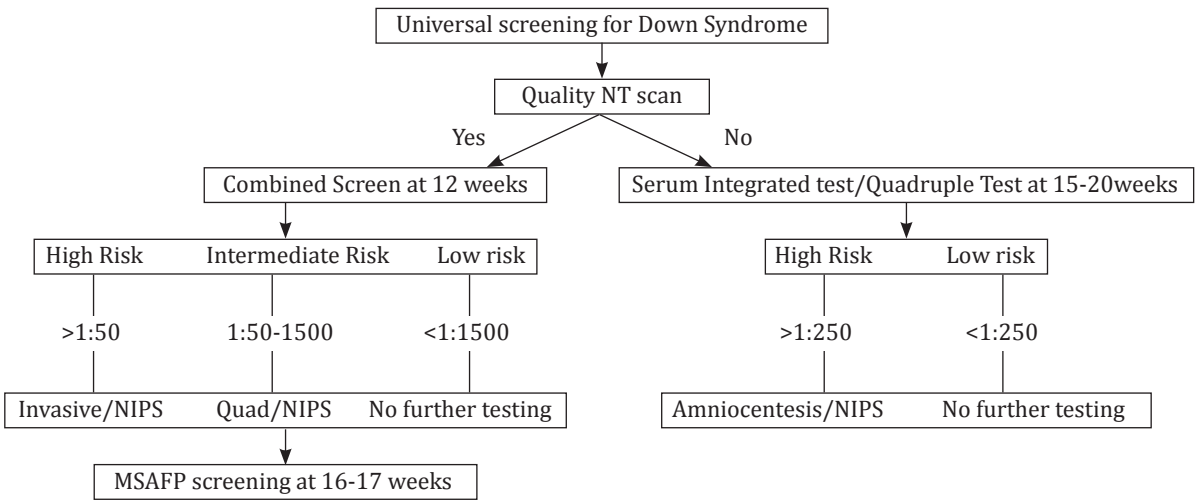
She was advised ultrasound at 16 weeks to exclude NTD. Her early level 2 USG at 16-17 weeks showed atrium of lateral ventricle 9.2 mm with dangling choroid plexus, cisterna magna shallow and hemivertebra in lumbosacral region. Fig 8 shows fetus with NTD after termination.

NTD screening by MSAFP should be done in every pregnancy screened by first trimester tests combined with ultrasound to exclude NTD by 16-17 weeks.

Conclusions

Every pregnant woman should be offered screening tests. The choice of test depends upon many factors mainly gestational age at presentation and reliable NT measurement and availability of diagnostic tests. If patient presents in first trimester in centres with reliable NT measurement combined screen should be done. If patient presents in second trimester or NT measurement is not reliable, quadruple test or integrated tests should be done. A proposed model for Down syndrome screening in India is mentioned in Figure 9.

Figure 9: A proposed algorithm for implementation of Down Syndrome screening in India



Suggested Reading

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SOP: Management of Rh Isoimmunised Pregnancy

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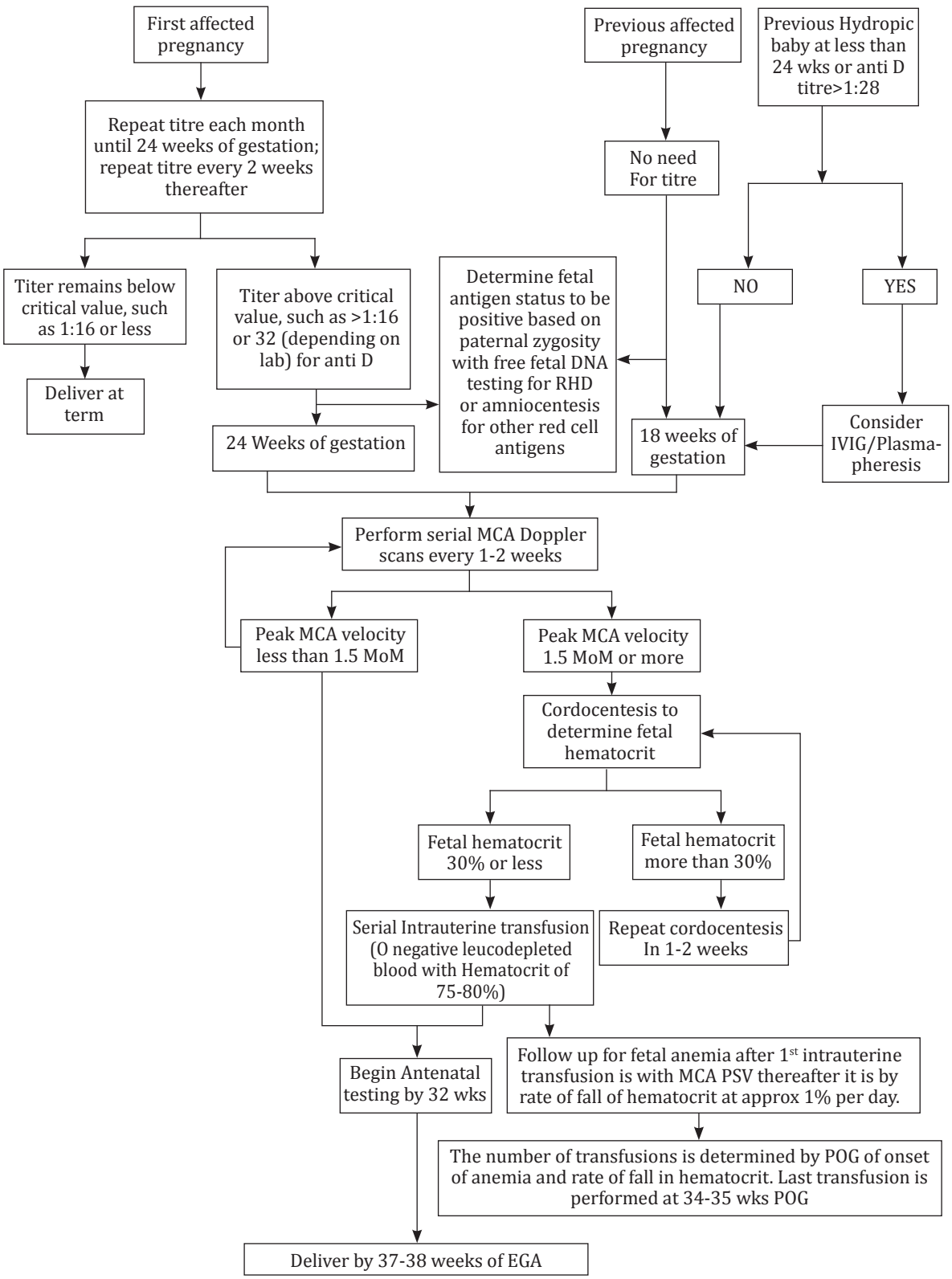

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Calendar of Monthly Clinical Meetings 2017-2018

Months	Name of the Institute
26th October 2017	**ESI Hospital, Basaidarapur**
24th November 2017	MAMC & LN Hospital
29th December 2017	Sir Ganga Ram Hospital
19th January 2018	Dr RML Hospital
23rd February 2018	Lady Hardinge Medical College
23rd March 2018	UCMS & GTB Hospital
27th April 2018	Apollo Hospital, Sarita Vihar

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Antenatal and Intrapartum Care in Twin Pregnancy

Apoorva Reddy
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Introduction

There has been an increase in the incidence of multiple gestations in the recent times mainly due to the advances achieved in the field of assisted reproductive techniques. The incidence has gone up from 18.9 in 1000 births in 1980 to 33.9 in 1000 births in 2014 and 25% of all pregnancies conceived through ART result in twin gestation.

Almost all complications, both maternal and fetal especially those associated with prematurity are increased in multiple pregnancies except post-datism and fetal macrosomia. In addition, the unique situations arising due to monochorionic placentation further complicate these pregnancies.

Chorionicity v/s Zygosity

Dizygotic twins result from ovulation and fertilization of two separate oocytes resulting in two separate chorions (dichorionic pregnancy). Rare cases of dizygotic twins with monochorionic placentation have been reported with unknown etiology after ART.

Monozygotic twins on the other hand result from ovulation and fertilization of a single oocyte followed by cleavage. In ART, it is especially seen after day 5 blastocyst transfer. Placentation is directly related to the timing of zygotic cleavage. Overall, 20% of all dichorionic pregnancies are monozygotic in nature.

Prevalence

Twins account for about 9 in 1000 births in India. The prevalence rate worldwide for monozygotic twins has almost always remained constant at 3-5 per 1000 births. About 1% of monozygotic pregnancies are monoamniotic monochorionic.

Dizygotic twins have a variable prevalence which is determined by use of assisted reproductive techniques, increasing maternal age, ethnicity, parity, family history and maternal BMI.

Diagnosis

Ultrasound examination between 10-14 weeks remains the most reliable way to ascertain not only the number of foetuses but also the chorionicity and gestational age (RCOG Level B).

In dichorionic pregnancies, the extension of the chorionic tissue from the fused placentas gives rise to the ***lambda or the twin peak sign*** with a diagnostic accuracy of 95%. The presence of two separate placentas or discordant sex is a reliable way to diagnose dichorionicity. In monochorionic pregnancies, the two amnions are perpendicular to the placenta giving rise to the 'T' sign (Figure -1). The absence of any inter- twin membrane is seen in monochorionic monoamniotic pregnancies. The thickness of the inter-twin membrane has also been used to establish chorionicity, however there is no consensus regarding the cut-off for diagnosis of thick and thin membrane. Diagnosis of chorionicity becomes difficult later in gestation as fetal crowding leads to thinning of the intertwin membrane. The nomenclature once assigned should not be changed (RCOG Level C).

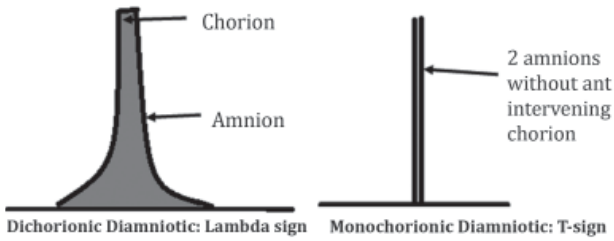

Figure 1: Lambda and T sign for chorionicity

Fetal Reduction

Multiple pregnancy reduction to twin gestation significantly reduces perinatal morbidity and mortality associated with higher order pregnancies (ACOG Level B). The preterm delivery rate (<32 weeks) is 36.9% in triplet pregnancy as against 7.8% when reduced to twins.

In trichorionic pregnancies, multifetal pregnancy reduction to dichorionic gestation is achieved by intrafetal (either intracardiac or intracranial) instillation of KCl (Figure 2). This is done between 11- 13+6 weeks to reduce the risk of miscarriage (5-7%) and also those foetuses at the lowest risk for aneuploidies or anomalies can be identified. The fetus closest to the cervix is usually left behind to reduce the risk of infection.

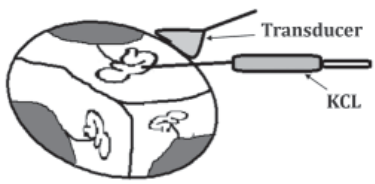

Figure 2: Fetal reduction in Trichorionic Triamniotic Pregnancy

In monochorionic pregnancies, the presence of anastomosing vessels would mean that intrafetal instillation of KCl in one twin would affect the other as well. Fetal reduction is best achieved by intra-fetal laser ablation near the fetal umbilical vessel confluence using a 600-micron laser fibre. Nd-Yag laser is fired in 20-50W bursts till there is cessation of blood flow in the umbilical vessels.

Later in gestation, bipolar cord coagulation or radiofrequency ablation can be used for selective fetal reduction. The miscarriage rates are slightly higher at 10-15%.

Fetal reduction of twins to singleton has been associated with superior perinatal outcome with reduction in perinatal morbidity and mortality with preterm delivery rate <37weeks being 56.7% in twins versus 9.5% in those reduced to singleton.

Aneuploidy Screening

Dizygotic twin pregnancies have a different risk for aneuploidies for each fetus, whereas monozygotic twins are thought to have the same risk. Therefore, the background risk of one fetus being affected in dizygotic pregnancies is twice the risk as in singleton pregnancies.

The combined first trimester screening is the only screening for Trisomy 21 which can provide fetus specific risks in dizygotic pregnancies. A 2014 systematic analysis showed a sensitivity of 86% in dichorionic and 87% in monochorionic pregnancies.

Increased nuchal translucency in any fetus may indicate chromosomal or structural anomalies. It was also thought to be an early sign of twin to twin transfusion syndrome; however recent studies have shown no significant association between the two. RCOG recommends that screening for TTTS by first trimester NT should not be offered (Level C).

Maternal serum biochemistry alone is difficult to interpret as both twins contribute to the serum levels of the analytes. Non-invasive prenatal screening for Trisomy 21 by cell free DNA is difficult to interpret and the results are not validated.

Diagnostic testing

Sampling for diagnosis of aneuploidies should be done for both the sacs in dichorionic pregnancies even if a structural problem is seen in only one twin because of the 20% chances of monozygosity. Conversely, both sacs of monochorionic pregnancies should be sampled as there is a risk of heterokaryotypic monozygotic twinning (RCOG Level 4).

Complications

Maternal

Women with twin gestation are at a higher risk for a lot of pregnancy complications irrespective of chorionicity. These include hyperemesis gravidarum due to higher levels of beta-hCG, gestational hypertension and pre-eclampsia, anaemia, gestational diabetes and cholestasis.

Perinatal

1. **Vanishing Twin:** Spontaneous reduction of twins to singleton is common in early gestation. In a study of 549 twin pregnancies, spontaneous reduction of one sac occurred in 27% before 7 weeks of gestation and both sacs in 9%. This is more common in pregnancies conceived through ART. The fetal loss rate is even higher in monoamniotic pregnancies. The take home single baby rate for dichorionic pregnancies when both fetuses are alive at 12 weeks is higher than in monochorionic.
2. **Fetal Growth Restriction**: The WHO Global study in low and middle-income group countries showed an incidence of small for gestational age foetuses (growth<10th centile) as 38.4% as against 9.7% in singletons. Separate growth curves have been customised for twin gestation as there is slower fetal growth especially in the 3rd trimester as compared to singletons. The slower fetal growth has been attributed to placental crowding as well as variations in umbilical cord insertions leading to unequal placental sharing. However perinatal outcome is better predicted when growth is plotted on singleton curves. Inter twin discrepancy of estimated fetal weight of more than 20% is used to define fetal growth discordance.
3. **Congenital Anomalies**: Monozygotic twins are 3-5 times more likely to have structural congenital problems whereas for dizygotic pregnancies, the rates are comparable to singleton pregnancy. Congenital heart disease is more common in monochorionic pregnancies (5-7% in one twin) especially in the presence of TTTS. Hence anomaly scan should include extended cardiac evaluation (RCOG level C). If required a fetal echocardiography may be performed between 22-24 weeks.

   In dichorionic pregnancies, selective feticide with intra-fetal KCl of the twin with anomaly incompatible with life can be done up to 20 weeks of gestation. Expectant management is also a reasonable option, however in conditions which lead to polyhydramnios (anencephaly), fetal reduction should be considered to reduce the risk of preterm delivery. In monochorionic pregnancies reduction can be achieved by occluding all the cord vessels.
4. **Preterm delivery**: The WHO study showed a 35% chance of preterm delivery (<37 weeks) in twins as against 9% in singletons. Data collected from a large private tertiary care centre in India showed that 78% of twin deliveries occurred before 37 weeks of gestation. The rate is mainly attributable to increase myometrial distension leading to increase

in myometrial contractions. Also, the increased incidence of maternal and perinatal complications prompts delivery before 37 weeks.

Special complications associated with monochorionic pregnancies

The shared placentation with multiple arterio-venous, arterio-arterial and veno- venous anastomosis leads to a separate set of complications in monochorionic twins.

1. **Twin to Twin Transfusion Syndrome**: This condition complicates about 15-20% of all monochorionic pregnancies. It mainly arises because of an imbalance between the unidirectional arterio-venous anastomosis which is more than the arterio-arterial anastomoses. These lead to changes in the hemodynamic circulation of both the twins.

   The onset is generally after 16 weeks of gestation and risk is present throughout pregnancy, although the incidence after 26 weeks is very rare.

   The features include an oligo-polyhydramnios sequence. The staging is based on the ***Quintero's classification***:

   i. **Stage 1:** Significant discordance in amniotic fluid levels. There is oligohydramnios (DVP <2cm) in the donor sac and polyhydramnios (DVP >8cm before 20weeks and >10cm after 20 weeks) in the recipient sac. Fetal Bladders are visible.

   ii. **Stage 2:** Fetal bladder of donor not visible along with severe oligohydramnios. Fetal Dopplers are normal.

   iii. **Stage 3:** Fetal Doppler abnormalities in either of the twins

   iv. **Stage 4:** Fetal hydrops in either of the twins usually the recipient.

   v. **Stage 5:** Death of one or both the foetuses

   If untreated, perinatal mortality is high as 90% of one twin with risk of serious neurological abnormalities in the co-twin.

   Laser photocoagulation of the anastomosing vessels by Solomon's technique (ablating all the anastomoses along the equator) is the treatment of choice for TTTS (RCOG Level A). Most clinicians prefer doing the surgery stage 2 onwards; however if there is excessive polyhydramnios with cervical shortening, it may be considered in stage 1. Some authors recommend surgery for all cases of TTTS irrespective of stage to improve the neurodevelopmental outcome (Cochrane database 2014).

   The outcome of at least one twin survival is dependent on the stage and ranges from 49% (stage 4) to 91% (stage 1) after a successful surgery. Rarely TTTS may complicate monoamniotic pregnancies as well.

