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Healthy Babies to Healthy Mothers

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talkBACK

NEWSLETTER OF THE INDIAN SOCIETY FOR PRENATAL DIAGNOSIS AND THERAPY

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INDIAN SOCIETY OF PRENATAL DIAGNOSIS & THERAPY

Editorial

Fetal Growth Restriction:
Understanding the Challenges and Embracing Collaborative Solutions

Dr. Veronica Arora

In the realm of obstetrics and genetics, few challenges are as poignant and complex as fetal growth restriction (FGR). It stands as a testament to the delicate dance of factors that influence prenatal development and the intricate interplay between genetics, environment, and maternal health. As we delve into this topic, it becomes evident that a nuanced understanding coupled with collaborative efforts is essential to address the multifaceted dimensions of FGR.

Fetal growth restriction, also known as intrauterine growth restriction (IUGR), refers to a condition where a fetus fails to achieve its growth potential during pregnancy. This phenomenon is not merely a matter of size but encompasses a spectrum of challenges that can impact the short and long-term health of the unborn child. Factors contributing to FGR are diverse, ranging from maternal health issues such as hypertension and diabetes to placental insufficiency and genetic predispositions.

The complexity of FGR necessitates a multidisciplinary approach that brings together obstetricians, geneticists, neonatologists, and other healthcare professionals. Collaboration is not merely advantageous but imperative in devising effective strategies for prevention, diagnosis, and management of FGR. This collaborative ethos extends beyond healthcare providers to encompass researchers, policymakers, and advocacy groups dedicated to maternal and child health.

Prevention lies at the forefront of our efforts to combat FGR. Prenatal care plays a pivotal role in identifying risk factors early in pregnancy and implementing interventions to mitigate potential complications. Monitoring maternal health, addressing nutritional deficiencies, managing chronic conditions, and promoting healthy lifestyle choices are integral components of preventive care. Genetic counseling also assumes significance in cases where hereditary factors may contribute to FGR, enabling informed decision-making and personalized care plans.

Diagnosing FGR accurately and timely is paramount for optimizing outcomes. Advances in ultrasound technology and fetal monitoring have enhanced our ability to assess fetal growth patterns and detect deviations from the norm. Serial ultrasound examinations, Doppler studies, and biophysical profiling are valuable tools in evaluating fetal well-being and guiding clinical decisions. Close collaboration between obstetricians and geneticists is crucial in interpreting these findings and tailoring management strategies accordingly.

Management of FGR demands a nuanced approach that balances fetal well-being with maternal health considerations. Close fetal surveillance, including antenatal testing and fetal biometry, helps gauge the progression of FGR and informs decisions regarding timing and mode of delivery. In cases of severe FGR or fetal distress, early delivery may be warranted to minimize adverse outcomes. However, the timing of delivery must be carefully deliberated to optimize neonatal outcomes while considering the risks associated with preterm birth.

Postnatal care for infants affected by FGR is equally critical in ensuring optimal growth and development. Neonatologists play a pivotal role in providing specialized care to these vulnerable newborns, addressing nutritional needs, monitoring for complications, and facilitating early intervention services when indicated.

Beyond clinical care, research and advocacy are indispensable in advancing our understanding of FGR and advocating for policies that support maternal and child health. Collaborative research endeavors aimed at elucidating the genetic, epigenetic, and environmental determinants of FGR hold promise for identifying novel biomarkers and therapeutic targets. Advocacy efforts focused on improving access to prenatal care, enhancing healthcare infrastructure, and promoting awareness can have a profound impact on reducing the burden of FGR globally.

In conclusion, fetal growth restriction is a multifaceted challenge that necessitates a comprehensive and collaborative approach. By harnessing the collective expertise of obstetricians, geneticists, neonatologists, researchers, policymakers, and advocacy groups, we can strive towards a future where FGR is effectively prevented, diagnosed, and managed, ensuring optimal health outcomes for mothers and their precious offspring.

Foreword

Dear Esteemed Colleagues,

We hope this message finds you well and thriving in your endeavours within the field of prenatal diagnosis and treatment. As we embark on a new year filled with promise and innovation, we are delighted to share some exciting updates and developments from the Indian Society of Prenatal Diagnosis and Treatment (ISPAT) in this newsletter.

As healthcare providers dedicated to ensuring the well-being of our patients and their unborn children, we recognize the importance of staying informed about advancements in prenatal testing and diagnosis. Prenatal care plays a crucial role in identifying potential health risks and providing appropriate interventions to promote optimal outcomes for both mother and baby.

In recent years, prenatal testing and diagnosis have seen remarkable progress, offering us unprecedented insights into fetal health and development. These advancements empower us to detect, manage, and sometimes even prevent certain congenital conditions, thereby enhancing the quality of care we deliver to expectant families.

It is essential for us, as healthcare professionals, to remain abreast of the latest technologies and methodologies in prenatal testing. At ISPAT we have initiated :

1. Annual Conferences
2. New Research Initiatives
3. Continuing Education (CMEs) & webinars
4. Community Engagement
5. Member Spotlight.

