NIGF DELHI NEWSLETTER

Issue 1, October 2025

NIGF DELHI 2025 – 2027

NIGF Delhi Secretariat
Room No 11, Manipal Hospital, Dwarka

ORGANISING COMMITTEE NIGF DELHI CHAPTER

PATRON & CHIEF ADVISOR
DR SHARDA JAIN

PRESIDENT
DR LEENA N SREEDHAR

VICE PRESIDENT
DR JYOTSNA SURI

TREASURER
DR SUYESHA KHANIJAO

SECRETARY
DR REKHA BHARTI

JT. SECRETARY
DR PREETI GAUR

JT. SECRETARY
DR DIPIKA LOGANEY

JT. SECRETARY
DR GARGI V SHARMA

JT. SECRETARY
DR RITA BAKSHI

NIGF Delhi Office Bearers 2025-27

President
Dr. Leena N Sreedhar
Vice President
Dr. Jyotsna Suri
Secretary
Dr. Rekha Bharti
Treasurer
Dr. Suyesha Khanijao
Joint Secretaries
Dr. Dipika Loganey
Dr. Gargi Vikas Sharma
Dr. Preeti Gaur
Dr. Rita Bakshi
Advisors to NIGF Delhi
Dr. Achla Batra
Dr. Asmita Rathore
Dr. Harsha Khullar
Dr. Jyoti Bhaskar
Dr. Kishore Rajurkar
Dr. Manju Khimani
Dr. Meenakshi Ahuja
Dr. Neerja Bhatla
Dr. Punita Mahajan
Dr. Sanjivani Khanna
Dr. SPS Kochar
Dr. Surekha Jain
Dr. Susheela Gupta
Executive Members:
Dr. Aayushi Rathore
Dr. Amita Gupta
Dr. Anita Rajhoria
Dr. Anjela Aneja
Dr. Anupma Gupta
Dr. Bandana Sodhi
Dr. Bhavna Anand
Dr. Biplab Mukhopadhyay
Dr. Deepa Gupta
Dr. Divya Singhal
Dr. Geetu Gaba
Dr. Harmeet Khurana
Dr. Ila Gupta
Dr. Kiranjeet Kaur
Dr. Madhulika Sinha
Dr. Neeru Kiran Banerjee
Dr. Neha Khopkar
Dr. Nidhi Khera
Dr. Poonam Jain
Dr. Priti Arora Dhamija
Dr. Seema Sharma
Dr. Shalini Chawla khanna
Dr. Shalu Jain
Dr. Shivani V Sabharwal
Dr. Sonal Bhatia
Dr. Sonal Prasad
Dr. Soni Anand
Dr. Sushma Sinha
Dr. Sweta Balani
Dr. Tejashri Shrotri
Dr. Vandana Gupta
Dr Yogita Parashar
Dr Zeba khanam

NIGF Delhi Newsletter
Volume 1, Quarterly Issue 1,
October 2025

Contents

Publisher/ Editor
Dr Rekha Bharti on behalf of NIGF Delhi

"Each One of Us Can Make a Difference. Together We Make Change"

Barbara Mikulski

VIDEOS CONTRIBUTED BY:

TO WATCH THE VIDEOS, CLICK THE LINK AT THE END OF THE ARTICLES

From the Desk of Chairman, NIGF

"Maa Bharti's Daughters and Sons – Let's Give Back with Purpose"

Every doctor is not just a healer — but a torchbearer of Maa Bharti's dreams.

The NIGF – Delhi Chapter stands today with a clear vision and a renewed mission — to focus on the real, pressing health challenges that continue to confront women across Bharat:

- High **Maternal Mortality Rate (MMR)**
- **Stillbirths** that break hearts silently
- **Neonatal Deaths (NNDR)** that remain preventable
- **Rampant Anemia** in Adolescents and Women
- **Rising Burden of Cervical Cancer**

These are not statistics — they are unfinished duties of our generation.
Each one of us must remember that Maa Bharti has invested nearly ₹4 crores in making us what we are today — qualified gynecologists, empowered to protect her daughters.

Now, it is our turn to give back — through our **knowledge**, our **skill**, our **empathy**, and our **unwavering sense of responsibility**. Let this Bulletin not just be a compilation of articles — let it be a **Manifesto of Commitment**.

Together, let us pledge: **Every woman safe. Every child alive. Every girl strong. Every womb protected.**

We are not mere practitioners of medicine —
we are the **architects of a Viksit Bharat**, where no woman dies giving life,
where every daughter grows free of anemia,
and where cervical cancer becomes history.

Let's rise with pride — as the worthy sons and daughters of Maa Bharti.
And as we move forward, let our guiding motto be **A.C.E.**: A **Appreciate** one another's efforts and achievements, **C – Communicate** openly and constructively, **E – Educate** ourselves and others, continuously and compassionately

Together, with the spirit of **ACE**, let us make NIGF–Delhi a beacon of purposeful service and national pride.