2. **Selective Fetal Growth Restriction (sFGR):** sFGR complicates about 10-15% of all monochorionic pregnancies. The condition usually arises due to unequal placentation because of abnormal cord insertion. An inter- twin discrepancy of >20% is suggestive of growth discordance even when both the twins are above the 10th centile for gestation. sFGR in one twin may result in hypoxia and death of that twin leading to 25% risk of neurological morbidity of the co-twin. In these circumstances swiftly stopping the blood to the twin whose death is imminent, minimises the resultant morbidity to the co-twin. This may be achieved either through bipolar cord coagulation or radiofrequency ablation. The sudden cessation of blood flow impairs the formation of the pressure gradient and transfer of thromboplastin to the co- twin.

3. **Twin Reverse Arterial Perfusion (TRAP) Sequence**: TRAP complicates approximately 1% of monochorionic pregnancies, where because of the absence of a well formed cardiac structure, the acardiac twin is perfused by the normal structured pump twin through a large AV anastomoses leading to hemodynamic and cardiac changes in the latter.

   If untreated the condition may result in death of pump twin in 25% cases and preterm delivery in 80% cases. The prognosis and decision to treat is based on the volume of the acardiac twin. An acardiac: pump twin volume ratio >70% is associated with a bad prognosis. Treatment is either by intrafetal laser ablation or bipolar cord coagulation of the acardiac twin with a post- procedure survival rate of >90%.

4. **Twin Anaemia-Polycythaemia Sequence (TAPS):** The condition is usually a complication occurring post laser ablation for TTTS affecting about 13% of the cases. Although the amniotic fluid levels are normal, one twin becomes anaemic (MCA- PSV>1.5 MoM) and the other polycythaemic (MCA-PSV <0.8 MoM). The management options are not well defined and needs to be individualised.

5. **Single Twin Demise:** Death of a single twin in a monochorionic pair may lead to exsanguination and neurological morbidity in about 25% and 15-20% chances of fetal death of the normal co-twin. Most of the neurological damage is thought to occur at the moment of death and immediate delivery has not shown to improve the fetal outcome in the co-twin.

   If the pregnancy is viable, fetal MRI is recommended 3-4 weeks after the death of one twin for diagnosis multicystic encephalomalacia and brain atrophy (later changes). The co-twin should be monitored by MCA-PSV for development of fetal anaemia. Some authors have recommended fetal blood sampling followed by intrauterine transfusion for correction of anaemia in the co-twin with mixed results. At pre-viable gestation termination may be offered after counselling the parents regarding prognosis.

   Rarely, dichorionic pregnancies also have a chance

of neurological damage (1%) to the co-twin in the event of a single twin demise. The exact etiology is unknown.

6. **Monochorionic Monoamniotic** pregnancies in addition have additional morbidity because of the high chance of cord entanglement. Conjoined twins are another rare possibility that occurs in these pregnancies.

Monitoring

The monitoring of twins is dependent on the chorionicity.

Dichorionic

Intensive fetal monitoring is unnecessary in dichorionic twin gestation as the complication rates are not high. Scans for fetal growth and amniotic fluid assessment should be done 4-6 weekly, 20 weeks onwards. Fetal doppler is recommended in the presence of fetal growth restriction. Most instances of fetal growth discordance are identified between 20-28 weeks of gestation.

Monochorionic

In view of the high incidence of complications and stillbirth in monochorionic pregnancies (as high as 44 per 1000 births), an intensive USG regimen is required. RCOG recommends that USG assessment should take place every 2 weekly from 16 weeks onwards till delivery (level D). At each examination, fetal biometry, deepest vertical pocket, umbilical artery assessment and fetal bladder should be visualised. 26 weeks onwards, MCA-PSV should be recorded for the diagnosis of TAPS. Although TTTS is rare after 26weeks, sFGR can occur anytime until delivery.

Cervical assessment is recommended between 22-24 weeks of gestation.

Prevention of Preterm Delivery

1. **Progesterone support**: A meta-analysis in 2017 has shown a significant reduction in preterm births at <33weeks of gestation with progestational support when cervical length was <25mm when compared to a placebo (31% vs 43%). Neonatal morbidity was also significantly reduced. However, in unselected patients there is no role of progestational therapy (ACOG Level A).
2. **Cerclage/ Pessary**: A Cochrane review in 2014 concluded that there was no statistically significant difference in the perinatal morbidity (15.8% vs 13.6%) and mortality (19.2% vs 9.5%) in the cerclage group (USG or history indicated) as compared to the non-cerclage group. Thus, there is no evidence to suggest that cerclage or pessary prevents preterm delivery and its associated morbidity.
3. **Oral B-mimetics**: Although beta-mimetic agents have been shown to reduce the incidence of preterm labour, there has been no significant reduction in the incidence of preterm delivery, preterm PROM or neonatal morbidity. Hence there is no role of any tocolytic agent in multiple pregnancies (ACOG Level A).
4. **Bed rest and home uterine activity monitoring** have not shown to reduce the rates of preterm delivery (Cochrane review, 2017).

   Routine course of antenatal steroids is not recommended. It should be only reserved for those pregnancies between 23-34 weeks where delivery is anticipated within a week (ACOG Level B).

   When delivery is anticipated before 32 weeks of gestation, Magnesium sulphate must be considered for neuro-protection(ACOG Level B).

Timing of delivery

In uncomplicated dichorionic pregnancies, elective delivery between 38 – 38+6 weeks is recommended (ACOG Level C). The guideline also recommends pulmonary maturity testing by amniocentesis if delivery is anticipated at <38 weeks. Sampling of one twin is sufficient after 33 weeks of gestation.

In uncomplicated monochorionic diamniotic twins, elective delivery is recommended at 34-37+6 weeks (ACOG Level C) or 36-36+6 weeks (RCOG, with administration of antenatal steroids to all, Level C). This is due to the higher incidence of still births in later gestation as compared to neonatal morbidity due to prematurity.

In monoamniotic twins, because of the high incidence of cord entanglement, delivery should be by caesarean section between 32-34 weeks (RCOG, Level D).

Mode of delivery

Mode of delivery is not altered according to chorionicity except in cases of monoamniotic twins. Cesarean section rates (both emergency and elective) are higher in twins than in singleton pregnancies. Elective cesarean delivery is recommended for all non-vertex presentation of first twin, monoamniotic twins and in the presence of other obstetrical indications.

When both twins are in vertex presentation or the first is in vertex with the second in non- vertex presentation, vaginal delivery is as safe as cesarean section (Cochrane review 2015). Vaginal delivery is contraindicated when:

- The estimated fetal weight of the 2nd twin is >20% than that of the 1st twin.
- When the pelvis is inadequate for breech extraction.
- When the gestational age is<28 weeks or the weight of the 2nd twin is <1500gms.

TOLAC: Previous cesarean section is not a contraindication to vaginal delivery and scar rupture rates are similar to singleton pregnancies.

Labor*:* Continuous fetal heart monitoring for both twins is recommended as they are at an increased risk of intrapartum complications. Monitoring should be done on a single machine with two separate fetal transducers to obtain a synchronous tracing. Even after the delivery of the first twin, electronic fetal monitoring is the best way to monitor the other twin and as long as the fetal heart is reassuring, there is no need to have a finite delivery interval between both the twins. There are no contraindications to use of oxytocin and it may be used for the usual indications.

It is imperative to examine the placenta post-delivery to determine chorionicity for confirmation and prediction of neonatal morbidity. In case of monochorionic twins, vascular anastomosis must be identified by vascular injection of coloured dye (Figure 3).

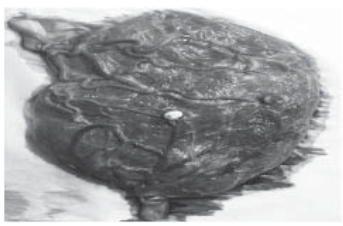

Figure 3: Placental injection in an uncomplicated monochorionic pregnancy. Pointers are on the AV anastomosis

Conclusion

Determination of chorionicity is the single most important factor in the management and prognosis of twin pregnancies. The perinatal morbidity and mortality in dichorionic gestation is significantly less than monochorionic gestations.

Suggested Reading

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Fetal Growth Restriction: An update on the Diagnosis, Classification and Management

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Fetal growth restriction (FGR) is among the obstetrical entities with the greatest variation in clinical practice and is a major cause of perinatal morbidity and mortality.

The first aim in the clinical management of FGR is to distinguish 'true' FGR from constitutional small for gestational age (SGA) fetus. The distinction between FGR versus SGA is clinically relevant because of the wide consensus that it is reasonable to electively deliver FGR earlier, whereas elective delivery before term offers no benefit in SGA.

Definition and Diagnosis

Multiple definitions of FGR have been suggested over the decades by various Experts and National/ International Societies (Table 1). Despite this, there is currently no agreed upon diagnostic criteria for FGR.

The FGR definition currently agreed in most Fetal Medicine Units includes biometric cut off plus doppler indices indicative of feto-placental function thus aiming to identify fetuses with pathological smallness caused by an underlying functional problem.

Table 1: FGR Definition in Recent Literature

Institution/ Author	FGR definition
Baschat et al (2007)	Combination of small fetal AC with elevated UA Doppler blood flow resistance
Cochrane (2013)	Failure to reach the growth potential
DIGITAT (2012)	EFW or AC <10th centile for gestational age
ACOG (2013)	Foetuses with EFW <10th centile for gestational age
RCOG (2013)	SGA refers to an infant born with a birth weight less than 10th centile. FGR is not synonymous with SGA
SOGC (2013)	FGR refers to a foetus with an EFW <10th centile on ultrasound that, because of a pathologic process, has not attained its biologically determined growth potential
PORTO (2013)	EFW < 5th percentile & umbilical artery PI>95th percentile
TRUFFLE (2013)	AC < 10th percentile & umbilical artery PI>95th percentile
Gordijin et al (2016)	AC <3rd centile OR EFW <3rd centile or AREDF OR Both of the following 1) EFW or AC < 10th centile and 2) UtA PI >95th centile OR UA PI>95th centile

AC abdominal circumference; AREDF absent/reversed umbilical artery end diastolic flow;,EFW estimated fetal weight; PI pulsatility index; UtA uterine artery;UA umbilical artery.

Early-Severe versus Late-Mild Foetal Growth Restriction

FGR is now classified under two different phenotypes depending on whether the onset is early or late in gestation. The cut off to define early versus late-onset FGR is arbitrarily set at 32 to 34 weeks at diagnosis or 37 weeks at delivery. In a recent prospective study, 32 weeks at diagnosis and 37 weeks at delivery best maximized differences in terms of clinical features and adverse outcome[1]. **Early-onset FGR** represents 20–30% of all FGR and is associated with gestational hypertension and/or pre-eclampsia in up to 70% of cases. On the other hand, **Late-onset FGR**, which represents approximately 70–80% of cases of FGR, shows a weaker association with hypertensive disorders of the pregnancy, roughly 10%.

Being early or late-onset determines differences in the severity of placental disease as well as in the fetal adaptive response and deterioration (Table2). Thus, foetuses with late onset disease do not present the sequence of doppler deterioration described for early-onset FGR.

Table 2: D**ifferences between the Early & Late Onset FG**

Early Onset FGR	Late Onset FGR
Challenge: Management	***Challenge: Diagnosis***
Severe placental disease: UA Doppler abnormal High association with PE	Mild placental disease: UA Doppler normal Low association with PE
Severe hypoxia ++: systemic CV adaptation	Mild hypoxia: central CV adaptation
Immature fetus higher tolerance to hypoxia = natural history	Mature fetus lower tolerance to hypoxia= no (or very short) natural history
High mortality and morbidity	Lower mortality (but common cause of late stillbirth

Methods and Indices for Foetal Assessment and their Correlation with Perinatal Outcomes

Umbilical Artery Doppler (UAD)

UAD is the only measure that provides both diagnostic and prognostic information for the management. When 30% of villous vasculature obliterates, an increase in UA PI > 95% occurs. Absent or reversed end diastolic flow

(AEDF or REDF) indicates 60-70% of villous obliteration and severe foetal deterioration. These abnormalities of the UAD, have been reported to be present on an average 1 week before the acute deterioration. There is an association between REDF in the UA and adverse perinatal outcome (with a sensitivity and specificity of about 60%), which seems to be independent of prematurity.[2]

Middle Cerebral Artery Doppler (MCA)

MCA informs about the existence of brain vasodilation, a surrogate marker of hypoxia. MCA is particularly valuable for the identification and prediction of adverse outcome among late-onset FGR, independently of the UA doppler, which is often normal in these foetuses.

A six fold increased risk of emergency cesarean section for foetal distress has been observed in foetuses with abnormal MCA PI when compared with SGA fetuses with normal MCA-PI which is particularly relevant because labor induction at term is the current standard of care of late-onset FGR[3]. Late-FGR with abnormal MCA-PI have poorer neurobehavioral scores at term-corrected age and at 2 years.

Cerebro Placental Ratio(CPR)

The CPR (Ratio of PI of MCA & UA) is essentially a diagnostic index. The CPR remarkably improves the sensitivity of UA and MCA alone, because increased placental impedance (UA) is often combined with reduced cerebral resistance (MCA). Thus, the CPR is already decreased when its individual components suffer mild changes but are still within normal range. The PORTO study demonstrated the association between redistribution, either isolated or associated with umbilical artery PI >95th centile, and adverse perinatal outcome[4]. Low CPR is associate with adverse perinatal outcome.

Ductus Venosus Doppler (DV)

DV is the strongest single Doppler parameter to predict the short-term risk of foetal death in early-onset FGR. DV flow waveforms become abnormal only in advanced stages of foetal compromise. Absent–reversed velocities during atrial contraction are associated with perinatal mortality independently of the gestational age at delivery with a risk ranging from 40%-100% in early-onset FGR. Thus, this sign is normally considered sufficient to recommend delivery at any gestational age, after steroid cover. In about 50% of cases, abnormal DV precedes the loss of short-term variability in CTG and in about 90% of cases it is abnormal 48 to 72h before the biophysical profile (BPP).

Aortic Isthmus Doppler

This vessel reflects the balance between the impedance of the brain and systemic vascular system. Reverse Aortic isthmus (AoI) flow is a sign of advanced deterioration, and a further step in the sequence starting with the UA and MCA Doppler. The AoI precedes DV abnormalities by 1 week and consequently, it is not as good as to predict the short-term risk of stillbirth. Among early-onset FGR with positive DV atrial velocities, a reverse AoI indicated a very high risk of late neonatal neurological complications including intraventricular hemorrhage and periventricular leukomalacia.

Fetal Heart Rate Analysis by Conventional and Computerized Cardiotocography (CTG And cCTG)

Early studies on high-risk pregnancies showed that although highly sensitive, cardiotocography has a 50% rate of false positives for the prediction of foetal death. Also subjective interpretation of the FHR limits the use of CTG in very preterm foetuses with a physiologically reduced variability.

The cCTG represents a step forward. It evaluates short-term variability of the FHR, an aspect that subjective evaluation cannot assess. Current evidence suggests that cCGT is sensitive to detect advanced foetal deterioration, and it provides a value similar to DV reverse atrial flow for the short-term prediction of fetal death.

Biophysical Profile

Early observational studies reported a very low risk of false positives for acidosis and perinatal death, but more recent studies on early-onset very preterm FGR foetuses raised concerns over the false negative rate, with up to 23% of instances of IUFD in foetuses with BPP>6 and 11% in those with BPP>8.[5] Consequently, whenever Doppler expertise and/or cCTG are available, the incorporation of BPP in management protocols of FGR is questionable.

Management: Timing of Delivery in Foetal Growth Restriction

Since no treatment has been demonstrated to be of benefit in growth restriction, assessment of foetal wellbeing and timely delivery remain the main management strategy.

Currently there is no consensus on what is the most appropriate trigger for delivery as the evaluation of the foetal status by Doppler indices and CTG cannot be assessed independently from the gestational age, which is the most significant determinant of both survival and foetal weight.

The Growth Restriction Intervention Trial (GRIT) study was the first RCT which aimed to assess the timing for delivering FGR foetuses and concluded that in "uncertainty" of the clinician as to whether to deliver or not to deliver in a foetus thought to be compromised,

timing of delivery varied on average by only 4 days. Furthermore, foetuses with severe DV abnormalities at or beyond 28 weeks should be delivered after completion of steroids as there is evidence that reversed A-wave in the DV increases the risk of intrauterine foetal death at any gestational age.

TRUFFLE[6] is the only randomized controlled study which has evaluated a standardized monitoring and delivery protocol focussed on computerized CTG and DV Doppler. Delivery was recommended in case of umbilical artery REDF between 30 and 32 weeks, umbilical artery AEDF between 32 and 34 weeks, or umbilical artery PI >95th centile beyond 34 weeks.

A stage-based classification and management protocol has been suggested by Figueras and Eduard Gratacós (Barcelona Center of Maternal-Fetal Medicine)[7]. (Table3)

Table 3: Stage based Classification and Management of FGR

Stage	Pathophysiologic correlate	Criteria (any of)	Monitoring*	GA/ mode of delivery
I.	**Severe smallness or mild placental insufficiency**	EFW <3rd centile CPR <p5 UA PI >p95 MCA PI <p5 UtA PI >p95	Weekly	37 weeks IOL
II.	**Severe placental insufficiency**	UA AEDV Reverse AoI	Biweekly	34 weeks CS
III.	**Low-suspicion fetal acidosis**	UA REDV DV-PI >p95	1 – 2 days	30 weeks CS
IV.	**High-suspicion fetal acidosis**	DV reversed flow cCTG <3 ms FHR decelerations	12h	26 weeks** CS

All Doppler signs described above should be confirmed at least twice, ideally at least 12 h apart.