As we navigate this ever-evolving field, let us remain committed to upholding the highest standards of patient-centred care. By staying informed, engaging in interdisciplinary collaboration, and prioritizing open communication with our patients, we can ensure that prenatal testing and diagnosis are integrated seamlessly into our practice, ultimately contributing to healthier pregnancies and better outcomes for all.

We extend our sincere appreciation to all ISPAT members for your unwavering dedication to advancing the field of prenatal diagnosis and treatment. Your passion, expertise, and commitment to excellence continue to inspire us all.

Thank you for your dedication to excellence in healthcare, and for your unwavering commitment to the well-being of the families we serve.

We congratulate ISPAT office bearers and specially editor Dr. Manjet Mehta for initiating the newsletter. We hope this will continue regularly.

Warm regards.

PROF. DR. NARENDRA MALHOTRA
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Messages

Dear ISPAT Members,

I am humbled to become the President of an organisation with such a huge Legacy.
Actually in obstetric terms. I am PREMATURE. I was to take the reins in 2025 but Destiny has put me here today.

When I look upon the past president in awe I suddenly realise that at 48 I am the youngest President of ISPAT.

The past presidents have such a high persona that it's humbling and exciting to be there in the same league.

As we all know Indian Society for Prenatal Diagnosis and Therapy, fondly called as ISPAT was established in 1989.

We are more than 3 decades from then. At that time Genetics was not what we know today, but today it's different. There is no aspect of healthcare where genetics has not touched. and most importantly "REPRODUCTION" because Genes of parents is what shapes the future progeny.

Being in this position puts a lot of responsibility on me & the team and I must say that we all are ready to take ISPAT forward to newer heights.

ISPAT would embrace all possible avenues to share knowledge plan academic events with all those organisations with whom we overlap.

We have eNewsletter, "Samvaad" series and many more activities planned for months to come.

We welcome you to become an ISPATian if not already and be part of this transformational journey.

Best regards,
Dr. Saurabh Dani
President ISPAT, 2023-25

Dear ISPAT Members,

I am delighted to share the exciting news of our inaugural newsletter launch! As your secretary, curating this edition has been a fulfilling experience, bringing together the latest updates, achievements, and highlights from our dynamic community.

In this special edition, we cast a spotlight on the ever-growing importance and applications of genetics in obstetric practice. Explore insightful articles that illuminate the transformative role of genetic insights in shaping the future of prenatal care. From breakthrough technologies to real-world applications, our newsletter unravels the evolving landscape of genetics in the realm of obstetrics, offering a comprehensive view of its impact on healthcare practices.

I extend heartfelt gratitude to all contributors and our dedicated editorial team for their hard work in bringing you this enriching content. Let's come together to celebrate this milestone and eagerly anticipate the many more editions that lie ahead.

Happy reading...

Best regards,
Dr. Manjeet Mehta
Hon. Secretary General, ISPAT

The Silent Threat:
Air Pollution's Role in Fetal Growth Restriction

Dr. Saurabh Dani

INTRODUCTION:

Air pollution, once seen merely as an environmental concern, has emerged as a significant threat to human health. Beyond its impact on respiratory diseases and cardiovascular health, research now points to a more insidious consequence: fetal growth restriction (FGR). This condition, characterized by inadequate growth of the fetus during pregnancy, poses serious risks to both maternal and child health. Understanding the link between air pollution and FGR is crucial for public health policies and individual awareness.

UNDERSTANDING FETAL GROWTH RESTRICTION:

Fetal growth restriction occurs when a fetus fails to reach its growth potential during pregnancy, leading to low birth weight and potential health complications. It increases the risk of infant mortality, developmental delays, and chronic diseases later in life. While factors such as maternal health, genetics, and lifestyle habits play roles in FGR, emerging evidence suggests that exposure to air pollution significantly contributes to its occurrence.

THE ROLE OF AIR POLLUTION:

Numerous studies have demonstrated the adverse effects of air pollution on pregnancy outcomes. Typical issues are FGR, premature birth, low birth weight, infant mortality, and childhood respiratory problems. Fine particulate matter (PM2.5), nitrogen dioxide (NO2), sulfur dioxide (SO2), and carbon monoxide (CO) are among the pollutants implicated in this phenomenon. These pollutants penetrate the placental barrier, leading to inflammation, oxidative stress, and disruption of fetal development.