* Recommended intervals in the absence of severe PE.If FGR is accompanied by this complication, strict fetal monitoring is warranted regardless of the stage.

** Lower GA threshold recommended according to current literature figures reporting at least 50% intact survival.Threshold could be tailored according to parents' wishes or adjusted according to local statistics of intact survival

Conclusions

In summary, a conservative management focused on the identification of etiology in periviable growth restricted foetuses is recommended, as prognosis can vary widely despite similar ultrasound findings at diagnosis. Beyond 26 weeks the current evidence suggests that a detailed surveillance protocol integrating fetal DV Doppler and computerized CTG allows better outcomes and delivery only when one or both become abnormal.

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Events Held in September 2017

- FOGsd organized a CME on **"Cervical and ovarian cancer followed by Teacher's day celebrations"** under aegis of AOGD on **4th September** at Crown Plaza Hotel, Okhla, under the leadership of Dr Anita Sabharwal.




CME on Cervical and Ovarian Cancer followed by Teachers Day Celebrations

- Dr Nymphea Walecha & Dr Susheela Gupta organized a talk on **"Menstrual Hygiene and PCO in Adolescents"** under aegis of Reproductive endocrinology committee of AOGD on **07th September** at Shive Modern School



Talk on "Menstrual Hygiene and PCO in Adolescents"

- CME on **"Fertility Preservation"** by DGF north under aegis of Reproductive endocrinology committee of AOGD on **14th September** at Hotel City Park, Pitampura under the guidance of Dr Gouri Devi & Dr Nymphea Walecha



CME on Fertility Preservation

- **"Gynae Endoscopic Workshop & Hands On training"** on **21st September, 2017** was held at Maulana Azad Medical College Auditorium, MAMC, under the able guidance of Dr Anjali Tempe

CME on Gynae Endoscopic Workshop & Hands On training

- CME on **"Induction of Labour"** by FOGsd under aegis of AOGD on **22nd September** at 01:30pm, Madhuban hotel GK- 1 by Dr Anita Sabharwal & Dr Shakuntla Kumar. Dr Sudha Prasad was felicitated on her selection as Vice President FOGSI

CME on Induction of Labour

- Gynae Endocrine Society of India in association with AOGD organized a Symposium under theme of **"Ovary: Unfolding the secrets in management"** in case-discussion format on **24th September, 2017** at J L N Auditorium, AIIMS, New Delhi under the leadership of Dr Alka Kriplani & Dr Nutan Agarwal


Ovary: Unfolding the secrets in management

- Skill Workshop of AOGD on **"Obstetrics Skills"** on **28th September 2017** at 7th Floor MCH Block, GTB Hospital




Skill Workshop of AOGD on Obstetrics Skills

- **AOGD Monthly Clinical Meeting** at Hindu Rao Hospital, Auditorium, G Block, 5th Floor on **29th September** it was enriched by presence of our elders, Dr K. Buckshee & Dr S. Batra




CME on Induction of Labour

HAGE CON 2017

Live Workshop on "Gynae Endoscopy" Basic to Advance

11th Nov (9 am - 5 pm)

Live Workshop on "Gynae Laparoscopy & Hysteroscopy"

TLH, Myomectomy, Endometriosis, Cystectomy & Operative Hyteroscopy

12th Nov (9 am - 5 pm)

CME on "Gynae Endoscopy"

Energy & Instrumentation, Energy sources, Tissue Retreival, Pelvic anatomy, Endometriosis & Adenomysis, Panel discussion on Safety in Endoscopy & Fertility Enhancing surgery

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Dr Ragini Agrawal

Dr Nisha Kapoor Sr. Vice President	Dr Neeru Thakral Vice President	Dr B B Dash Secretory
Dr Jyoti Malik Joint Secretory	Dr Anita Shah Joint Secretory	Dr Pallavi Vasal Treasurer
Dr Manju Dagar Clinical Secretory	Dr Ritu Jain Dr Anupama Sethi Joint Secretory	Dr Arvind Dr Anupama Sethi Co opt Member

Invited Faculty

Dr Nandita Palshetkar

Prof. Dr Alka Kriplani

39th Annual Conference of Association of Obstetricians and Gynaecologists of Delhi

Organised by

Department of Obstetrics and Gynecology
UCMS & GTB Hospital

Date: **18th, 19th November, 2017**
Venue: **India Habitat Centre, New Delhi**

Invitation

Dear Friends

With great pleasure, we invite you to the 39th Annual Conference of AOGD, the much-awaited annual academic extravaganza! In focus with contemporary Obstetrics & Gynecology practice the theme aptly chosen for this year is ***'Bridging the Gap- Taking Evidence and Innovation to Clinical Practice'.***

The highlight of the conference is the presence of Dr. Mario Leitao, Director, Minimal Access and Robotic Surgery (MARS), Memorial Sloan-Kettering Cancer Center, New York who will be delivering the Brigadier Khanna Oration. Apart from this the conference promises cutting edge symposia, interesting key notes, incisive panels, adrenaline packed debates and the Best Evidence of 2017 all rolled into a two-day academic bonanza! We urge you to see the Scientific program which has been put together carefully with much thought to interest all members of AOGD.

We look forward to our young obstetricians and gynaecologists participating in large numbers and presenting free papers, competition papers, participating in the Quiz and slogan writing. Role play by young students on socially relevant issues will be an attraction during the Inaugural ceremony, which promises to be interesting.

Friends, it is our sincere request, to please register early to avoid disappointment as only finite number of spots are available.

Look forward to seeing you all the 39th Annual Conference of AOGD this November!

Cheers

Shalini Rajaram
President, AOGD

Abha Sharma
Secretary, AOGD
9868399727

Dr Shalini Rajaram
AOGD President,
Organising Chairperson

Kiran Guleria
Vice President,
Co-Organising Chairperson

Abha Sharma
Secretary AOGD,
Organising Secretary

Scientific Advisors

Dr Geeta Radhakrishnan
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Dr Amita Suneja
Director Professor & HOD

Dr A G Radhika
Senior Specialist

Deptt. of Obs & Gynae, UCMS & GTB Hospital

39th Annual Conference of AOGD 2017

Bridging the Gap - Taking Evidence and Innovation to Clinical Practice

Scientific Programme

Day 1: Saturday, 18th November 2017

07:30am onwards	Registration & Breakfast	
08:00am - 09:00am	Free Communications, Posters, Quiz Written (Magnolia, Hall C - For Young Stars)	
	Stein Auditorium (Hall A)	**Silver Oak (Hall B)**
Session 1	**Understanding Preeclampsia**	**Resurrection of the Contraceptive Basket**
09:00am - 10:00am	Predictors of Preeclampsia: From bench to bedside	Antara & Chaya: New Additions to Contraceptive Basket
	Late Onset Preeclampsia: Is the pathogenesis different?	Emergency Contraception: Expanding indications
	Management of Acute Onset Severe Pre-eclampsia	Progesterone Vaginal Ring and Sino Implant II
	Drug Therapy for Control of Hypertension in Pregnancy: An update	Menstrual Moksha
	Discussion	Discussion
10:00am - 10:30am	**Tea & Exhibition**	
	Stein Auditorium (Hall A) & Silver Oak (Hall B)	
Session 2	**AOGD President's Oration**	
10:30am - 11:00am	Unfurling the Facts of Assisted Reproduction	
Session 3	**Plenary Session**	
11:00am - 11:20am	**Key Note Address:** ABC of Breast Health: What to do and What not to!	
11:20am - 11:40am	**Expert Opinion:** Prioritizing Surgical Safety and Minimising Surgical Infections	
	Stein Auditorium (Hall A)	**Silver Oak (Hall B)**
Session 4	**Panel Discussion:** Current Controversy	**Symposium:** Expert's Speak
11:40am -12:40pm	**Panel Discussion:** Addressing & Rationalising Rising Cesarean Section Rates	ART: The Way Forward
		FIGO Smart Phone Application for Management of Gynecological Cancers
		Laparoscopic Findings in Female Genital Tuberculosis: New Signs
		Non Hormonal Management of Osteoporosis
		Discussion
	Stein Auditorium (Hall A)	
12:40pm - 01:15pm	**Inauguration & Role Play: Violence against Doctors**	
01:15pm - 02:00pm	**Lunch & Poster Viewing**	
	Stein Auditorium (Hall A)	**Silver Oak (Hall B)**
Session 5	**Genetic Tests in Clinical Practice**	
02:00pm - 02:45pm	**Panel Discussion:** **Changing Practice & Prenatal Diagnosis: Case Scenarios**	**Panel Discussion:** **Hereditary Breast & Gynecologocal Cancers: Case Studies**
Session 6	**Stein Auditorium (Hall A)**	**Silver Oak (Hall B)**
02:45pm - 04:00pm	**High Risk Obstetrics: Time to up the ante!**	**Infertility: Technical Update**
	Delivery of Obstetric Care: Where and how to begin	Biomarkers for Ovarian Reserve: What is best?
	Pregnancy after Bariatric Surgery	Pre-implantation Genetic Screening: Should the practice continue?
	Jaundice in Pregnancy: Minimising morbidity & mortality	Ovarian Aging: Can it be stopped?
	An Approach to a Case with Oligoamnios	Luteal Support: What, when and for how long?
	Unexplained Recurrent Pregnacy Loss	Maximising Succesful Implantaton: Advances in endometrial receptivity
	Discussion	Discussion
Session 7	**Stein Auditorium (Hall A)**	**Silver Oak (Hall B)**
4:00pm - 05:15pm	**Video Session:** Obstetrics	**Video Session:** Gynecology
	Retrograde Hysterectomy for Placenta Praevia/accreta	Endoscopic Sentinel Node Dissection
	Laser ablation in TTTS	Le Fort's procedure: Simplicity personified!
	First Trimester Anomaly scan is not just NT/NB!	Mini Sling for SUI
	Obstetric Color Doppler	Clitoroplasty
	Laparoscopic Encerclage	Specimen Retrieval Techniques in Laparoscopy
	Step Wise Devascularisation of Uterus & Internal Iliac Artery Ligation made Easy	Laparoscopic Myomectomy
	Innovation in PPH Management: Bakri & Chhattisgarh Balloon	Robotic Management of Deep Endometriosis
05:15pm	**Tea & Exhibition**	

39th Annual Conference of AOGD 2017

Bridging the Gap - Taking Evidence and Innovation to Clinical Practice

Scientific Programme

Day 2: Sunday, 19th November 2017

07:30am onwards	Registration & Breakfast	
08:00am - 09:00am	Free Communications, Posters, Quiz Orals (Magnolia, Hall C - For Young Stars)	
	Stein Auditorium (Hall A)	**Silver Oak (Hall B)**
Session 8	**Fetal Medicine: Managing the Unborn**	**Rational Use of Hormones: Which, when, how much and how long?**
09.00am - 10.00am	Rh Isoimmunisation/Fetal Anemia: When to refer, what to do?	Threatened Miscarriage
	Options beyond Laser in Complicated Twin Pregnancy	Adolescent Endometriosis
	Growth problems, Monitoring and Timing Delivery in Multiples	Ovarian Insufficiency
	Ultrasound in Delivery decisions	Menopausal HT
	Discussion	Discussion
10:00am - 10:30am	**Tea & Exhibition**	
Session 9	**Plenary Session**	
	Brigadier Khanna Oration (Stein Auditorium & Silver Oak Hall)	
10:30am - 11:00am	Management of Endometrial Cancer: MSKCC Practice Dr Mario Leitao, Director, Robotic Surgery, Memorial Sloan Kettering Hospital, New York	
Session 10	**Key Note Address**	
11:00am - 11:20am	Abnormal Uterine Bleeding: Evidence Based Practice	
Session 11	**GSK Sponsored Session**	**Sponsored Session**
11:20am - 11:50am	**Vaccination for Women**	
	Maternal Vaccination for Pertussis prevention (Tdap)	
	Vaccination for Adolescent Girls & Young Women (HPV, MMR & Varicella)	
Session 12	**Stein Auditorium (Hall A)**	**Silver Oak (Hall B)**
11:50am - 12:30pm	**Contemporary Practice**	**Smart Science**
	Atosiban/Magnesium Sulfate in Preterm Labor	Dilemmas in Management of Ectopic Pregnancy
	Fetomaternal Risks and Monitoring in GDM	Non Technical Skills: Medicolegal importance for doctors
	TOLAC: Experience and Practice points	HPV Biomarker Triage in Current Screening Paradigms
	Discussion	Discussion
Session 13	**Young Turks - Research Presentations**	**Panel Discussion: Gynae Oncology**
12:30pm - 01:15pm	Competition Paper 1	Minimally Invasive Surgery in Gynecologic Malignancy: Safe and Best Practice
	Competition Paper 2	
	Competition Paper 3	
	Competition Paper 4	**Oncology Update**
01:15pm - 02:00pm	Competition Paper 5	Borderline Ovarian Tumors: A Dilemma
	Competition Paper 6	Lymphadenectomy in Ovarian Cancer: LIONS Trial
	Competition Paper 7	Management of Vulvar Intraepithelial Neoplasia
	Competition Paper 8	Discussion
02:00pm - 02:30pm	**Lunch & Poster Viewing (Hall C)**	
Session 14	**Best of 2017: Evidence Based Practice in Obstetrics**	**Best of 2017: Evidence Based Practice in Gynecology**
02:30pm - 03:45pm	Exercise Training and Weight Gain in Obese Pregnant Women	Uterine Artery Embolization vs. Hysterectomy in the Treatment of Symptomatic Uterine Fibroids
	Thyroid Disorders in Pregnancy: 2017 Guidelines	Treatment Strategies for WHO Type II Anovulation: Systematic review and metaanalysis
	Preterm birth prevention in Singleton & Twin Pregnancy	Risk Reducing Salpingectomy/Salpingo-Oophorectomy: Current Guidelines
	Elective Delivery versus Expectant Management for Pre-eclampsia: Meta analysis of RCT's	Morcellation in Fibroids: Risks and Current Practice
	Antiretroviral Therapy in Pregnancy: An Update	Selective Progesterone Receptor Modulator: Latest recommendations
Session 15	**Razor Sharp Debates**	**Confronting Controversies**
03:45pm - 04:45pm	Cesarean on Demand is the Right of a Pregnant Mother	Management of Adenomyosis in Women under 35
	Soil and Seed are Ripe for Uterine Transplantation in India	IVF vs Reversal of Sterilisation after Tubal Ligation
	All Fibroids seen during Cesarean Section must be Removed	Hydrosalpinx: Tubal Surgery or in Vitro Fertilisation: An everlasting Dilemma
	Egg Freezing before 30: Sure shot way of achieving future pregnancy	Vaginal versus Laparoscopic Hysterectomy: The better route!
04:45pm - 05:15pm	**GBM & Valedictory**	
05:15pm	**Tea & Exhibition**	

39th Annual Conference of Association of Obstetricians and Gynecologists of Delhi

18th - 19th November, 2017

Pre-conference Workshops: 17th November 2017

Venue: **India Habitat Centre, Lodhi Road, New Delhi**

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Category: (Tick any) Delegate ( ) PG Student ( ) Faculty ( ) AOGD Membership No. .....

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ACCOMPANYING PERSON'S DETAILS

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THEME TOPICS FOR ABSTRACT SUBMISSION

1. Improvising Surgical Techniques ( ) 2. High Dependency Obstetrics ( ) 3. Gynecological Emergencies ( )
4. Rational use of Hormones in Obstetrics & Gynecology ( ) 5. Miscellaneous ( )

- Guidelines for Abstract Submission are available on conference website **www.aogdconference2017.com**
- **Last date of Abstract Submission for Free Communication & Poster: 15th October 2017**

PRE-CONFERENCE WORKSHOPS: TICK (√) ANY ONE

PRE CONGRESS WORKSHOPS	ORGANIZING CHAIRPERSON	VENUE	CONTACT NO.
1. Gynae Oncology	Dr Rupinder Sekhon rupysekhon@hotmail.com	Crown Plaza, Rohini	9810163076
2. Gynae Endoscopy	Dr Malvika Sabharwal drmalvika@jmh.in	Apollo Spectra Hospital, New Rohtak Road, Karol Bagh, New Delhi- 110005	9810116293
3. Infertility	Dr Renu Misra drrenumisra@gmail.com	Sitaram Bhartia Institute of Science & Research, B-16 Quran Institutional Area, New Delhi	9811147217
4. Fetal Medicine	Dr Vatsla Dadhwal vatslad@hotmail.com	Board Room, AIIMS	9868397308
5. Intrapartum Skills	Dr Abha Singh abhasinghlhmc@gmail.com	ME Hall SJ Auditorium LHMC	9891420228
6. Urogynaecology	Dr Amita Jain amita_jain75@yahoo.com	The Suryaa hotel, Okhla Road, New Delhi	9871136110

All DD/Cheque payable at New Delhi & should be made in favour of **"AOGD CONFERENCE 2017"**

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Registration Category	Upto 30th Sept'17	Upto 30th Oct '17	Spot Registration	Upto to 30th Sept '17	Uo to 30th Oct '17	Spot Registration
AOGD Member	Rs. 4500	Rs. 4800	Rs. 5000	Rs. 2000	Rs. 2200	Rs. 2500
PG Student	Rs. 4000	Rs. 4200	Rs. 4500	Rs. 1500	Rs. 1800	Rs. 2000
Non- AOGD Member	Rs. 5000	Rs. 5500	Rs. 6000	Rs. 2000	Rs. 2500	Rs. 2700
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LIST OF PRIZES – AOGD CONFERENCE 2017	
1. Dr S N Mukherjee-Rotating Trophy	Best AOGD Monthly Clinical Meeting
2. Research Paper-Best Competition Paper	Gold, Silver, Bronze
3. Dr Batra's Medal-Winning Team of AOGD Quiz	Gold Medal
4. Dr Neera Agarwal's Medal-Best Paper on theme topic of Obstetrics (Maternal Health)	Gold Medal
5. Dr Neelam Bala Vaid's Medal-Best Paper on theme topic of Gynecology (Adolescent Health)	Gold, Silver
6. Dr Suneeta Mittal's Medal-Population Stabilization	Gold Medal
7. Dr U P Jha & Dewan Balakram's Medal (Best Presentation in Gynae Oncology)	Gold Medal
8. Dr U P Jha & Raj Soni's Medal (Best Oral/Video/Paper Presentation in Endoscopy)	Gold Medal
9. Mr. S Bhattacharya & Dr Ganguly's Medal-Free Paper competition Miscellaneous Category	Gold, Silver
10. Poster Presentation	Gold, Silver
11. Slogan Competition	First Prize, Second Prize

Managing Periviable Birth: Current Issues and Recommendations

Chanchal Singh[1], Anita Kaul[2]

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"A person's a person, no matter how small." – Dr Seuss

Introduction

Preterm birth continues to be a challenge for both obstetricians and paediatricians birth near the threshold of viability is an even greater challenge with complex clinical and ethical dilemmas. Although neonatal outcomes in babies born between 28 to 34 weeks have improved dramatically in the last few decades, periviable birth is fraught with high fetal and neonatal mortality and severe long-term morbidity in survivors. The recent news of survival and discharge of baby Nirvaan born at 22 weeks' gestation weighing 610 grams, from a Mumbai hospital after four and a half months of NICU stay (all national dailies, 23rd September 2017) puts a sharp focus on the need to address this extremely difficult clinical situation.

Definition

The American College of Obstetricians and Gynecologists (ACOG) defines 'periviable birth' as between 20 0/7 weeks to 25 6/7 weeks (20^{+0} to 25^{+6} weeks)[1] although most literature reports outcomes between 22 to 26 weeks' gestation.

Incidence, Risk Factors, Complications and Outcomes

The reported incidence in the United States is highly variable ranging from 0.03% to 1.9%.[2] There is lack of corresponding Indian data. Periviable birth may be inevitable as in the case of spontaneous preterm labour or preterm prelabor rupture of membranes (PPROM) or it may be anticipated in maternal complications like severe preeclampsia or antepartum hemorrhage necessitating delivery.

The complications of extreme prematurity are listed in table 1. A recent publication has reported survival rates of 30 to 36% among infants born at 22 to 24 weeks of gestation.[3] The same paper reports survival without neurodevelopmental impairment at 18 to 22 months of 'corrected' age (age of the infant if born at term) as 16 to 20%. Survival with neurodevelopmental impairment was reported as 15%. The authors defined neurodevelopmental impairment as moderate to severe cerebral palsy, Gross Motor Function Classification System level of at least 2 (on a scale of 1 to 5 with 1 being mild impairment and 5 most severe), profound hearing loss requiring amplification in both ears, profound visual impairment with visual acuity of less than 20/200 in both eyes or cognitive impairment (mental development index score of less than 70, 2 SD below the mean). The incidence of impairment decreases significantly with increasing gestational age and is reported as 43% at 22 weeks, 40% at 23 weeks, 28% at 24 weeks and 24% at 25 weeks of gestation.

Table 1: Complications of extreme prematurity

Short term	Long term
• Intraventricular haemorrhage	• Post haemorrhage hydrocephalus
• Necrotizing enterocolitis	• Short bowel syndrome
• Retinopathy of prematurity	• Visual impairment
• Sepsis	• Hearing loss
• Bronchopulmonary dysplasia	• Neurodevelopmental delay, eg cerebral palsy, cognitive impairment
• Death	• Impaired gross motor function

Management

Parent counseling

Counseling of parents is the most important aspect of management in this difficult clinical situation. It is important that obstetrician and neonatologist work in tandem to give accurate and consistent information to parents when periviable birth is imminent. They should use accurate figures without personal bias to help parents decide between active resuscitation and comfort care. The hospital should also have clear protocol regarding periviable birth which is consistent with local outcomes and legal issues.

The NICHD (National Institute of Child Health and Human Development), United States, has made available an 'estimator' on their website to estimate the likelihood of perinatal morbidity and mortality at a given gestation and fetal weight.[4] https://www.nichd.nih.gov/about/org/der/branches/ppb/programs/epbo/Pages/epbo_case.aspx It must be emphasized that dating may not be accurate in non IVF pregnancies and the ultrasound

estimation of fetal weight will not be exact. Thus, counseling and expected outcome may change after birth. The expected outcome and thus parent counseling will also change with each day gained in utero. One must also remember that this data reflects survival and outcomes in the western setting. Indigenous data, wherever available, should be used to help decision making and parent counseling.

The factors that are likely to affect clinical outcome in periviable birth are listed in table 2.

Table 2: Factors likely to affect outcomes in periviable birth[1]

- Gestational age at birth
- Birth weight
- Gender of the newborn
- Ethnicity
- Multiple gestation
- Antenatal interventions (corticosteroids for lung maturity, tocolysis, antibiotics for PPROM, magnesium sulphate for neuroprotection)
- Mode of delivery
- Place of delivery
- Neonatal resuscitation versus comfort care
- Local policies concerning neonatal resuscitation

The following clinical interventions have been suggested[1,5] for improving outcomes when periviable birth is anticipated and/or occurs; however, these are broad guidelines which must be adapted to the local context. Above all, management should be individualized and as stated before, should be in accordance with parental expectations following detailed discussion regarding both maternal as well as neonatal outcomes. ACOG recommendations for management of periviable birth are listed in table 3. It must be noted that most of these recommendations are extrapolation from studies on premature birth as data specific to the periviable birth is not available.

Transfer to a tertiary care centre

When parents decide for active resuscitation, delivery should take place in a tertiary care centre equipped with neonatal intensive care unit (NICU) capable of handling the extremely premature infant. In many cases, maternal condition may also mandate delivery in a higher centre, e.g. severe preeclampsia or antepartum hemorrhage. In utero transfer has decidedly better neonatal outcomes than transfer of the newborn after birth. Every hospital should have guidelines/protocol in place for in utero transfer of women anticipated to have a periviable birth when the decision is for active resuscitation.

Tocolysis in case of established preterm labour

The neonatal prognosis changes dramatically with every day gained in utero; thus, tocolysis should be given at least to allow antenatal corticosteroids to act unless continuation of pregnancy is contraindicated due to maternal complication.

Antibiotics after PPROM

Broad spectrum antibiotics are recommended in case of PPROM. However, these have no role in cases of preterm labor with intact membranes.

Emergency/ 'Rescue' Cerclage

When the patient presents with painless dilatation of the cervix with membranes bulging at the internal os or prolapsing into the vagina, rescue cerclage can be considered upto 24 weeks. Contraindications include uterine contractions, PPROM and/or intra-amniotic infection.

Antenatal corticosteroids for fetal lung maturity

Antenatal corticosteroids have been shown to decrease the incidence of mortality, intraventricular hemorrhage, periventricular leukomalacia and necrotizing enterocolitis in infants born between 23 to 25 weeks' gestation and hence are recommended at this gestation.

Magnesium sulfate for fetal neuroprotection

Although data specific to the periviable period is not available, studies that reported improved neurological outcomes included births at 24 weeks of age. Thus, magnesium sulfate for neuroprotection is recommended in imminent periviable birth. The dose is the same as previously recommended: 4-6 grams loading dose followed by continuous infusion of 1 gram/hour for 24 hours or till delivery whichever occurs earlier.

Continuous electronic heart monitoring for fetal well being

When a decision has been made for active resuscitation, continuous CTG has been suggested; however, the differences in the CTG pattern of premature fetuses, i.e. increased baseline and decreased variability need to be kept in mind while interpreting the trace.

Cesarean delivery

A routine cesarean delivery is not recommended in periviable birth unless required due to maternal indication like placenta praevia. Cesarean may be beneficial in malpresentation which is common at early gestation but it has not been shown to decrease the incidence of intraventricular hemorrhage and mortality when the fetus is in cephalic presentation. Cesarean delivery at this gestation would essentially mean a classical cesarean/ upper segment transverse incision as the lower uterine segment is not yet formed. The maternal risks of hysterotomy as well its impact on subsequent pregnancies including uterine rupture and morbidly adherent placenta need to be discussed before taking a decision.

Table 3: ACOG and SMFM guidelines on obstetric interventions for periviable birth[1]

POG (weeks) / Intervention	20 0/7-21 6/7	22 0/7-22 6/7	23 0/7-23 6/7	24 0/7-24 6/7	25 0/7-25 6/7
NN assessment for resuscitation	Not recommended	Consider	Consider	Recommended	Recommended
Antenatal steroids	Not recommended	Not recommended	Consider	Recommended	Recommended
Tocolysis (to allow for steroid cover)	Not recommended	Not recommended	Consider	Recommended	Recommended
Magnesium sulfate	Not recommended	Not recommended	Consider	Recommended	Recommended
Antibiotics in PPROM	Consider	Consider	Consider	Recommended	Recommended
GBS prophylaxis	Not recommended	Not recommended	Consider	Recommended	Recommended
CS for fetal indication	Not recommended	Not recommended	Consider	Consider	Recommended

Impact of periviable birth on maternal health

Antenatal interventions required to improve the perinatal outcome like administration of steroids, magnesium sulfate for neuroprotection do not have an adverse effect on maternal health. However, interventions like emergency cerclage or caesarean section can have significant morbidity for the mother. Thus, the perceived benefits of any intervention on neonatal outcome must be weighed against the adverse effects on the mother. Decision to prolong the pregnancy ('expectant' management) in case of PPROM carries the risk of chorioamnaionitis. Also, maternal complications like preeclampsia or antepartum hemorrhage necessitating periviable birth contribute to maternal morbidity.

Prevention of periviable delivery

This review would be incomplete without a brief mention of strategies proven to prevent preterm labor and thus reduce periviable birth. Each day in utero improves neonatal survival substantially.

Screening and prevention of preterm birth: progesterone and ultrasound indicated cerclage

Both the ACOG and RCOG recommend mid-trimester cervical screening by transvaginal ultrasound (figure 1) in women at risk for preterm labor.

ACOG recommends weekly, intramuscular 17-hydroxyprogesterone caproate (17-OHPC), 250 mg from 16 to 24 weeks till 34 weeks in women with singleton pregnancy with history of singleton, spontaneous preterm birth before 34 weeks. This intervention has been shown to reduce the risk of recurrent preterm birth by 40%.

Women with no history of preterm birth but with a short cervix on TVS (<20 mm) are candidates for vaginal micronized progesterone. This practice is supported by several randomized controlled trials (RCTs) and a meta-analysis of these RCTs demonstrated a significant risk reduction in preterm delivery before 33 weeks in the progesterone group (12.4% versus 22%, relative risk 0.58, 95% CI 0.42-0.08).[6]

Vaginal progesterone is unlikely to have any clinical benefit in high risk women without a short cervix as concluded by the results of the PROMISE study[7] which evaluated the utility of vaginal progesterone in women with recurrent miscarriages.

Women with history of preterm birth AND short cervix on ultrasound are candidates for prophylactic cerclage. Emergency cerclage has already been discussed above.

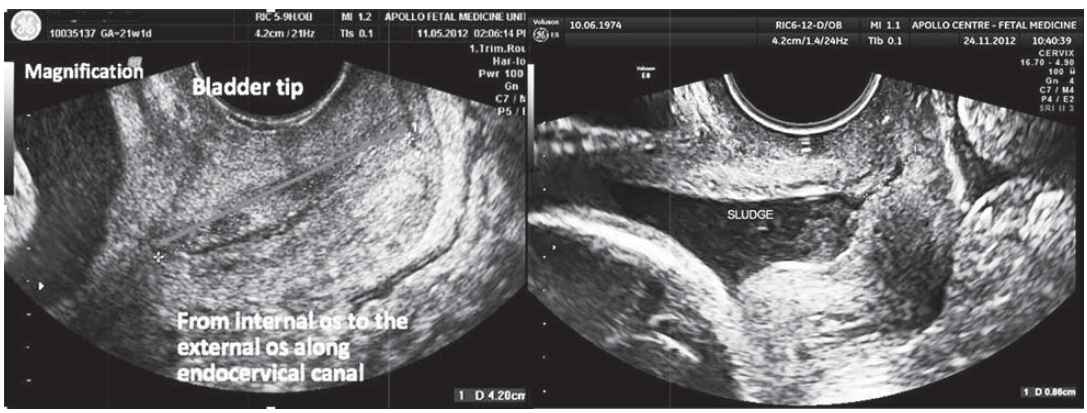

Figure 1: [A] 2D image of the cervix on transvaginal ultrasound showing normal cervical length and correct technique for cervical length measurement. [B] Short cervix with funneling.

Conclusion

Periviable birth needs to be addressed as more and more data on survival comes in and with increasing parental expectations. Accurate parental counseling and multidisciplinary management remain the cornerstone for management of this difficult clinical entity.

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1. Obstetric Care Consensus No. 6: Periviable Birth. American College of Obstetricians and Gynecologists, Society for Maternal-Fetal Medicine. Obstet Gynecol. 2017;130(4): e187-e199.
2. Chauhan SP, Ananth CV. Periviable births: epidemiology and obstetrical antecedents. Semin Perinatol. 2013;37(6):382-8.
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7. Coomarasamy A, Williams H, Truchanowicz E, et al. A randomized trial of proges- terone in women with recurrent miscarriages. N Engl J Med 2015;373(22): 2141–8.

You're my life's one miracle, everything I've done that's good
And you break my heart with tenderness and I confess it's true
I never knew a love like this till you

You're the reason I was born, now I finally know for sure
And I'm overwhelmed with happiness, so blessed to hold you close
The one that I love most with all the future has so much for you in store
Who could ever love you more?

The nearest thing to heaven you're my angel from above
Only God creates such perfect love

When you smile at me, I cry and to save your life I'll die
With a romance that is pure heart you are my dearest part
Whatever it requires, I live for your desires
Forget my own, your needs will come before
Who could ever love you more?

Well there is nothing you could ever do to make me stop, loving you
And every breath I take is always for your sake
You sleep inside my dreams and know for sure
Who could ever love you more?

Lyrics of song "MIRACLE"
- by Celine Dion

Congratulations to the winners of September Quiz:

Dr Sandhya Jain **Dr Bhanu Priya**

Key to September Issue Quiz

1 d; **2** a.5-10%, b. 17/13, c. Next Generation Sequencing, d. Hereditory Breast & Ovarian Cancer, e. Risk Reduction Mastectomy, f. Risk Reduction Salpingo oophorectomy; **3** BRCA 2; **4** b; **5** a; **6** d; **7** c; **8** c; **9** 1c, 2e, 3a, 4b, 5d; **10** LYNCH Syndrome; **12** b; **13** b; **14** Thermocoagulator; **15** 1c, 2d, 3a, 4b; **16** a <5%, b 75-80%/ 85-96%, c 25-30%, d 6/ 3; **17** Immunohistochemistry & Microsatellinte instability; **18** Olaparib; **19** Hyperthermic intraperitoneal chemotherapy; **20** 3.

"Body, Mind and Soul"

Prenatal Bonding: Psychological Aspects of Antenatal Care

Nidhi Khera

Senior Consultant, Dept of Obstetrics & Gynecology, Apollo Cradle Hospital, Moti Nagar, Delhi

The period of human development within the womb is one of the most profound yet enigmatic one with continuum of everyday speculations to understand it better. Initial interest in the maternal psychological orientation towards the pregnancy and fetus began to emerge in earnest during the 1960s. Technological advancements and the emerging knowledge base have opened a Pandora's box on the intrauterine environment, giving the opportunity to characterize the interplay between maternal emotions, maternal and fetal physiology, and fetal behaviour in a manner that did not previously exist.

Effects of In Utero Influences

The concept of perinatal events influencing an individual's health through their adult life is not new. David Barker's epidemiological studies in the 1980s led to the Barker hypothesis that proposed the quality of the intrauterine environment was a major factor in future health and disease arising from the programming effects of maternal pregnancy nutrition. Subsequent evidence showed similar associations between birth weight and impaired glucose tolerance, type II diabetes and metabolic syndrome later on in life, but went a step further suggesting an alternative developmental-evolutionary model of disease. In utero exposures to stress, variations in nutrition and effects of parity are few of the most significant stimuli to the fetus to alter its developmental course. Once the changes have been set up or initiated the developmental life course cannot easily be reversed. What may be adaptive changes of the fetal endocrine-metabolic systems in utero, will then predispose the adolescent or adult to vulnerability for biological or psychosocial challenges. Hence, the focus is now shifting to a greater concentration on the in-utero events and period beyond the well-known physical aspects to the more subtle yet complex psychological states and their long term influence on the fetal outcomes.

Mechanisms of Effect of Maternal Psychological Stress

Maternal psychological distress is associated with autonomic changes, disturbance of maternal circadian rhythms, and behavioural changes that may influence maternal diet and lifestyle. These may influence the availability of oxygen and glucose to the fetus, affect maternal and placental endocrine functions, induce fetal oxidative stress, or reduce fetal circulation of insulin like growth factors (IGF I and IGF II) which in turn regulate fetal development and growth . Barker has hypothesised, fetal adversity, even for a short time can slow and alter the patterns of rapid cell division in fetal development. Neural development can similarly be impacted, affecting not only cell density and function but the developing connectivity across neural regions resulting in long lasting effects on mental health via fetal HPA axis programming.