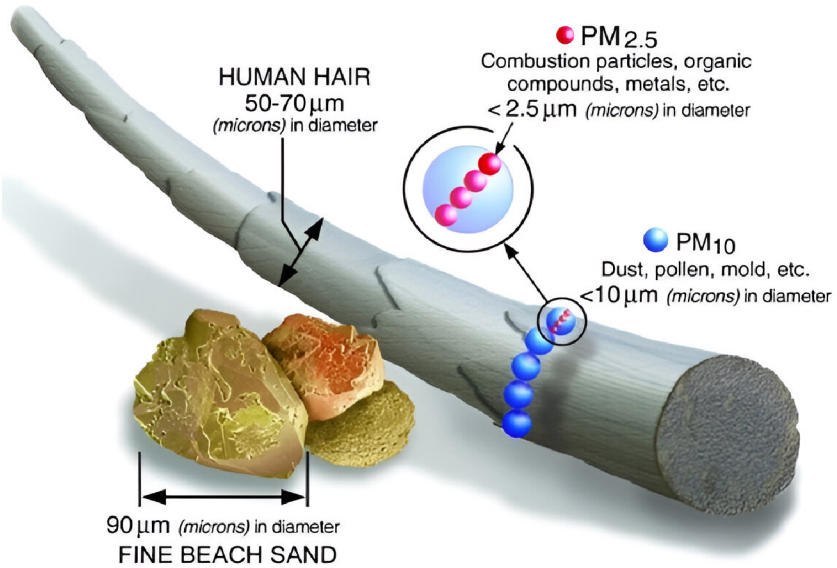
The European Union (EU) recommends a limit to various components of air pollution. For example, a type of superfine particles, called PM2.5, that are grade-1 carcinogens (highly cancer causing), should be below 25 µg/m3. However, even in areas with PM2.5 below those levels, there is an increased risk of low birth weight babies.

EVIDENCE FROM RESEARCH:

A study published in Environmental Health Perspectives in 2019 analyzed data from over 40,000 births and 54 studies and found a clear association between maternal exposure to air pollution and FGR. Similarly, research conducted in China, where air pollution levels are notoriously high, revealed a dose-response relationship between PM2.5 exposure and FGR risk. These findings underscore the global impact of air pollution on maternal and fetal health.

MECHANISMS OF HARM:

Air pollutants exert their detrimental effects through various mechanisms. Inflammation and oxidative stress triggered by pollutants impair placental function, reducing oxygen and nutrient delivery to the fetus. Moreover, exposure to pollutants disrupts fetal programming, altering gene expression patterns and predisposing the unborn child to metabolic disorders and cardiovascular diseases later in life.



When toxic organic matter such as polycyclic aromatic hydrocarbons (PAH) are adsorbed onto the surface of PM, DNA adducts are formed. High levels of DNA adducts were associated with reduced gestational length, and a correlation has been observed between the adduct levels in the mother's and the newborn's blood. High levels of PAH can interfere with nourishment of the fetus by increasing blood viscosity, and reducing the flow to the placenta and uterus.

DNA adduct is a piece of DNA covalently bond to a chemical. When a chemical binds to DNA, it gets damaged resulting in abnormal replication.

VULNERABLE POPULATIONS:

Certain populations face higher risks of FGR due to air pollution exposure. Pregnant women living in urban areas or near industrial sites are particularly vulnerable. Socioeconomic factors also play a role, with disadvantaged communities facing disproportionate exposure to environmental hazards and experiencing higher rates of FGR.

IMPLICATIONS FOR PUBLIC HEALTH:

Addressing air pollution is crucial for mitigating the burden of FGR and improving maternal and child health outcomes. Implementing stringent air quality regulations, promoting clean energy initiatives, and investing in public transportation are essential steps. Additionally, healthcare providers should educate pregnant women about the risks of air pollution and advise them on minimizing exposure during pregnancy.

CONCLUSION:

Air pollution is not just a threat to the environment; it poses a grave risk to maternal and fetal health, contributing to the prevalence of fetal growth restriction. As evidence mounts linking air pollution to adverse pregnancy outcomes, urgent action is needed to curb emissions and protect vulnerable populations. By prioritizing clean air initiatives, we can safeguard the health and well-being of future generations.

SOURCE:

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Fetal Growth Restriction

Dr. Shivani Gupta Dr. Ria Jain

Fetal growth restriction (FGR) is an entity when the fetus does not grow up to its genetic potential. We can comment on the growth of a fetus by referring to growth charts.

2 types of growth charts are available -

1. Standard charts- are based on the growth potential of babies if optimum conditions are present. They are independent of race and ethnicity and thus are a more objective means of comparison. Eg. Hadlock, Intergrowth and WHO charts.

2. Reference charts- are further of 2 types

- Live birth reference charts- are based on the live birth weight of babies being born at various gestational ages in a population at that point of time. Disadvantage- babies born earlier are not always normal (Pre-eclampsia, PPROM, malformations). Hence, the 10th centile in this chart is going to be lesser- will miss out on SGA.

- USG EFW reference charts- Use EFW at each GA in a population at a referral centre. The disadvantage in such charts is that the population coming in the OPD is a mixed crowd and not always healthy. A referral bias is present at referral centres where more complicated cases are referred. Hence, the 10th centile might be less again and more chances of missing out on SGA babies.

Thus, small babies are diagnosed using Standard growth charts.

Babies are labelled to be small if their EFW is less than 10th percentile on standard growth charts.