A variety of mechanisms are proposed by which maternal mental states may impact on fetal development. In most studies, maternal psychological distress is associated with elevated maternal stress hormones such as cortisol, adrenocorticotropic hormone (ACTH) and adrenaline. Changes in the levels of these hormones may be transferred to the fetus via the placenta. Maternal prenatal cortisol concentrations have been most commonly reported as a predictor of child developmental outcomes. A recent systematic review suggested that the placenta may have adaptive mechanisms designed to protect the fetus from these maternal changes.

Effects on Pregnancy Outcome

Psychological maternal-fetal attachment commences fairly early in pregnancy and increases over gestation, culminating in the birth of an infant. Maternal mental health problems have been found to be associated with pre-term delivery and a variety of adverse fetal growth outcomes. Of particular interest is the observation that, maternal anxiety is a consistently strong predictor of reductions in fetal head growth.

Effects on Child Psychology

Early exposure of offspring to maternal anxiety and depression has been associated with vulnerability to behavioural and emotional problems during childhood and adolescence. Several studies have indicated that the infants of mothers with elevated cortisol levels in pregnancy showed increased fussiness and negative behaviour and delayed language development. Various studies have found correlation of prenatal maternal anxiety state with increased likelihood of inattention/ hyperactivity problems. Highly pressured mothers-to-be tend to have more active fetuses and more irritable infants. Stress, diet, and toxins may combine to have a harmful effect on fetal intelligence. A recent study by biostatistician Bernie Devlin, suggests that genes may have less impact on IQ than previously thought and that the environment of the womb may account for much more. The previous thought process of nature influencing the fetus before birth and nurture after birth needs an update.

Fetal Psychology

Fetal Psychology deals with study of fetal movement, taste, hearing, vision, alertness, personality and even learning from the stimulating, interactive environment of the mother's womb. Along with the ability to feel, see, and hear comes the capacity to learn and remember. These activities can be rudimentary, automatic, even biochemical. For example, a fetus, after an initial reaction of alarm, eventually stops responding to a repeated loud noise. The fetus displays the same kind of primitive learning, known as habituation, in response to its mother's voice. It is observed that within hours of birth, a baby already prefers its mother's voice to a stranger's, suggesting it must have learned and remembered the voice, albeit not necessarily consciously, from its last months in the womb.

There have been naturalistic observations of fetal heart rate or motor responsivity to episodes of maternal alarm, including maternal distress following a fall, an earthquake, and sounding of an air raid alarm during the Gulf War. Maternal dispositional indicators of anxiety or perceived stress, measured through self-report, have been linked to higher levels of fetal motor activity, greater variability in fetal heart rate, and state-specific alterations to both commencing in the second half of gestation. However, self-reported psychological trait or state parameters have not been closely linked to variation in maternal physiological parameters, such as cortisol. As a result, studies that rely solely on maternal report provide limited opportunities to understand the potential mechanisms that may mediate these observations.

The fetus is likely responding to the cadence of voices and stories, not their actual words, observes Fifer, but the conclusion is the same: the fetus can listen, learn, and remember at some level, and, as with most babies and children, it likes the comfort and reassurance of the familiar. Babies are born with distinct differences and patterns of activity that suggest individual temperament. Just when and how the behavioural traits originate in the womb is now the subject of intense scrutiny.

Prenatal Bonding

Parenting begins before birth and includes prenatal maternal and paternal bonding with the baby. Prenatal interventions, including viewing of prenatal scans and cognitive behavioural therapy are a keystone for the development of this bonding. A conscious intention of mothers to be along with her family members to understand their emotions, take care of their emotional well-being and interact with their babies goes a long way in supporting their unborn baby's emotional intelligence and enhancing their current and future relationships. The first step is being aware of one's feelings and emotions during pregnancy and to look for ways to create the best environment for the baby and for oneself. Emphasis is also on the emotional diet during pregnancy ***"looking after you"*** during which one will find out ways to increase energy levels, let go of negativity, raise self-esteem and promote positivity. Spending quiet time with the baby alone wherein one can listen to soft and soothing music regularly and '***Blow away your worries'*** is important. Music has been shown to be the ear for the baby's brain development. This offers the additional advantage to the mother as well, supporting her in letting go of any negativity. Talking to the baby is one of the easiest ways of having an epigenetic effect on the baby- ***"Talk to your belly, explain what's going on"***. Babies enjoy hearing their parents' voices and feeling your hands, and they can feel what the mother is going through with heightened environmental senses. Pregnancy is the one time where ***meditation*** is so natural. Moms are primed for this reflective time if they are able to sit and listen to the world around them for a few minutes, close their eyes, and breathe. One can try sitting still with eyes closed if one likes, and repeat positive affirmations to improve the release of positive hormones.

The role of the partner is equally important. Fathers are actually the strongest indicator of whether or not a woman has a healthy pregnancy and delivers a healthy baby. Because when a woman feels loved, respected, cherished, and she feels that the baby she is carrying is loved and wanted by the father, she feels safe, secure, supported and has a higher self-esteem. When a father is absent due to life circumstances, extended family and friends become more important.

Some Prenatal Bonding Tips

1. Include baby in conversations..
2. Turn up the music.
3. When baby kicks or rolls over, gently push back to acknowledge that one feels them moving and want to make contact.
4. Rub stomach gently.
5. In the final weeks of pregnancy, listen to calming music every night before sleep.
6. Meditate and focus on nothing but the fetus.
7. Think about baby before falling asleep and ask them questions. Dreams may provide an answer.
8. Read children's books with fun rhymes and consistent rhythms.

Conclusion

To conclude there is a consistent body of research that suggests that maternal psychological distress, measured mostly as symptoms of depression, anxiety and stress, is a significant factor to be considered in fetal development. Since stress and nutrition are closely interrelated, there may be common mechanisms involved. Alteration in stress hormones and changes in specific key nutrients during critical developmental periods may act synergistically to program fetal neurodevelopment. Parents-to-be who want to further their unborn child's mental development could start by assuring that the antenatal environment is well nourished, low-stress, drug-free. Various simple methods can be incorporated in antenatal period to enhance the parental bonding with the unborn child.

Fetal Therapy

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Fetal therapy has phenomenally evolved in last two decades due to early detection of anomalies, improvement of pathophysiological knowledge of major fetal anomalies and the development of better imaging technologies. The therapy may be curative or may improve outcomes by reducing associated morbidity. Intrauterine transfusion for the treatment of hemolytic disease of fetus/newborn was the first successful fetal intervention.

The applications of fetal therapy have a broad range: (1) maternal medical therapy; (2) ultrasound-guided needle procedures (e.g. intrauterine transfusion, shunts, balloon valvuloplasty, and radiofrequency ablation or interstitial laser coagulation); (3) fetoscopic procedures (placental laser ablation for TTTS, umbilical cord occlusion, tracheal balloon occlusion, amniotic band release, laser ablation for lower urinary tract obstruction); (4) open fetal surgery (myelomeningocele repair or resection of some lung masses or teratomas), and (4) ex utero intrapartum treatment procedures for the management of anomalies compromising the newborn's airway.

Pharmacotherapy

Fetal Thyroid Disorders

If fetal goiter is documented, cordocentesis and fetal blood T4 and TSH is determined, and intra-amniotic thyroxine injections are given if severe hypothyroidism is diagnosed. Fetal hyperthyroidism most commonly occurs in the context of maternal Graves' disease. Fetal hyperthyroidism from any cause has potentially harmful effects; therefore, antenatal treatment by giving drugs to the mother is important.

Fetal Alloimmune Thrombocytopenia (FAIT)

FAIT can lead to serious consequences, mainly intracranial haemorrhage with associated neurological morbidity and mortality. Maternal therapy with the repeated administration of intravenous immunoglobulin potentially inhibits the immunologically mediated mechanism of fetal platelet destruction. The dosage of intravenous immunoglobulin at 1 g/kg/week has been commonly prescribed. Reported response rates vary from 30–85% and long-term effects on mother and child remain unclear. An international multicentre study is currently investigating the optimal dose of intravenous immunoglobulin treatment.

Fetal Arrhythmias

The treatment for **congenital heart block** secondary to SLE is maternal administration of steroid drugs, such as the fluorinated compounds dexamethasone and betamethasone, which are not metabolized by the placenta and are transferred to the fetus in active forms. Sympathomimetic drugs (such as terbutaline, isoproterenol, ritodrine, and salbutamol) administered maternally have been demonstrated to increase heart rate with variable improvement in hydrops. All patients with known fetal CHB should be delivered in a tertiary care centre with the means to provide emergency pacing techniques.

The three most common **fetal tachyarrhythmias**, aside from premature atrial contractions (PACs), are supraventricular tachycardia (SVT), atrial flutter (AF), and ventricular tachycardia (VT). Medical management in cases without hydrops may consist simply of digoxin therapy, whereas in other cases adding a second agent such as flecainide, procainamide, or amiodarone may be needed. In cases of VT, digoxin should be avoided.

Stem Cell and Gene Therapy

The human fetus has unique tolerance to foreign antigens and the ability to transport large cell volumes, leading to the assumption that it could be an ideal candidate for stem cell transplantation. Intrauterine human stem cell transplantation has been performed for haemoglobinopathies, immunodeficiencies, storage diseases and osteogenesis imperfecta, but experience is still limited. The advantages of intrauterine transplantation are that this procedure is less expensive and the recipient does not require chemo- or radiotherapy. Gene therapy is in its experimental phase and its progression to clinical practice has to overcome the challenges of development of improved vectors and vector administration, and research into the optimal gestational ages for gene therapy. It must be concluded that stem cell transplantation shows promise but is still experimental.

Ultrasound-Guided Needle Procedures

The common maternal complications include preterm labor, PPROM and infections.

Fetal Anemia

Intrauterine transfusion (IUT) treatment is considered most successful for fetal anemia due to red cell alloimmunization. Moreover, the use of this procedure has also been reported in pregnancies with parvovirus B19 infection, fetomaternal hemorrhage and placental chorioangiomas. The routes of approach could be intravascular (IVT) or intraperitoneal (IPT). Fresh O

negative, CMV negative blood which has been cross matched against the mother and leucocyte depleted, irradiated and double packed to a hematocrit of 70-80% is used. A three-way stop cock with an extender tube along with a transfusion set is assembled. A 20/ 22 G needle is introduced into the amniotic cavity and fetal paralysis is achieved. Fetal blood sampling is performed and hematocrit obtained. The three-way stop cock is connected to the needle and packed cells transfused at the rate of 1-2 ml/min. During the procedure fetal heart is checked intermittently. Complications like fetal distress can occur after local cord accidents (rupture, spasm, tamponade from a hematoma or excessive bleeding), volume overload and sometimes cause fetal demise.

Vesico-Amniotoc Shunts

Lower urinary tract obstruction (LUTO) is caused by pathology such as the presence of a posterior urethral valve, urethral atresia in the male fetus or cloacal anomaly (hypoperistalsis microcolon syndrome) in the female fetus. In severe cases, the upper urinary tract is distended bilaterally and renal tissue appears thin and hyperechogenic, showing cystic change due to scarring secondary to compression and ischaemia. Oligohydramnios occurs due to decreased renal function and thus urine output. If this occurs in the canalicular phase of fetal lung development (18–24 weeks of gestation) there will be associated pulmonary hypoplasia. Vesicoamniotic shunting may be considered with the aim of minimising compression damage to the renal tissue and reducing the risks of pulmonary hypoplasia. Vesicoamniotic shunting is a percutaneous procedure performed under ultrasound guidance, using local anesthesia for maternal pain relief. Prior to placement of the shunt, an amnioinfusion is routinely required to allow space for deployment of the proximal end of the catheter. A double pig tailed catheter (Rodeck/Rocket or Harrison shunts) is then placed with the distal end in the fetal bladder, and proximal end within the amniotic cavity. The outcomes associated with vesicoamniotic shunting are not clear. Furthermore, the most recent randomized trial aimed at examining the utility of vesicoamniotic shunting (PLUTO Trial) ended prematurely without answering this important question due to poor recruitment, although anecdotal evidence appears to point to improved outcomes with this intervention. However, the indication and optimal timing for intervention remained unclear.

Fetal Valvuloplasty

Pulmonary valvuloplasty in the case of severe obstruction and an intact septum results in decreasing signs of heart failure, delivery at term and favourable anatomy for a biventricular circulation after birth. Fetal aortic valvuloplasty (FAV) is performed at midgestation in an attempt to prevent the evolution to HLHS and allow postnatal survival with a biventricular (BV) circulation. Short- and intermediate-term survival among patients who underwent fetal aortic valvuloplasty and achieved a BV circulation postnatally is encouraging. The procedure is usually performed at 21–32 weeks of gestation under local maternal anaesthesia and sedation with intramuscular fentanyl, pancuronium or atropine for the fetus. Under ultrasound guidance, a needle is passed percutaneously through the maternal abdomen into the fetal chest and the atretic valve and balloon dilatation is then performed. Fetal positioning is critical to enhance success and reduce complications. Better long-term outcomes have been seen with pulmonary than with aortic valve atresia because of the lower pressure system of the right ventricle. However, morbidity still exists, and ongoing assessment is warranted. The fetal risks involved are transient bradycardia, hemopericardium, intracardiac thrombus formation, loss of catheter tip, balloon rupture, stent embolization and fetal loss (10%).

Radiofrequency Ablation (RFA)

RFA has been used for selective fetal reduction in monochorionic pregnancies, with good outcomes. RFA involves generating changes in alternating current at very high frequencies (200–1200 kHz) between the tines of a needle. As the electrical current alternates in various directions between the tines, tissue ions become agitated as they attempt to align with the electrical field. Frictional heat is then produced, resulting in very high tissue temperatures causing tissue coagulation and necrosis. Selective fetal reduction using RFA was offered as a management option for all cases of major structural malformations, severe TTTS (stages 3 or 4), complications after fetoscopic laser treatment for TTTS, severe discordant growth restriction (>40% weight discordancy, with abnormal fetal Doppler measurements before 24 weeks of gestation), and for twin reversed arterial perfusion (TRAP) sequence in monochorionic fetuses. The procedure is performed under local anaesthesia under antibiotic cover. The radiofrequency needle is inserted percutaneously under continuous ultrasound guidance into the intrafetal portion of the umbilical cord. The needle tip position is confirmed by colour flow mapping, before the tines were applied. Radiofrequency energy is applied by the generator until an average temperature of 110°C is achieved in all the three tines for 3 minutes. This constitutes a complete cycle. Thermal energy is applied until the cessation of blood flow is demonstrated in the umbilical cord by pulse wave and colour flow Doppler. Cardiac asystole in the targeted twin is confirmed either immediately or 30 minutes post procedure The advantages of RFA are that unlike bipolar cord occlusion it can be performed easily and safely in early gestation (before 16 weeks of gestastion) and has technical advantages (smaller needle diameter, less maternal discomfort and ability to perform the procedure under local anaesthesia). The procedure-related complications are also comparatively low. RFA has also been used in ablating sacrococcygeal teratomas. Minimally invasive interventions, can cause fetal trauma due to thermal spread after interstitial laser ablation or RFA or due to extratumoral spread of embolizing or

sclerosing agents. Theoretically, RFA and interstitial laser ablation carry the risk of fetal hyperkalemia, release of harmful tumor metabolites or the later development of collateral circulation.

Fetoscopic Procedures

Maternal risks are similar to ultrasound guided fetal procedures with additional risk of anaesthesia in the mother.

Twin - To - Twin Transfusion Syndrome (TTTS)

TTTS is a morbid condition complicating 10–15% of monochorionic pregnancies and is associated with multiple placental vascular anastomoses between the fetal circulations. For severe TTTS (Quintero stage II–III disease), fetoscopic laser ablation of vascular anastomoses has been shown to be a more effective option. Overall survival after laser therapy is 60-70%, with at least one fetus surviving among 75-80% of cases presenting before 26 weeks of gestation, but this depends on the stage of the disease at the time of therapy. The risk of severe handicap among survivors of laser therapy is about 5%. Laser therapy carries small risks of preterm prelabour ruptured membranes (5%) and intra-amniotic haemorrhage (1%). Selective feticide has been used in severe TTTS (stage IV disease), in an attempt to save one twin when the outcome for the other has appeared hopeless and delivery was not an option. Techniques to achieve feticide must be adapted to the presence of a communicating circulation between the twins and thus fetoscopic laser coagulation and, at later gestational ages, ultrasound-guided bipolar cord coagulation are preferred. The maximum survival rate for the pregnancy is, obviously, 50%, with a 70–80% rate of intact survival for the co-twin. Preterm prelabour rupture of the membranes and its associated complications remain a significant risk.

Congenital Diaphragmatic Hernia (CDH)

This potentially lethal condition has an incidence of 1 in 2500–5000 and is usually a sporadic phenomenon, <2% of cases are familial. There is an association with certain chromosomal abnormalities and genetic disorders. For pregnancies with good prognostic features (including infradiaphragmatic liver position and lung: head ratio >1.0), expectant management and regular monitoring by ultrasound is recommended. Transferral to a centre with appropriate neonatal and paediatric surgical support for delivery can optimise the immediate postnatal management. Severe and extremely severe diaphragmatic hernias have poor outcomes and thus are candidates for innovative therapies such as Fetal Endo Tracheal Occlusion (FETO). The current approach to fetal tracheal occlusion is endoscopic placement of a balloon in the upper part of the trachea under fetoscopic guidance. The balloon can accommodate an increase in tracheal diameter as the fetus grows and does not cause tracheal damage, although laryngomalacia has been described. The procedure is performed at between 26–28 weeks of gestation; effects depend on pre-existing lung size, but reported survival rates are 50% until discharge. Traditionally, occlusion reversal was achieved by removing the balloon at the time of caesarean delivery using an extrauterine intrapartum treatment (EXIT) strategy. Intrauterine reversal of occlusion could lead to morphologically better lung maturation and reversing the occlusion at 34 weeks of gestation, either by ultrasound guided puncture or fetoscopy may be done. FETO is thought to improve outcomes by decreasing mortality and allowing more rapid neonatal stabilization. Ultimately, the goal of FETO is to minimize pulmonary hypoplasia and pulmonary arterial hypertension. Following delivery, neonates still require diaphragm repair. Associated complications are those of an invasive prenatal procedure (preterm premature rupture of the membranes and preterm delivery).