Screening for small babies can be done in the Booking assessment in the first trimester as follows - (RCOG guidelines)

Minor risk factors

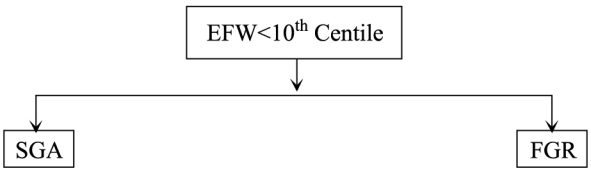
Maternal age ≥35 years
IVF singleton pregnancy
Nulliparity
BMI <20
BMI 25-34.9
Smoker 1-10 cigarettes per day
Low fruit intake pre-pregnancy
Previous pre-eclampsia
Pregnancy interval <6 months
Pregnancy interval ≥60 months

Major risk factors

Maternal age >40 years
Smoker ≥11 cigarettes per day
Paternal SGA
Cocaine
Daily vigorous exercise
Previous SGA baby
Previous stillbirth
Maternal SGA
Chronic hypertension
Diabetes with vascular disease
Renal impairment
Antiphospholipid syndrome
Heavy bleeding similar to menses
PAPP-A <0.4 MOM

1. Small for gestational age (SGA)- Babies are deemed SGA when their estimated fetalweight (EFW) is less than the 10th centile but with normal maternal and fetaldopplers. Their growth velocity also remains constant. Studies have shown that SGAbabies have a similar risk of adverse outcomes as babies with normal growth.

2. FGR- FGR babies have estimated fetal weight (EFW) less than the 10th centile, alongwith doppler abnormalities and/or drop in growth velocity. FGR babies if notmanaged appropriately have poor outcomes. Hence it becomes important todifferentiate between SGA and FGR.



FGR is an important cause of intrauterine fetal demise as well neonatal morbidity and mortality. Maternal, placental, fetal and genetic causes have been found to be causative for the same. It is important to identify these babies antenatally so that appropriate treatment and surveillance can be started and the decision for timely delivery can be made to minimise adverse fetal outcomes.

Etiology of FGR -

1. Fetal Infections- Serological screening for Cytomegalovirus (CMV), Toxoplasmosis, and Rubella can be offered in SGA babies.

2. In case of late onset FGR, placental disease is mild and umbilical artery dopplers are normal. Fetal growth restric tion begins in the third trimester after the placenta is not able to meet the nutritional demands of the fetus.

3. Placental- Maternal medical conditions such as pre-eclam psia, medical renal disease, autoimmune disorders and essential hypertension can affect the placental vasculature and transfer of nutrients and oxygen to the fetus.

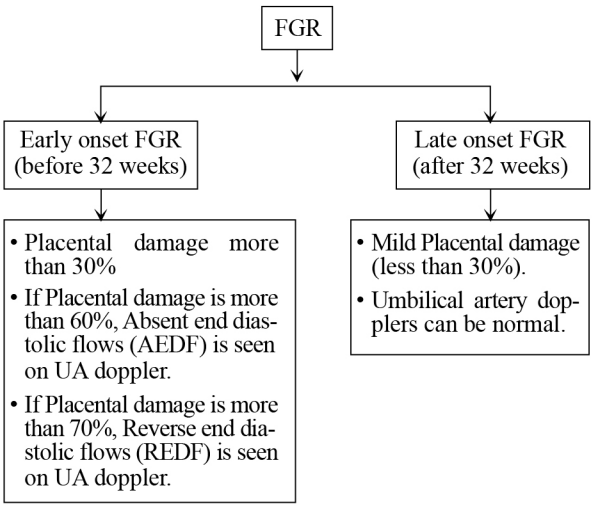
We will discuss the management of placental cause of FGR.

FGR can further be classified into Early and Late onset FGR.

1. In early onset FGR, placental disease is severe from early gestation, hence the fetal growth is restricted early on. In such cases, we will see umbilical artery doppler abnormalities.

2. In case of late onset FGR, placental disease is mild and umbilical artery dopplers are normal. Fetal growth restriction begins in the third trimester after the placenta is not able to meet the nutritional demands of the fetus.

In case of very mild placental disease, EFW may not fall <10th centile (AGA) and therefore can be missed if growth velocity and dopplers are not done and trends not assessed.



Although the diagnosis may be different, but the management of the two are the same.

In the diagnosis of FGR, the following dopplers play a significant role.

1. Umbilical artery (UA)- Umbilical artery provides information about the fetal extraction of oxygen and nutrients from the placenta. UA PI represents the resistance in the placental circulation. It is deranged in severe placental diseases (>30%), and hence is used to diagnose Early FGR. However, it is less useful to diagnose mild placental disease and Late onset FGR.

2. Middle cerebral artery (MCA)- the MCA dopplers are deranged when the fetus becomes hypoxic and there is vasodilation in the brain. MCA derangement occurs at the later gestational age when the fetus brainstem matures. Hence it is useful in later stages of FGR and Late onset FGR.

3. Cerebroplacental ratio- It is the ratio of Pulsatility index (PI) of MCA and PI of the Umbilical artery. CPR has been found to be a sensitive marker to predict fetal hypoxia, and is more sensitive than Umbilical artery or MCA alone.

4. Uterine artery- represents the uteroplacental maternal circulation and is useful for screening. If abnormal, it aids in prediction of fetal growth restriction and pre-ec lampsia in the mother. However, it is not useful for surveil lance of FGR as it does not provide information regarding the fetus.

5. Ductus venosus (DV) - Increase in the placental vasculature resistance leads to increase in the afterload of the fetal heart. As this afterload increase, we can see a deepening and finally reversal of the "a" wave of the DV waveform. This represents chronic hypoxia. DV waveforms can be used to time delivery in preterm SGA babies with abnormal UA dopplers.

Other important parameters used in diagnosis and surveillance of FGR babies-

1. Growth velocity- (Delphi consensus) Fall in growth interval more than two quartiles or 50 percentiles along with abnormal dopplers can also aid in diagnosis of FGR. This parameter is especially useful in AGA babies in whom the EFW>10th centile.

2. cCTG- A reactive CTG can exclude fetal hypoxia. In chronic hypoxia, the there is reduced heart rate variation. cCTG has an upper hand over conventional CTG as there is reduced inter and intra observer variation.

3. BPP- The relationship with BPP and fetal pH is consistent across gestational ages. A score of less than or equal to 4 is associated with fetal pH less than or equal to 7.2, while a score of less than or equal to 2 has a sensitivity of 100% for fetal acidemia. Hence BPP scoring is useful for monitoring and timing of the delivery of baby.

** Update- Angiogenic factors (sFlt1 and PlGF) have the same predictive value of poor outcome as CPR.*

Diagnosis of FGR-

FGR= EFW<3rd centile

OR

EFW<10TH centile +

Any one of the following :

1. AC/EFW crossing centiles > 2 quartiles on growth centiles
2. CPR<p5 or UA pI>95th centile
3. UtA>p95

Integrated Management of IUGR-

Stage	Monitoring	Delivery
I. EFW<3rd centile, CPR<p5, UtPI>p95, UAPI>p95, MCAPI<p5	Weekly	By 37 weeks Labour induction
II. UA AEDF or reverse AoI	Biweekly	34 weeks C.S
III. UA REDF or DV PI>p95	1-2 days	30 weeks C.S
IV. DV reversal a flow	12hrly	26 weeks C.S

SGA- Follow up every 2 weeks and deliver by 39-40 weeks.

There is no consensus and robust data on the optimal monitoring policy or timing of delivery of late onset FGR. A recent publication by Peasley et al in 2023 explored a pragmatic approach in management of late onset FGR. However, they concluded that an RCT is still needed to verify their hypothesis.

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“Fetal Growth Restriction: More Questions than Answers”

Dr. Vidhika Berwal

Fetal growth restriction (FGR) implies failure of a fetus to achieve its growth potential and is both a common obstetric condition and a major cause of perinatal morbidity and mortality(1). However, given the difficulty in determining the growth potential of the individual fetus, FGR is commonly defined as sonographic estimated fetal weight or abdominal circumference below the 10th percentile for gestational age. Approximate incidence of fetal growth restriction is between 5-8% (2).

FGR is a complex and multifactorial disorder affecting the fetal development that often results in multiple perinatal complications which depends consequently on severity of growth restriction and or doppler abnormalities.

Growth restriction not only causes neonatal morbidity, but also poses a great risk for long term morbidity. These children are prone to develop cardiovascular disease, dyslipidemia and poor neurological outcome. This observation was first made in 1989 by Barker and colleagues and confirmed in the last few decades (3).

It has been postulated that cardiovascular remodelling is due to hemodynamic redistribution and adaptation to hypoxia and insufficient nutrition (4).

It is suggested that early and late FGR represent two distinct entities. The optimal gestational age cut-off that differentiates these two phenotypes of FGR is currently unclear and has been arbitrarily set in previous studies at between 32 and 37 weeks (5).

Savchev et al attempted to establish the cut-off using a composite neonatal outcome and a decision tree analysis technique; they identified 32 weeks at the time of diagnosis as the optimal gestational age cut-off (6).

Recently, it has been found that the distinction between early and late FGR is supported by placental pathology and that using placental pathology as a direct measure of the mechanisms underlying FGR, the optimal gestational age at birth cut-off that differentiates early from late FGR is 33 weeks of gestation (7).

Screening and Prediction of FGR

At present, there is no screening approach available combining good sensitivity and specificity with negative or positive predictive value (8).

Similar to the first-trimester risk evaluation in pre-eclampsia, screening for fetal growth restriction can be performed by combining the maternal medical history, Doppler ultrasound of the uterine arteries, mean arterial blood pressure, and the biochemical marker PAPP-A (9).

Even if the detection rate does not match that of pre-eclampsia screening, it can be used to detect some pregnancies with a high risk of FGR which will then be closely monitored. During second trimester, the combination of Doppler ultrasound and angiogenic factors (e.g., sFlt-1/PlGF ratio) appears to improve the FGR prediction, as does the combination of fetal biometry and the angiogenic marker(10).