Fetal Cystoscopy

Fetal cystoscopy is technically more difficult than vesicoamniotic shunt placement, is an emerging treatment option for LUTO. This option holds several advantages over shunting in that it allows for direct visualization of the obstruction to ascertain specific diagnosis and does not require an amnioinfusion. Given the need for minimal maternal movement, as well as the longer procedure duration, consideration should be given for maternal regional (epidural or spinal) anesthesia, rather than local analgesia. Similar to vesicoamniotic shunting, fetal anesthesia may be accomplished. Using a larger trocar (2.2 mm) than used for vesicoamniotic shunting (1.6 mm), a 1.0 mm fetoscope in a curved sheath and at least a 70° field of view is used for cystoscopy. After confirming that the trochar is inside the fetal bladder, the fetoscope is introduced into the sheath, and advanced toward the bladder neck and the dilated posterior urethra. If a membrane-like obstruction of the urethral lumen is seen, the diagnosis of PUV is confirmed and the valves can be treated using hydroablation, guide-wire or laser fulguration. However, if a non-membrane-like structure is found, even with the fluid injection, the urethral atresia is diagnosed and no attempt to perforate this structure is performed, and a vesicoamniotic shunt is placed The main complication of fetal cystoscopic laser ablation of PUV is urological fistula, which seems to be associated with less operator experience, elevated laser power/energy and less curved instruments. Therefore, percutaneous fetal cystoscopy is useful for diagnostic as well as therapeutic purposes in LUTO, however it is necessary to have adequate experience and instruments to perform this challenging procedure. Lastly, given that this procedure remains experimental, it should be performed under institutional review board approval.

Open Fetal Surgery

"Open" fetal surgery refers to any procedure requiring

a hysterotomy in contrast to those involving only the insertion of a fetoscope. Prenatal surgery is associated with higher rates of preterm birth, intraoperative complications, and uterine-scar defects apparent at delivery, along with a higher rate of maternal transfusion at delivery.

Management of Myelomeningocele

Management of Myelomeningocele Study (MOMS) was a randomized controlled trial to compare the safety and efficacy of prenatal repair of myelomeningocele with that of standard postnatal repair. The trial was stopped early because of the demonstrated efficacy of prenatal surgery. Prenatal surgery was associated with less need for a CSF shunt in children at 12 months and a better composite score for mental development and motor function at 30 months. Prenatal surgery also showed benefist in several key outcomes, including hindbrain herniation and the ability to walk unaided. The fetus with ventricles < 10 mm is clearly the ideal candidate for in utero intervention. More caution should be advised in predicting the outcome in a fetus with larger ventricles, for those whose ventricles are 15 mm or larger at screening, there appears to be no benefit related to shunting.

Fetal Vesicostomy

Fetal vesicostomy, via open fetal surgery, is yet another treatment option for LUTO. However, despite its promising neonatal results, the associated maternal and perinatal morbidity, along with the paucity of large scale data precludes its widespread use for the treatment of LUTO at this time. In addition, this technique does not improve the bladder function. Despite the promising results for each of the above interventions, there remains a paucity of high quality data supporting the use of fetal intervention in cases of LUTO with a favorable prognostic profile and oligohydramnios.

Conclusion

To conclude, this article describes the available options for fetal therapy. These interventions should be taken up in dedicated centres with multi-disciplinary support and by specialists. Though we have moved ahead, however still many dilemmas need to be resolved. Most of the interventions are still experimental and good quality evidence with respect to their benefits are still awaited.

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Approach to Case of Ambiguous Genitalia in Antepartum Period

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Introduction

Ambiguous genitalia, also known as 'Disorders of Sexual Development' (DSD), is not a disease process in itself but a sign that includes any problem noted at birth or suspected prenatally wherein the external genitalia are atypical in relation to the chromosomal or gonadal sex of the baby. These are one of the most challenging and fascinating conditions encountered by the clinician. Also, what looks like an isolated genetic abnormality on USG prenatally may be associated with other abnormalities postnatally. The ability to diagnose DSD's has advanced rapidly in recent years. In most cases today, clinicians can promptly make an accurate diagnosis and counsel parents on therapeutic options. Although major advances have occurred in treatment approaches, the social and psychological aspect remain an important consideration.

Normal Sexual Differentiation

For the first 6 weeks, human development in the two sexes is identical i.e., in a bipotential state.

There are three components in sex differentiation:

1. Chromosomal sex, determined at time of fertilization (XY - male and XX - female);
2. Gonadal sex (Ovary and testis) develop around 6–7 weeks after fertilization;
3. Phenotypic sex, determined by hormonal influence of the gonads on external and internal genitalia. (This development is completed by 12 weeks in the male and somewhat later in the female)

Sex determination of the fetus is a complex process and it results from the interaction between the sex chromosomes and the gene products, which help, in the development of gonads. Gonads produce hormones, which determine the phenotype of the baby i.e., the external genitalia.

Classification

In 2006, the Lawson Wilkins Pediatric Endocrine Society (LWPES) and the European Society for Pediatric Endocrinology (ESPE) revised the nomenclature using sex chromosome as a prefix in order to reflect our enhanced understanding of the pathophysiology of these disorders (table 1).

Table 1: Previous terminology and their revised nomenclature

Previous Terminology, 2001	Revised Nomenclature from European Society for Pediatric Endocrinology, 2006
1. Female pseudohermaphrodite	• 46, XX DSD
2. Male pseudohermaphrodite	• 46, XY DSD
3. True hermaphrodite	• Ovotesticular DSD: ✓ 45, X/46, XY (mixed gonadal dysgenesis, ovotesticular DSD) ✓ 46, XX/46, XY (chimeric, ovotesticular DSD)
4. XX male	• 46, XX testicular DSD
5. XY sex reversal	• 46, XY complete gonadal dysgenesis
6. Miscellaneous	• 47, XXY(Klinefelter's syndrome and variants)

The category to which the disorder belongs is thus a combination of chromosomal sex, phenotypic sex and gonadal sex.

In which pregnancies, DSDs should be suspected?

The following risk factors are associated with DSDs:

- History of recurrent miscarriages or stillbirths
- Abnormal dual or triple marker results (screening for Down's) i.e., low serum unconjugated estriol, low PAPPA levels, high AFP or hCG
  1. Low maternal serum unconjugated estriol level- Smith–Lemli–Opitz syndrome, CAH and placental aromatase deficiency as well as chromosomal abnormalities such as trisomy 18.
  2. High AFP and hCG and low PAPPA levels- Placental insufficiency, hypospadias
- Family history of:
  1. Genital abnormality
  2. Mental retardation
  3. Inherited disorders
  4. Childless or amenorrheic females suggestive of AIS
  5. Unexplained infant death suggestive of salt-losing CAH on pedigree analysis.
  6. History of consanguineous marriage (lead to AR disorders such as CAH or multifactorial disorders such as hypospadias)

Variants of DSD's

Isolated: Herein the fetal genital abnormality is not associated with any other fetal anomaly. They are more common. If diagnosed prenatally, they should be followed by further investigations as the same phenotype can result from different conditions. This will help in obtaining precise information regarding the etiology and thus the prognosis.

Non-isolated: They are associated with other congenital anomalies as follows:

- Chromosomal abnormalities such as Trisomy 13, Trisomy 18, Triploidy
- Single gene disorders (Noonan syndrome, Carpenter syndrome, etc.)
- Exposure to teratogens (endocrine disrupters like phenytoin or aminoglutethimide, pesticides, isotretinoin)
- Imprinting disorders such as Prader–Willi syndrome
- EEC association (epispadias, bladder exstrophy, cloacal exstrophy)
- Sporadic conditions- Cloacal dysgenesis and omphalocele–exstrophy of the bladder–imperforate anus–spine abnormality (OEIS)

Diagnosis

DSD's are a challenge for both the family and the healthcare team. For proper diagnosis and management, a multidisciplinary approach is required which involves experts like perinatologists, endocrinologists, medical geneticists, neonatologists, urologists, psychologists, radiologists and social workers.

Whenever there is a discrepancy between the fetal phenotypic and chromosomal sex, DSD's should be suspected and investigated to make the final diagnosis.

To diagnose DSD's, one must know how to differentiate normal sex organs on USG.

Prenatal Sex Determination by USG/ MRI:

1. **Evaluation of the External Genitalia (visualized 2nd trimester onwards)**
   - ***Examination of fetal perineum-*** Male external genitalia may be identified and by exclusion made the diagnosis of female external genitalia. Overall accuracy rate of 95.6%.
   - ***Sagittal sign for the direction of phallus***- On scanning the fetus in the midline sagittal plane, following the rump from dorsal to ventral, a focal bulge, representing the penis or clitoris, can be seen ventrally. The clitoris presents as a caudal notch while the penis presents as a cranial notch.
   - ***Anogenital and ano-perineogenital distance***- Both longer in males (85% accuracy)
   - ***Dome sign-*** It indicates a scrotum as a non-septate, dome-shaped structure at the base of the penis.
   - Labia majora and minora seen as ***two or four parallel lines***.
   - ***Median penile raphe*** seen as a longitudinal, midline, echogenic line at the base of the fetal penis in the tangential plane.
   - Measuring the ***angle of the genital tubercle*** to a horizontal line through the lumbosacral skin surface in the mid-sagittal plane.

     Male sex- > 30˚

     Female sex - < 10˚

     Indeterminate- 10–30˚
   - ***Different angle of micturition*** in both gender due to different direction of the phallus (**ventral in females and caudal in males)**
2. **To Evaluate Internal Genitalia:**
   - ***Fetal testis***: Testes descend into the scrotum after 25 weeks of gestation. Both descended and undescended testes can be seen on USG.
   - ***Fetal uterus and ovaries*** (as early as 19 weeks): In the uterus, the transverse diameter and the circumference are measured. Uterus is better visualized by 3D volume contrast imaging (VCI).
   - ***Fetal rectovesical interspace***: It measures the distance between posterior wall of the bladder and anterior wall of the rectum. It is more in females due to the presence of uterus in between the bladder and rectum.

The detection rate of all USG parameters in males is better than in females and increases as the gestational age advances.

USG/MRI Findings suggestive of DSD

- ***Signs of incomplete masculinization of the external genitalia in XY DSD:***
  - o Abnormal phallic structure (absent, short or abnormal shape)
  - o Scrotum (absent or bifid)
  - o Absent or undescended testes late in pregnancy
- ***Masculinization of female external genitalia in XX DSD:***
  - o Enlarged phallic structure (clitoris)
  - o Abnormal/fused labia instead of a scrotum, with identifiable uterus or a relatively large rectovesical distance.
  - o Enlarged and discoid fetal adrenal glands with a large hypoechogenic cortex (CAH)[10]
- ***Non-visualization of fetal bladder*** with the umbilical arteries running alongside a mass in the abdominal wall, below the insertion of the umbilicus, in the presence of normal amniotic fluid volume and abnormal external genitalia associated with the presence of omphalocele and lower spine segmentation is seen in OEIS.
- In severe hypospadias, the penis curves ventrally caused by atresia of the corpus spongiosum distal to the urethral meatus (known as chordae) leading to a ***ventral urinary stream on USG (characteristic)***

- ***Tulip sign*:** Seen in cases with severe hypospadias, as a severe curvature of the penis in association with peno-scrotal transposition due to a bifid scrotum.

In case of doubt of DSD after USG and / or MRI, invasive techniques have to be used to diagnose the chromosomal sex (invasive procedures like CVS, amniocentesis or cordocentesis)

- ***Chromosome analysis***
- ***Microarray analysis***
- ***Amniotic fluid hormonal studies*** (17-hydroxy-progesterone, testosterone, androstenedione, 11-dexoycortisol and 7- dehydrocholesterol2.)
- **Uretheroscopy** of the fetus to see the confluence of urethra and vagina can be done to plan further post-natal management and counselling.
- ***Mutation analysis*** in cases where a specific single gene disorder is suspected based on family history or USG findings. Herein fetal DNA (extracted from amniocytes) is assessed

Disadvantage

Lengthy procedure, May be uneventful, Results may be available late in pregnancy or after delivery

Differential Diagnosis

After radiological and chromosomal analysis, we come to the differential diagnosis:

XY Male

Rectovesical interspace or uterus not visualized:

1. Disorders of androgen synthesis:
   - Absence of luteinizing hormone(LH)
   - Lack of testicular response to pituitary hormones
   - Testicular enzyme deficiency: steroidogenic acute regulatory protein deficiency, 3β-hydroxysteroid dehydrogenase, 17β hydroxysteroid dehydrogenase or 17 lyase deficiency.
   - 5 alpha reductase deficiency leading to abnormal conversion of testosterone to DHT in the external genitalia.
2. Disorders of androgen action i.e., complete or partial AIS
3. Congenital hypogonadotropic hypogonadism
4. Vanishing testes syndrome
5. Isolated hypospadias

XY Female

Rectovesical interspace or uterus visualized:

1. Disorders of testicular development
   - Complete or partial gonadal dysgenesis
   - SRY/SF-1 gene mutation or deletion
   - Sex chromosome abnormalities (45, X/46, XY mosaicism)
2. Persistent Müllerian duct syndromes

XX Male

Rectovesical interspace or uterus not visualized:

1. Müllerian agenesis/hypoplasia
2. Uterine abnormalities

XX Female

Rectovesical interspace or uterus visualized:

1. Disorders of gonadal development (Turner's and its variants)
2. Androgen excess:

Fetal: CAH (Most common cause of DSD's- 90%)

- M/C due 21 hydroxylase deficiency (90%)
- 11β-hydroxylase deficiency
- 3β-hydroxysteroid dehydrogenase deficiency

Fetoplacental: Aromatase (CYP19) deficiency, oxidoreductase deficiency

Maternal: Maternal virilizing tumors, androgen medications

Prenatal diagnosis and accurate categorization of the DSD is limited by:

- Fetal position, presentation and amniotic fluid volume as they obscure proper assessment on USG.
- The expertise of the radiologist in detecting the phenotypic and gonadal sex.
- The resolution of USG machine.
- The fact that determination of chromosomal sex can only be done by invasive procedures which have their own risk of miscarriage or preterm delivery and the fact that these techniques are not readily available.
- Also, the most severe abnormality can look normal, though of the opposite sex, and thus may go undetected unless further investigated due to suspicion.

  For example:

  Severe CAH resulting in masculinization of female genitilia will look like a male fetus

  AIS fetus due to severe incomplete masculinization will look like normal female fetus.

* It is therefore important to assess fetal DSD as accurately as possible and make the most likely diagnosis in order to enable the woman to make an informed decision regarding the outcome of the pregnancy.

Prenatal Counselling

- DSD's are a medical and psychosocial emergency and require multidisciplinary team approach.
- We have to inform the family about the normal embryology and abnormality, the differential diagnosis and postnatal treatment and prognosis so as to meet the parents' intellectual capabilities, taking into consideration cultural and religious background.
- We have to leave the decision of continuing or terminating the pregnancy onto the parents.
- The family have the right to decide whether to get further investigations to define the etiology prior to making a decision or to continue the pregnancy and to have maternal prenatal treatment, if applicable.
- We should give the parents time to cope up before making this decision.
- We have to counsel them to defer newborn gender determination.

Prenatal Treatment

- Resection in the case of a maternal androgen-secreting tumor.
- Maternal treatment with dexamethasone in cases of CAH, to reduce prenatal clitoral growth. It best works when started before 9 weeks of gestation.

Intranatal Management: DSD's have no impact on the mode of delivery but we should be ready for postnatal management of the DSD's.

Post-Natal Management

The post-natal evaluation is done in case where prenatal suspicion is present and to confirm our diagnosis and further plan the management.

1. ***Detailed family history***
2. ***External genitalia examination*****:** We grade the external genitalia by ***Anatomical Classification of Virilization (Prader)****:*
   - I. Female external genitalia with clitoromegaly.
   - II. Clitoromegaly with partial labial fusion forming a funnel-shaped urogenital sinus.
   - III. Increased phallic size with complete labioscrotal fusion forming a urogenital sinus with a single opening.
   - IV. Complete scrotal fusion with the opening of the urogenital sinus at the base of the phallus.
   - V. Normal male external genitalia.