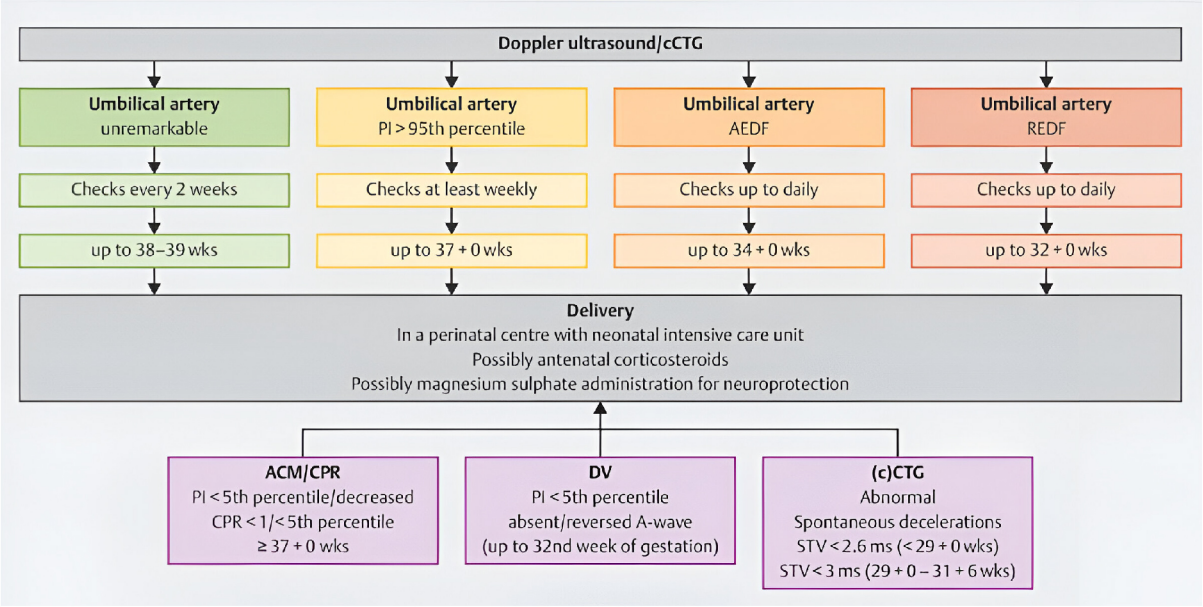
However, further studies are still needed before widespread clinical use.

Unlike in pre-eclampsia, the administration of low-dose aspirin appears to be only moderately successful in the prevention of FGR (although the trial did not have enough statistical power for the prevention of FGR) (11);
This also requires further studies.

Management of FGR

FGR management is a challenge for all involved: Fetal hypoxemia should be diagnosed early to avoid irreversible damage and intrauterine death. On the other hand, in order to minimise the sequelae of prematurity pregnancy should not be terminated too early.

No individual monitoring approach can predict the outcome of FGR in valid fashion. Management of pregnancies with FGR fetuses relies on a combination of different examination techniques, which are summarised in Fig A.



Place of delivery

In order to ensure immediate and continuous care in the FGR setting, delivery should proceed in a perinatal centre with neonatal intensive care unit and an experienced paediatric team.

Timing of Delivery

In addition to gestational age, parity and cervical maturation, various other factors such as the presence of abnormal findings (Doppler, cCTG) and other fetal or maternal specifics or complications must be taken into account when deciding on the type of delivery, and this decision must be made for each patient individually. In cases where vaginal delivery is being attempted, continuous intrapartum monitoring is manadatory.

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Role of Nutrients in FGR

Dr. Neharika Malhotra

Intrauterine Growth Restriction (IUGR)/ Fetal growth restriction (FGR) is a condition in which a fetus doesn't grow at the expected rate inside the womb.

Macronutrients, including carbohydrates, proteins, and fats, play crucial roles in supporting fetal growth and development, even more so in the context of IUGR.

MACRONUTRIENTS:

Carbohydrates: Carbohydrates are the body's primary source of energy. In the context of IUGR, ensuring an adequate intake of carbohydrates is important for providing energy to the fetus to support its growth and development. Complex carbohydrates, such as whole grains, fruits, and vegetables, are preferred as they provide sustained energy without causing rapid spikes in blood sugar levels.

Glucose, the major substrate for fetal growth, is transported across the placenta in proportion to its concentration in the maternal circulation and according to the rate of placental red blood flow.

Gluconeogenesis is virtually absent in the fetus so that the fetus obtains its glucose almost entirely from circulating levels in the mother.

Maternal glucose and other metabolic fuels thus provide the energy for fetal growth and facilitate the passage of nutrients from mother to fetusThe recommended daily allowance for carbohydrate during pregnancy is 175 g/day.

Proteins: Proteins are essential for the growth and development of tissues, including the fetus. Adequate protein intake during pregnancy is crucial for the development of the fetal brain, muscles, and other vital organs. In cases of IUGR, ensuring sufficient protein intake becomes even more critical to support the fetus in reaching its growth potential. Good sources of protein include lean meats, poultry, fish, eggs, dairy products, legumes, and nuts.