   We also look for:
   - The position of the urethral meatus- Hypospadias
   - Pigmentation of labioscrotal folds suggests the possibility of increased corticotropin levels as part of adrenogenital syndrome.
   - Inspection of inguinal region for undescended testis or fistulas in complex cases.
   - Palpation of the gonads
   - Rectal examination: For palpation of a cervix and uterus which will confirm the presence of internal Müllerian structures
3. ***Neonatal imaging:*** To look for the presence of gonads, a uterus, and/or a vagina and to see for neonatal adrenal glands for hypertrophy/ hyperplasia
4. ***MRI*** for further anatomical delineation if required
5. ***RGU and/or cystoscopy/vaginoscopy*** and possibly **laparoscopic visualization** to delineate the internal reproductive organs/anatomy
6. ***Gonadal biopsy*** for histological/genetic evaluation
7. ***Cord blood and fetal blood sampling*** for ***hormonal levels*** (store in EDTA and sodium heparin tubes) such as levels of 17-hydroxyprogesterone,
8. ***Genitography*****:** To delineate the internal ductal anatomy more accurately than USG/MRI. It helps in surgical planning of the case.
9. ***Chromosomal analysis***
10. ***Endocrine screening***
11. ***Serum chemistry/electrolyte tests***
12. ***Androgen-receptor levels and 5-alpha reductase type II levels.***

Post Natal Treatment

Medical Care**:** Will depend on the cause of DSD and supplemental hormonal therapy can be given whenever indicated

Surgical Care

- In a virilized female, the surgical procedure is termed feminizing genitoplasty and includes vaginoplasty and clitoroplasty.
- Undervirilized males typically have hypospadias requiring surgical reconstruction.

Conclusion

- DSD's can be suspected prenatally by the USG showing abnormal external genitalia or discrepancy between fetal chromosomal and phenotypic sex.
- Detection of DSD's is possible only after complete development of external genitilia i.e., 12 weeks of gestation.
- We should always look for associated anomalies.
- Fetal USG findings should be followed by karyotyping or hormonal studies if the parents decide to undergo further investigations like amniocentesis.
- Parents should be informed regarding the fetal abnormalities detected, the possible postnatal management and prognosis as well as the prenatal options by a multidisciplinary team.
- The parents should be taken into confidence that they will be supported by the team regardless of the decision that they take.

Suggested Readings

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2. Dreger A D, Chase C, Sousa A. *et al* Changing the nomenclature/ taxonomy for intersex: A scientific and clinical rationale. J Pediatr Endocrinol Metab200518729–733.
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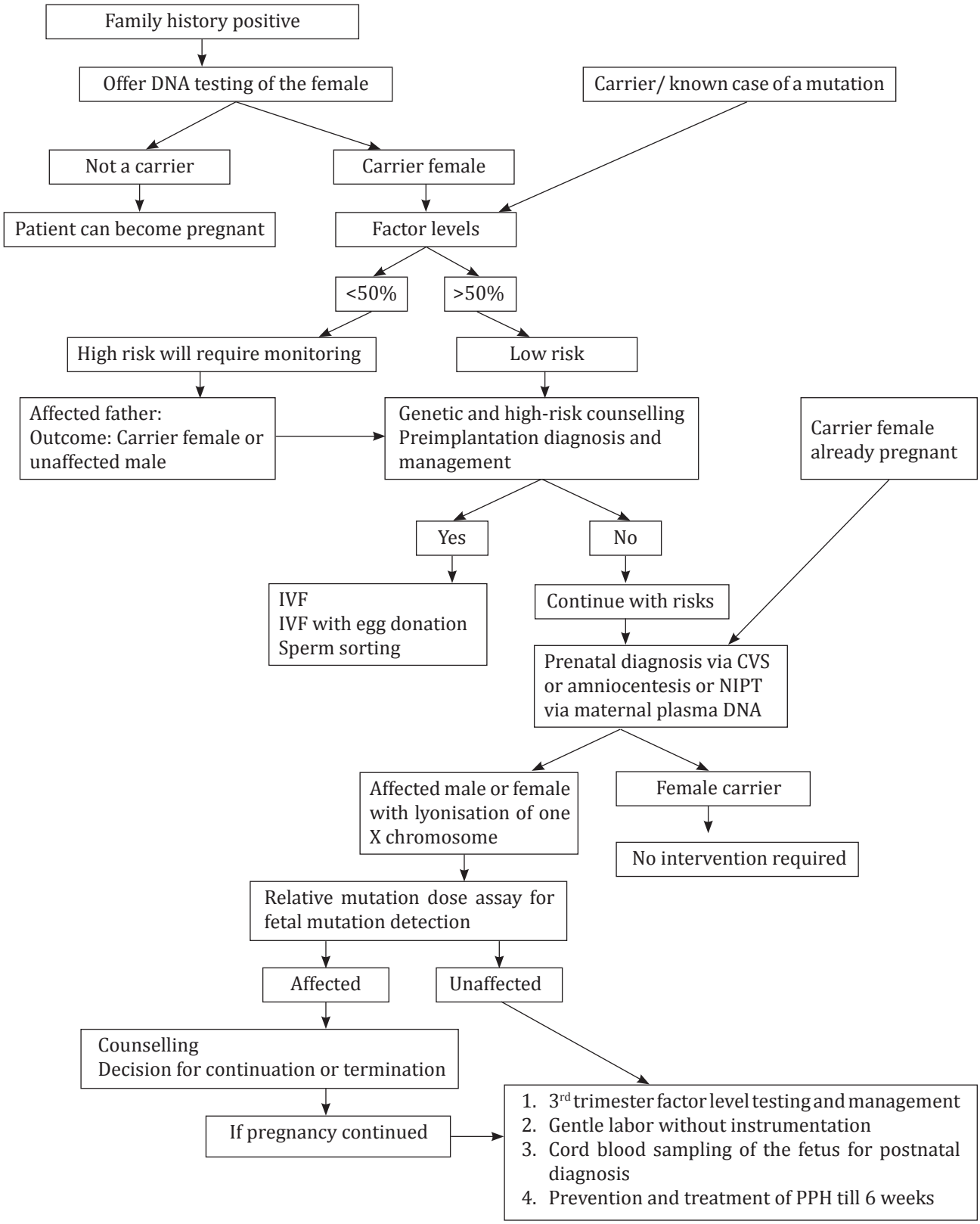
Ready Reckoner: *Hemophilia in Pregnancy*

Aparna Setia[1], Nilanchali Singh[2], Pallavi Sharma[3]

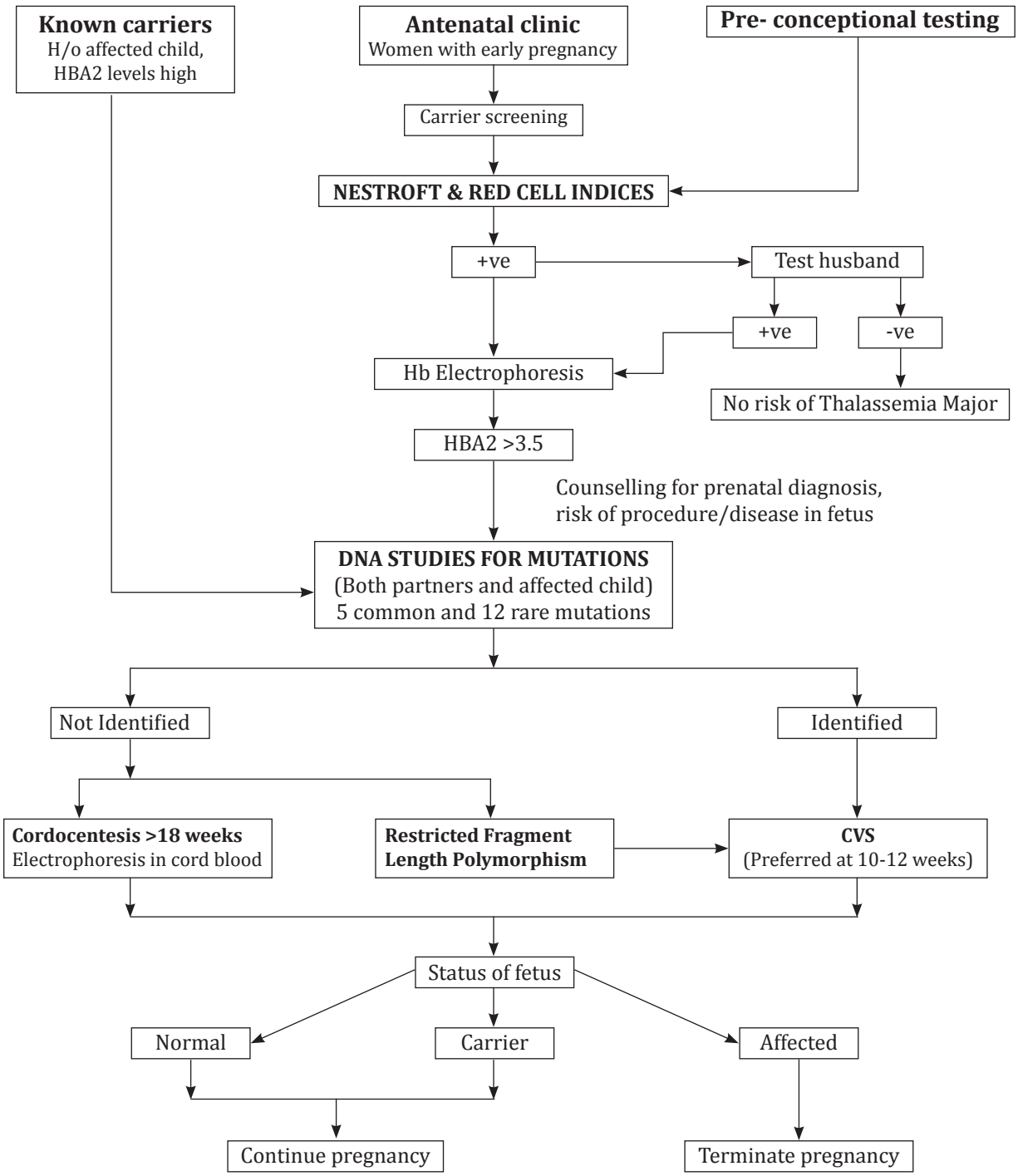
[1]Post Graduate, [2]Assistant Professor, [3]Senior Resident, Department of Obstetrics and Gynecology, MAMC & LNJPH, Delhi



Ready Reckoner: *Diagnosis and Management of Thalassemia in Pregnancy*

Nilanchali Singh[1], Aparna Setia[2], Pallavi Sharma[3]

[1]Assistant Professor, [2]Post Graduate, [3]Senior Resident, Department of Obstetrics and Gynecology, MAMC & LNJPH, Delhi



Journal Scan

Sruthi Bhaskaran
Assistant Professor, University College of Medical Sciences & GTB Hospital, Delhi

1. Fetal Diagn Ther. 2017;42(2):92-98.

Vaginal Probiotic Administration in the Management of Preterm Premature Rupture of Membranes

Daskalakis GJ, Karambelas AK

Objective

To examine the influence of vaginal probiotic administration as an adjunct to standard antibiotic treatment on perinatal outcome in women with preterm premature rupture of membranes (PPROM).

Materials and Methods

This was a prospective randomized trial of cases with PPROM (24-34 weeks) that were admitted to our department between 2011 and 2015. Forty-nine cases received vaginal probiotics for 10 days in combination with antibiotic prophylaxis and were compared to 57 others that received only antibiotics for the same time period.

Results

The mean gestational age at birth (35.49 vs. 32.53 weeks), the mean duration of the latency period (5.60 vs. 2.48 weeks), and the mean birth weight (2,439.08 vs. 2,004.81 g) were significantly higher in the study group in comparison to the controls. Moreover, the neonates of the study group had a lower chance to enter the neonatal intensive care unit or the neonatal special care unit, shorter total hospitalization time, and lower need for oxygen administration and mechanical ventilation, as well as lower length of oxygen administration.

Conclusions

Preterm premature rupture of membranes (PPROM) occurs in approximately 2% of pregnancies and is the cause for almost one third of preterm deliveries Vaginal probiotics as an adjunct to antibiotic prophylaxis in women with PPROM prolonged the latency period and improved the perinatal outcome.

Editor's comments

The etiology of this complication is not completely understood. However, infections seem to play a major role, as in 36% of cases, there are positive amniotic fluid cultures. The standard care of PPROM cases before 34 weeks involves the administration of glucocorticoids and antibiotics. Antibiotic treatment reduces the rate of chorioamnionitis and improves the perinatal outcome by prolonging the latency period. The major problem related to the antibiotic use is the destruction of the normal vaginal microbiota and the possible overgrowth of virulent microorganisms, which further increases the risk of an ascending infection. Probiotics are live microorganisms that exert various beneficial effects on human health, and several reports in the literature indicate that they can protect against genital infections and restore the vaginal flora in women. A recent Cochrane review observed a significant reduction in vaginal infections following local treatment with probiotics during pregnancy. A recent observational study reported that the addition of probiotics to ampicillin treatment in women with PPROM prolonged the latency period. Probiotics may have a protective role in major pregnancy complications such as gestational diabetes and preeclampsia.

2. Fetal Diagn Ther. 2017;41(1):51-57. doi: 10.1159/000445946.

Use of an Amnioport to Maintain Amniotic Fluid Volume in Fetuses with Oligohydramnios Secondary to Lower Urinary Tract Obstruction or Fetal Renal Anomalies

Polzin W.J, Lim F.Y, Habli M, Van Hook J, Minges M, Jaekle R, Crombleholme TM

Objective

We describe a technique to maintain amniotic fluid in fetuses with severe oligo-/anhydramnios secondary to lower urinary tract obstruction or fetal renal disease when urine production is inadequate to maintain a normal amniotic fluid volume (AFV).

Methods

An amnioport was inserted into the amniotic space. The catheter was secured to prevent dislodgment and tunneled to a subcutaneous reservoir. The reservoir was accessed as necessary, infusing normal saline to maintain AFV. Pregnancy continued until term or indicated delivery.

Results

Since 2010, 15 patients in this category were considered for an amnioport. Six chose comfort care and one elected percutaneous amnioinfusions. Nine amnioport procedures were performed in eight patients. There were no fetal deaths. All eight had successful restoration and maintenance of amniotic fluid. Delivery ranged from 9 to 96 days after placement (mean 63.7 days). One died due to unrecognized laryngeal web and another one died of pulmonary hypoplasia after preterm premature rupture of membranes. None of the remaining six had pulmonary hypoplasia. Three remain alive.

Discussion

Severe oligo-/anhydramnios in the second trimester secondary to fetal anomalies is almost uniformly lethal due to pulmonary hypoplasia without restoration of amniotic fluid. The amnioport procedure may allow pulmonary survival but commits families to postnatal care decisions regarding pulmonary and renal complications.

Editor's comments

The treatment of lower urinary tract obstruction (LUTO) remains problematic despite the availability of vesicoamniotic shunts used to restore amniotic fluid volume (AFV) in patients who, after counselling, opt for fetal intervention. Incomplete diagnoses, shunt complications and shunt migration, failure to restore AFV, and poor antenatal criteria to predict long-term outcomes make counseling difficult because the intervention may not produce the desired outcome. Decompression of the fetal urinary tract obstruction with restoration of AFV has been shown to limit pulmonary hypoplasia and renal dysplasia in animal models and in humans with obstructive uropathy. Authors describe the use of an amnioport catheter placed into the amniotic space via maternal laparotomy providing an indwelling fluid infusion system. It leaves the provider with a simple postoperative approach to restore and maintain normal AFV in pregnancies complicated by fetal LUTO and associated renal dysplasia or primary fetal renal anomalies, both situations resulting in oligohydramnios possibly precluding normal pulmonary development. This provides an alternative to serial percutaneous amnioinfusions.

3. Journal of Fetal Medicine 2017; 4(1): 7–12

Clinical Significance of Conventional Karyotype and QF-PCR in Detection of Fetal Chromosomal Abnormalities

Mirza Kozaric, Mirsada Hukic, Azra Hasic, Alma Kozaric, Amina Kurtovic-Kozaric

This study aims to compare the advantages of two widely used methods for fetal chromosomal detection, karyotyping and QF-PCR, together with the indications for invasive prenatal diagnosis. We retrospectively investigated 888 amniocenteses analyzed by karyotyping only or karyotyping combined with QF-PCR. We assessed the results of each method and compared them to the indications for prenatal testing including maternal age, fetal ultrasound findings, and serum screening. We found 39 (4.4%) abnormalities, where 59% of those abnormalities were numerical and 41% were structural abnormalities undetectable by QF-PCR methods. Many structural abnormalities do not have clinical significance and we found that 23% of found structural abnormalities were clinically significant but undetectable by QF-PCR (0.3% of all amniocentesis analyzed). Additional 23% of found structural abnormalities were balanced translocations which can have rare clinically significant consequences. In total, 46% of found structural abnormalities had possible clinical consequences, which were undetectable by QF-PCR, or by noninvasive prenatal testing for five common aneuploidies. Thus, QF-PCR is a reliable method to detect most common fetal aneuploidies, but karyotyping should be used if any other chromosomal abnormalities are suspected. Even though QF-PCR is a fast and reliable method, physicians should be aware of the limitations of various methodologies for detection of fetal abnormalities and assign the proper method to the indication for amniocentesis.

Editor's comments

Amniocentesis is an invasive procedure performed on pregnant women in the interest of obtaining fetal cells, which are subsequently subjected to genetic and molecular analysis. Historically, the first cytogenetic test used to detect fetal chromosomal abnormalities was karyotyping. It requires an in vitro culture of fetal cells, cellular harvest, and examination of stained chromosomes. Disadvantage of karyotyping is the long wait for the results, typically from 10 to 21 days, which can be an anxious time for future parents. Other methods are currently being used as independent tests or in conjunction with karyotyping, like fluorescent in situ hybridization (FISH) or quantitative fluorescent polymerase chain reaction (QF-PCR), or by noninvasive prenatal testing for five common aneuploidies. QF-PCR is a molecular method that detects numerical abnormalities of chromosomes 13, 18, 21, X, and Y. It is a fast and reliable diagnostic tool that can give results in several hours, but is limited to the detection of the most common fetal abnormalities. Both methods, karyotyping and QF-PCR, can be used as stand-alone test or together for the detection of fetal chromosomal abnormalities. Even though QF-PCR is a fast and reliable diagnostic assay, it cannot detect abnormalities like deletions, translocations and inversions.

Proceedings of AOGD Monthly Clinical Meet

AOGD Monthly Clinical Meeting was held at Hindu Rao Hospital on 29th September 2017

1. Post-partum Uterine Scar Dehiscence following Cesarean section

Sangeeta Popli, Neha, Mamta Gupta

Introduction: Scar dehiscence is disruption of myometrium at the scar site. Its occurrence in the postpartum period following cesarean section is a rare. It though can present as secondary PPH, pelvic abscess, wound dehiscence, chronic pelvic pain, menstrual disturbances, dysmenorrhea, secondary infertility or can remain asymptomatic. Its presentation as subacute intestinal obstruction and association with tuberculosis abdomen has not been reported.

Case report: We report a case of 30-year-old female, P1, referred from a secondary care hospital postoperative day 3 LSCS with fever, breathlessness, abdominal distension and vomiting. Her antenatal, intra-partum and immediate post-partum period was uneventful. X-ray abdomen erect and CT scan of abdomen revealed subacute large bowel obstruction with free fluid. Xray chest and CT scan thorax revealed bilateral pleural effusion, basal atelectasis and paratracheal lymph nodes. Ascitic tap was done and cytology of ascitic fluid, high ADA values suggested abdominal tuberculosis. She was managed conservatively for subacute intestinal obstruction. ATT was started. MRI showed complete disruption of the uterine scar and communication of the uterine cavity with peritoneal cavity. In view of tuberculosis abdomen, pleural effusion was likely to be tubercular. Laparotomy has been planned for repair of scar after 3 months. Presently the patient is doing well with no complaints.

Conclusion: Diagnosis of post-partum scar dehiscence can be made by high index of suspicion. Presentation can vary. MRI is the gold standard for diagnosis. Treatment is mostly surgical repair or hysterectomy, though it can be managed conservatively also.

2. A Case Report - Term Pregnancy with Incidental Cervical Fibroid

Mala Shukla, Rekha Jain, Puja Singh

An unbooked partially investigated G2P1+0+0+1 presented in emergency at 36+5 weeks gestation with breech in labor with previous caesarean section done 6 years back. Patient was taken up for caesarean section, uterovasical fold reflected normally. On incising the lower segment, it was found to be very thick and no cavity was found so incision was extended in upper segment in J shaped fashion. A distorted cavity was entered and an alive baby was extracted as breech with difficulties. Placenta was normally expelled. Because of atonic PPH, a subtotal hysterectomy was performed during caesarean section.

As the expanded mass occupying the pelvis, was adherent, unencapsulated and could not be dislodged from the pelvis during caesarean, it was left in-situ. Patient made an uneventful recovery with wound healing by primary intention and was discharged on post operative day15.

Post-operative pelvic USG showed an involuting stable cervical fibroid.

Patient came for review after 3 weeks and had resumed her normal household activities including breast feeding the baby. On day 45, she presented with secondary partial wound dehiscence of 5 cm on right lateral side. She was admitted, daily wound dressing and antibiotic was given.

On day 49, a fleshy mass was seen protruding from rectus sheath - which the surgeons opining could possibly be the caecum. She underwent exploratory laparotomy and a complex putrifying mass was found adherent to anterior abdominal wall, whose anatomical landmarks could not be delineated. While exploring its lower extent, a plane was entered and a 12x10x8 cm autolyzed mass was removed intact. The bed of mass was avascular and others surrounding organs were normal. Abdomen was closed and patient made uneventful recovery and was discharged in stable condition. During follow up cervix was not visualized on speculum examination. It was suggestive of that fibroid was probably originated from cervix.

3. Struma carcinoid in dermoid cyst: a rare entity

Suman Mendiratta, Rekha Yadav, Suman Dath, Deepanjali, Disha, Rajni, Namrita

Introduction: Struma carcinoid of the ovary is a rare tumor of germ cell origin characterized by an intimate mixture of thyroid tissue & carcinoid. Correct diagnosis depends on pathologic examination with the use of special stains.

Case report: A 36-year-old female, P2L2, presented with lower abdominal pain since 5– 6months. She had an uncomplicated medical & gynecological history with

regular menstrual cycle. On examination, normal size anteverted uterus with B/L adnexal masses approx. 5 X 6 cms, irregular, non-tender, restricted mobility with variegated consistency were felt. On ultrasound B/L masses aprox. 6 X 4 cms was found in both ovaries. All serum tumor markers (LDH, CA125, AFP, b-HCG) were within normal range except CA19-9 (125.10 u/ml). MRI pelvis confirmed the USG findings, adenexal masses with intralesional fat contents & possibility of ovarian dermoid was suggested with no other pelvic & abdominal pathology. On Exploratory laparotomy: right side 7 X 6 cms and on left side 5 X 6 cms dermoid cyst with hair & fat globules was seen. Right oophorectomy along with left cystectomy was done. On histopathology, right adnexal cyst revealed mature cystic teratoma. Left ovary revealed strumal carcinoid in mature cystic teratoma with intact ovarian capsule. Immunohistochemistry showed chromogranin positive tumor cells with thyroglobulin positive scattered thyroid follicles. 24 hour urine Hydroxy-indole acetic acid was done in postop period was found normal (1.36 mg/24hrs).

Conclusion: The coexistence of a carcinoid tumor within a mature teratoma is very rare. Conservative surgical approach for sparing fertility and to avoid premature menopause may be a reasonable option. However, further evidence is needed to support conservative treatment in such cases without adversely affecting patient's morbidity & mortality.

Important day of the Month:

Cerebral Palsy Day

Richa Agarwal

Astt. Professor, Obstetrics & Gynecology, UCMS & GTBH, Delhi

Around 17 million people across the world are living with cerebral palsy (CP). Another 350 million people are closely connected to a child or adult with CP. Cerebral palsy (CP) is the most common physical disability in childhood and is also one of the least understood.

World Cerebral Palsy Day is a social movement and a day to celebrate and affirm the lives of the 17 million people living with cerebral palsy (CP). This falls on 6th Oct, 2017. The project was launched in 2012 by Cerebral Palsy Alliance (Australia) and United Cerebral Palsy (USA). It is supported by over 380 CP service organisations, universities, parent groups, research institutions, student groups, schools and children's hospitals from 62 countries.

The project is coordinated by the World Cerebral Palsy Initiative, a group of non-profit cerebral palsy organisations with a global vision to create real change for people living with CP.

The primary goal of celebrating this day is to ensure that people know about cerebral palsy. It is also celebrated to ensure that adults and children with cerebral palsy have the same rights, opportunities and access as any other person in the society. Helping these people live their lives better and creating powerful voices for them will bring about the momentum needed for World Cerebral Palsy Day.

From 2012 to 2014, World CP Day focused on an innovation campaign called "Change My World in 1 Minute" where ideas were sought for products and services that needed to be invented for people with CP-that had the potential to 'change the world' for people living with CP, and then they challenged designers and engineers to create a prototype.

In 2015, the campaign evolved into a social movement that targets the six key issues that affect people with CP around the world, irrespective of geographical, cultural and economic differences. The website provides tools and resources for organisations to adapt and take action locally.

1. **Public awareness:** It is very important for people to know about this illness. There are still a lot of educated people who do not know about cerebral palsy. Raising public awareness camps will help people acknowledge the fact that there is such illness and understand it better.
2. **Civil Right Demands:** We should contribute in making sure that the disabled demands are being met and the people are treated well. Only then they will have a sense of acceptance by everyone and help lead a better life.
3. **Better Medicinal Treatment:** The people with cerebral palsy should have access to the top of the line treatment processes so as to provide them the best possible assistance in living the fullest possible life.
4. **Improve Life Quality:** India is a country where the disabled people do not have equal access to facilities compared to the normal. You don't often come across a disabled restroom everywhere you go. These, when improved, can help cerebral palsy patients improve their quality of life.
5. **Education:** Helping all educators create an experience that will encourage the broader community to embrace people with CP, and provide an education to members of the CP community that is equal to that of every other citizen of the societies in which we live.
6. **Contribution:** Each of us has a responsibility to contribute economically, artistically, socially and/or politically.

Quiz Time: *Tick it, Fill it, Click it, Whatsapp/ Email it*

Rashmi, Bindiya

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

1. Write True of False
   A) An inter- twin discrepancy of >10% is suggestive of growth discordance even when both the twins are above the 10th centile for gestation.
   B) Quintareo's stage 2: Fetal bladder of donor not visible along with severe oligohydramnios. Fetal Dopplers are normal.
   C) Monoamniotic twins have a high risk of cord entanglement
   D) Lambda or the twin peak sign with a diagnostic accuracy of 65-70%.
   E) In TRAP A acardiac: pump twin volume ratio >70% is associated with a bad prognosis.

2. What are the properties of blood used for intrauterine transfusion?

   _____

3. What is the ACOG definition of previable birth?

   _____

4. What is true regarding interventions for previable birth
   a) Magnesium sulphate is used as tocolytic
   b) Tocolytics are continued till term
   c) Post-delivery transfer is better than in-utero transfer
   d) Cesarean section for fetal indication is recommended for 250/7-256/7

5. Match the following

Column 1	Column 2
AFP 1.11, E3 0.26, HCG 0.12, Inhibin 0.64 MoM	NTD
PAPPA- 0.33 MoM, FBHCG 1.45 MoM, NT – 1.66 MoM	Trisomy 18
PAPP-A (0.1 - 0.2 MoM) + beta-hCG (0.2 - 0.4 MoM) NT 0.97	Trisomy 21
AFP 3.23, E3 1.48, HCG 0.93 Mom	Trisomy 18

6. Difference between full integrated test and Step wise sequence testing is

   _____

Tick the MCQs and fill in the blanks.
Click a pic and whatsapp or email to us
Whatsapp Nos.: 9810645212, 9810719002
Email: info@aogd.org

7. All are true about Non Invasive Prenatal Test except:
   a) It detects cell free fetal DNA in maternal blood
   b) Cell free DNA comes from dead cells and is seen in all individuals
   c) In negative test, routine morphology scan in second trimester is not required
   d) A positive test in first trimester warrants termination of pregnancy

8. Define Early Onset IUGR:

   _____

9. Followings for FGR are true (T) or false (F)
   a. Ductus Venosus Doppler is the strongest predictor of fetal death
   b. CPR is as sensitive as Umbilical artery Doppler study
   c. AEDF in UAD indicates 60-70% villous obliteration
   d. Aortic isthmus Doppler is very sensitive for predcting short term risk of SB

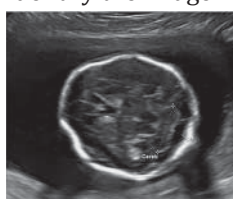
10. cCTG stands for ……..
    Expand following Conditions amenable to in utero therapy:

11. FAIT .....

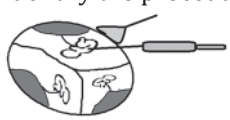
12. LUTO .....

13. CDH .....

14. Identify the image:



15. Identify the procedure:



Refer page 42 for Previous answer key.

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- Regular emails on Fetal Medicine activities all over the world
- Free access to the website
- Substantial discount on the subscription to the Journal of Fetal Medicine.

For membership, kindly contact Vishal Mittal at +919312227181 or send an email at sfmsecretariat2017@gmail.com. Online membership can be taken through our website www.societyoffetalmedicine.org

Membership Charges:

Membership for 10 years: INR 4000/-; One Time Processing Fee: INR 500/-; Total: INR 4500/-

Please make Cheque/ Draft in favour of *"Society of Fetal Medicine"* payable at *"New Delhi"& send to the "Secretariat, C584, Defence Colony, New Delhi-110024, India."*

For Bank Transfer:
Account Name: "Society of Fetal Medicine" **Account No.:** 91111010002044
Bank Name & Address: Syndicate Bank, Sir Gangaram Hospital, Rajinder Nagar, New Delhi-110060,
IFSC Code: SYNB0009111

North Zone

All India Co-Ordinating Committee
Royal College of Obstetricians & Gynaecologists North Zone India
in collaboration with the
Association of Obstetrician & Gynaecologists of Delhi (AOGD)

AICC RCOG NORTH ZONE ANNUAL CONFERENCE 2017

Be Up To Date – RCOG Annual Professional Development Conference

Auditorium Maulana Azad Medical College Delhi on 16th & 17th December 2017

Pre Conference Workshops 15th December 2017 Maulana Azad Medical College Delhi

Post Conference Workshops 18th & 19th December 2017 Academic Centre B-235, C. R. Park Delhi

Website: **http://www.aiccrcognzindia.com**

Topics

Obstetric Module
Guideline: Sepsis in pregnancy
Recent advances: Labour curve Revisited
Panel Discussion: Newer trends in management of Hypertensive disorders in pregnancy – Case based discussion

Clinical Governance & Risk Management Module
Understanding Audit and Clinical Application with Examples
Risk Management and Patient Safety: Case Based Scenarios
How research can be used to improve quality of care

Fetomaternal Medicine Module
Guideline: Monochorionic twin pregnancy, management
Recent advances: CPR RATIO: Should it be included in delivery decision making
Panel Discussion: Fetal growth restriction: Case based discussions

Urogynaecology Module
Guideline: Management of bladder pain syndrome
Recent advances: Interstitial Cystitis

Reproductive Medicine Module
Guideline: Endometriosis, investigation and management
Recent advances: Role of AMH in ART and beyond
Panel Discussion: Recurrent Implantation failures: Newer management Case based discussions

Gynaecology Module
Guideline: Endometrial hyperplasia management of
Recent advances: New regimens in hormonal contraception: to bleed or not to bleed
Panel Discussion: Adolescent endocrinal issues – case based discussions

Gynae Oncology Module
Guideline: Guidelines for the diagnosis and management of vulval carcinoma
Recent advances: Sentinel lymph node biopsy to be a standard of care in all gynaecological malignancies ?
Panel Discussion: Current role of imaging in staging for gynaecological malignancies

Oration
Technology for women's health
Is Myomectomy needed before ART procedures

International Faculty

Professor Khalid S Khan
Editor-in-Chief BJOG

Dr Prabha Sinha
MBBS, DGO, FRCOG, MRCPI, Diploma in advanced ultrasound (RCOG/RCR, UK)

Dr Nirmala Agarwal
Organizing Chairperson

Dr Anita Kaul
Co-Chairperson

Dr R Sharma

Dr A Aneja

Dr J Behura

Dr A Dang

Organizing Secretaries

Why Attend?

- Unique opportunity to attend the prestigious Annual AICC RCOG North Zone Conference with integrated modules covering important aspects of Obstetrics and Gynaecology.
- This conference will closely follow the "Preparation for MRCOG part 2 and 3 examinations training" and is aimed to provide a comprehensive clinical update to all clinicians (obstetricians and gynaecologists, sub- specialists, trainees and general practitioners)
- Our expert international faculty will provide information on carefully selected topics of research and publication, medicolegal pitfalls, clinical governance, patient safety and audit, a detailed understanding of these are required by an Indian trainee in order to clear the MRCOG part 2 and 3 examinations. There will be ample opportunity for live interaction with speakers to clear all doubts and controversies.
- Excellent opportunity to all gynaecologists and specially useful to all those undergoing training, planning, aspiring, and want guidance regarding the MRCOG examinations, Fellowship in UK, MD/MS or DNB exams.
- Complete Professional development with upto date knowledge for exam going MD MS DNB postgraduates
- Promulgate ethical and standards of practice

Workshops (For All Delegates & Post Graduates)

S No.	Pre Conference Workshop (MAMC) Friday 15th December 2017	Timing	Registration Fee
1	**How to Write A Paper and Publish**	9:00am-4:00pm	2000
2	**Gynaecare CTG Course**	9:00am-1:00pm	1000
3	**Obstetric Skills Workshop**	2:00pm-5:00pm	1000
	Post Conference Workshop (Academic Centre C R Park) Monday 18th & Tuesday 19th December 2017		
4	**Basic Colposcopy Course** (18th December 2017)	9:00am-5:00pm	2000
5	**Advance Colposcopy Course** (19th December 2017)	9:00am-5:00pm	2500

Conference

16th & 17th December 2017
Venue: Maulana Azad Medical College Auditorium Delhi

Registration Category	Upto 10th November 2017	11th November 2017 to 6th December 2017	6th December 2017 Onwards/ Spot Registration
Delegate/ Faculty	4000	5000	6000
P G Student	2400	3000	3600

Conference & RCOG North Zone India Secretariat
Dr Nirmala Agarwal (Organizing Chairperson)
OT Complex 3rd Floor Sant Parmanand Hospital, 18 Shamnath Marg, Civil Lines, Delhi 110054
M. 9560069925 / 9716801190, Tel No - 91-11-23981260, 23994401-10 Ext 314
Email: rcognz2012@yahoo.com/ n.menoky@gmail.com/ arbidang@gmail.com

RCOG UK Franchise MRCOG Final Preparation: Part II Written Course

Saturday 30th - Sunday 31st December 2017 & Monday 1st January 2018 (Total 3 Days)

Limited to 25 candidates only (First Come First Serve basis)
Course Fee: Rs 30,000
Certificate of attendance for this course will be provided by the RCOG UK
Venue: RCOG North Zone Academic Centre, B-235, C R Park, New Delhi-110019, INDIA

UK Course Organizer & Convener - Dr Sanjeev Sharma
India Conveners and Contacts for details - Dr Saritha Shamsunder (shamsundersaritha@gmail.com/9313826748)
Dr Sweta Gupta (swetagupta06@yahoo.com/8130140007)
Dr Mamta Sahu (mamta2sahu@yahoo.co.in/ 9810106470)

Online payment available on website. www.aiccrcognzindia.com

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