The DRI for pregnant woman recommends 1.1g/kg/day of body weight or an additional 25 g/day to meet the needs of pregnancy.
5. Maternal protein deficiency results in IUGR & low birth weight.

Fats: Fats are important for providing energy and essential fatty acids necessary for the development of the fetal nervous system and brain. Additionally, fats play a role in absorbing fat-soluble vitamins, such as vitamin D, which are crucial for fetal development. In cases of IUGR, ensuring a balanced intake of healthy fats, such as those found in nuts, seeds, avocados, and fatty fish, is important for supporting fetal growth and development.

Lipids are essential for the formation of cell membranes and hormones and are necessary for proper eye and brain development, especially during the prenatal period and into the first few years of the child's life.

The RDA for fat is 20% to 30% of total calories.

DHA (Omega 3 fatty acid) deficiency is linked with lower IQ scores in infant and with lower scores of visual acuity, as well as an increased risk of depression in adults and cardiovascular disease.

The revised RDA/DRI recommendation for essential fatty acids is an adequate intake of 13 g/day of omega 6 and 1.4 g/day of omega 3.

MICRONUTRIENTS:

NUTRIENTS	DEFICIENCY
Magnesium	• Low birth weight
Vit A	• Low birth weight and limits growth in fetus
Vitamin B6	• Pre-eclampsia
Vitamin D	• Retardation of the fetal skeleton development
Selenium	• Pre-eclampsia • IUGR
Calcium	• Retardation of the fetal skeleton development • Pregnancy induced hypertension (PIH) • Preeclampsia • IUGR • Decrease in fetal bone mineral content
Iron	• Maternal anemia • IUGR • Low birth weight • Impaired motor and mental development and learning in child
Folic Acid	• Preeclampsia • IUGR
Zinc	• Limits fetal growth

In summary, adequate intake of carbohydrates, proteins, and fats and other micronutrients are essential for supporting fetal growth and development, particularly in cases of intrauterine growth restriction. Pregnant individuals should strive to maintain a balanced diet that includes a variety of nutrient-rich foods to ensure optimal fetal growth and development. However, it's important for individuals with IUGR to work closely with healthcare providers, as they may require specialized dietary recommendations based on their specific circumstances.

Unveiling the Power of Genetic Testing in Early Onset Fetal Growth Restriction

Dr. Manjeet Mehta

INTRODUCTION:

Fetal Growth Restriction (FGR) poses significant challenges during pregnancy, impacting both maternal and fetal health. While traditional diagnostic methods have shed light on this condition, the emergence of genetic testing has revolutionized our understanding and management of early-onset FGR. In this article, we delve into the pivotal role of genetic testing in identifying underlying genetic factors contributing to FGR and its implications for prenatal care and management.

THE ROLE OF GENETIC FACTORS:

While environmental and placental factors play significant roles in the development of FGR, genetic factors also contribute substantially to its etiology. Advances in genetic testing techniques have enabled us to uncover the genetic causes of FGR, offering insights into its pathogenesis.

GENETIC TESTING IN EARLY-ONSET FGR:

Early-onset FGR, occurring before 32 weeks of gestation, often has a more severe presentation and is associated with a higher risk of adverse outcomes. Traditional diagnostic methods, such as ultrasound biometry and Doppler studies, provide valuable information but may not always elucidate the underlying cause of FGR. Genetic testing, including chromosomal microarray analysis (CMA), whole exome sequencing (WES), and targeted gene sequencing, has emerged as a powerful tool in identifying genetic abnormalities contributing to FGR.

CHROMOSOMAL MICROARRAY ANALYSIS (CMA):

CMA allows for the detection of chromosomal imbalances, such as deletions, duplications, and copy number variations (CNVs), with high resolution. In cases of FGR with associated structural anomalies or multiple congenital anomalies, CMA can identify chromosomal abnormalities that may not be apparent on traditional karyotyping. Additionally, CMA can uncover rare genomic disorders associated with FGR, guiding further clinical management and genetic counselling.

WHOLE EXOME SEQUENCING (WES):

WES involves sequencing the protein-coding regions of the genome, known as the exome, to identify genetic variants that may contribute to FGR. This comprehensive approach enables the detection of both common and rare variants in genes associated with fetal growth and development. WES has been instrumental in identifying novel genetic mutations underlying FGR and expanding our understanding of its genetic architecture.

TARGETED GENE SEQUENCING:

Targeted gene sequencing focuses on specific genes or gene panels implicated in FGR or related conditions, such as intrauterine growth restriction (IUGR) syndromes. By analyzing genes involved in placental development, nutrient transport, and fetal growth regulation, targeted sequencing

can pin point pathogenic variants contributing to FGR. This targeted approach facilitates timely diagnosis and personalized management strategies based on the identified genetic abnormalities.

IMPLICATIONS FOR PRENATAL CARE AND MANAGEMENT:

The integration of genetic testing into prenatal care for early-onset FGR has profound implications for patient management. A precise diagnosis informed by genetic testing results allows for tailored counseling regarding recurrence risks, prognosis, and available treatment options. In cases where a genetic cause is identified, prenatal interventions, such as fetal surveillance and targeted therapies, can be implemented to optimize outcomes for both the current pregnancy and future pregnancies.

GENETIC COUNSELING AND FAMILY PLANNING:

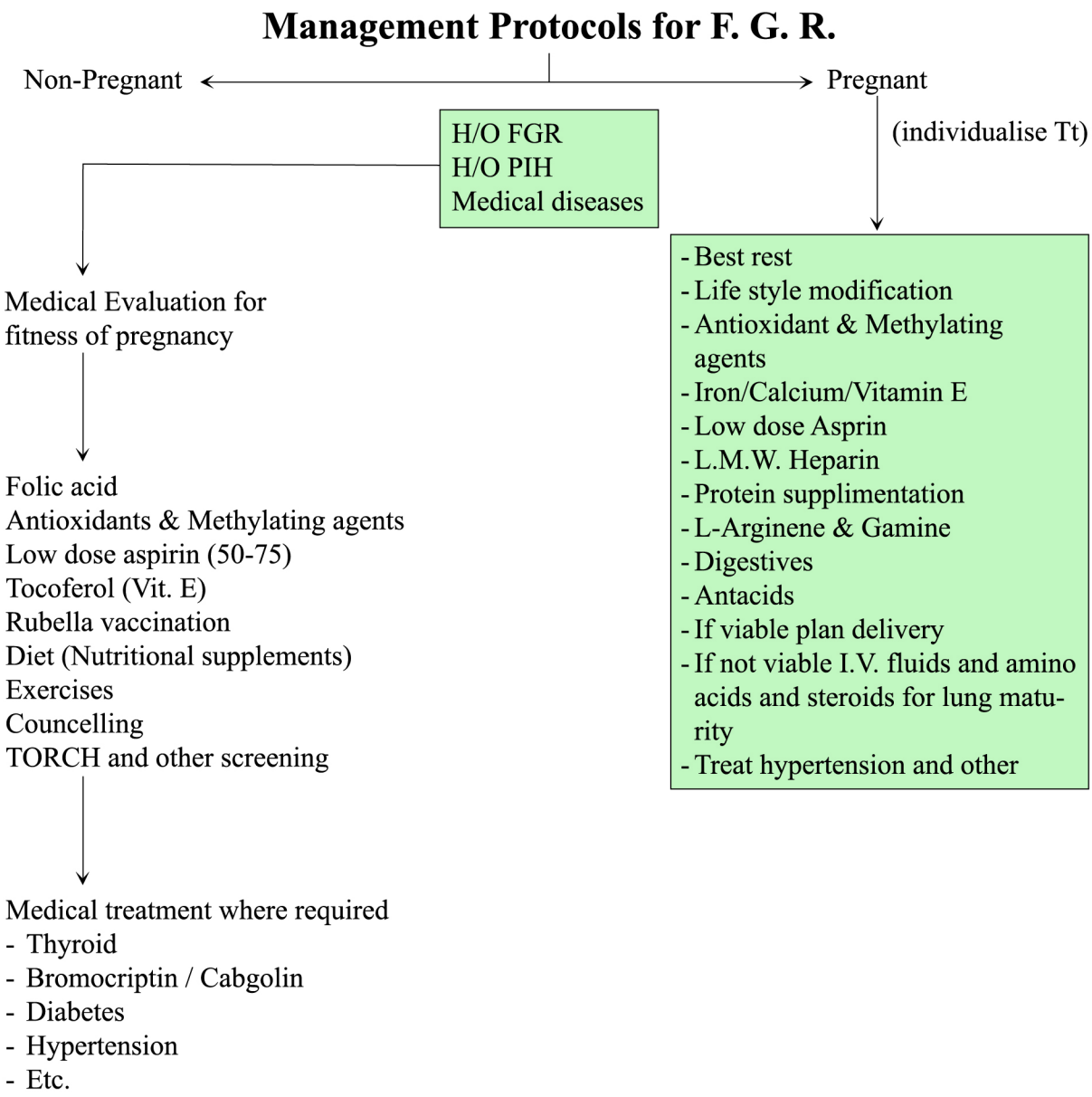
Genetic testing results in early-onset FGR may have implications beyond the current pregnancy, influencing family planning decisions and informing recurrence risks for subsequent pregnancies. Genetic counseling plays a pivotal role in interpreting test results, discussing implications for the family, and facilitating informed decision-making regarding reproductive options, including prenatal testing and preimplantation genetic diagnosis (PGD).

CONCLUSION:

Genetic testing has revolutionized our approach to early-onset FGR, offering unprecedented insights into its genetic underpinnings and guiding personalized management strategies. By unraveling the complex interplay of genetic factors contributing to FGR, genetic testing empowers healthcare providers to deliver targeted interventions and optimize outcomes for both mother and baby. As we continue to advance our understanding of the genetic basis of FGR, genetic testing will undoubtedly play an increasingly prominent role in prenatal care, shaping the future of maternal-fetal medicine.

Algorithm in FGR

Dr. Narendra Malhotra



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Celebrity Kids with FGR

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