Jai Maa Bharti. Jai Viksit Bharat. 🇮🇳

Dr. Sharda Jain

Patron NIGF

Message from NIGF President

Dear Esteemed Members of NIGF

It gives me immense joy and pride to pen this message for the **first edition of the Quarterly News Bulletin of the Delhi State Body of the New Incredible Gynae Forum (NIGF)**.

As Co-Founder and President of this association, I see this moment not merely as the launch of a publication, but as the beginning of a platform that will connect minds, foster dialogue, and strengthen our collective mission to advance women's health.

I congratulate Dr Leena N Sridhar, President, Delhi State Body of NIGF, for taking the lead in this initiative.

The NIGF was envisioned as a regional body that unites obstetricians and gynecologists across North India with a shared goal: to promote excellence in clinical practice, education, research, and advocacy in women's health.

Over the years, we have witnessed immense progress in our field—from advances in minimally invasive surgery and reproductive endocrinology to transformative approaches in menopause care, oncology, and preventive health. Yet, we also recognize that challenges remain—rising lifestyle disorders, the impact of environmental stressors, gaps in rural health delivery, and the urgent need for patient-centered, evidence-based care.

This bulletin has been created to serve as a **mirror and a voice** for these aspirations. Each edition will highlight key scientific updates, best practices, policy perspectives, and the remarkable work being done by our members. It will be a forum to share experiences from clinics, operating rooms, classrooms, and community initiatives—because every story enriches our collective learning.

I particularly envision this platform to be **inclusive and dynamic**, embracing all aspects of women's health—adolescent care, reproductive health, safe motherhood, gynecologic innovations, urogynecology, menopause management, oncology, and the emerging frontiers of regenerative and preventive medicine. By doing so, we hope to nurture not only professional growth but also advocacy for women's well-being across all ages and backgrounds.

May this quarterly bulletin become a **cornerstone of knowledge and collaboration**, inspiring each of us to strive harder and dream bigger for the women we serve. Together, let us ensure that NIGF continues to be a beacon of academic excellence, ethical practice, and compassionate care.

With best wishes for the success of this inaugural issue and many more to come!

Dr. Ragini Agrawal
Co-Founder & President, NIGF

Message from President NIGF Delhi

Dear friends,

Delhi, being the **Rajdhani**, holds a very special place in the development of our nation, *Bharat*. **Maternal mortality and morbidity** are key indicators of a nation's health, and as Gynaecologists, we play a pivotal role in improving these outcomes. It is therefore only fitting that Delhi leads the way and sets an example for others to follow.

I am deeply **indebted to our Chief Patron, Dr Sharda Jain ma'am** for her constant guidance and to Dr **Ragini Agarwal, President, NIGF**, for reposing faith in me.

As **President of the NIGF Delhi Chapter**, I am truly **delighted and humbled** by the unwavering support of our esteemed **Advisors**, our committed **Core Group**, and the **large body of Executive Members**—all united in working towards our shared motto, **ACE**:

A – Appreciate (each other)

C – Communicate (with each other)

E – Educate (ourselves and others)

It gives me great pleasure to present our **first quarterly** newsletter. This edition features **videos created by our own members**, demonstrating various commonly performed procedures—simple, practical, and to the point. The discussions in each newsletter will revolve around the topics showcased in these videos, fostering shared learning and continuous professional growth.

Together, let us continue to **Appreciate, Communicate, and Educate**, and work towards a healthier future for every mother and child.

"The woods are lovely, dark and deep, but I have promises to keep and miles to go before I sleep" ----------Robert Frost

Dil walo ki dilli ❤

Happy Reading!!

Dr Leena N Sreedhar
President, NIGF Delhi chapter

MANAGEMENT OF PPH- THE BUNDLE APPROACH

Dr. Achla Batra[1], Dr. Akriti Batra[2]
[1]Consultant, Obgyn, Batra Medical Centre, [2]Chief Fertility Consultant Nova IVF, Rohini

Introduction

Postpartum hemorrhage (PPH) remains the leading cause of maternal mortality worldwide, accounting for nearly 25% of maternal deaths. Despite advancements in obstetric care, PPH continues to challenge health systems, especially in low- and middle-income countries (LMICs). Traditional approaches often rely on isolated interventions, which may be delayed or inconsistently applied. Most PPH-related deaths are preventable through timely, quality care.

To address this, World Health Organization (WHO) and global partners proposed a structured bundle for PPH management. The Massachusetts General Hospital Global Health Innovation Lab (MGH GHI) developed the PPH Emergency Care (EmC) bundle, which integrates clinical and systems-based interventions

The Bundle Approach

A bundled approach means relying on "bundles of interventions", where one bundle consists of proven clinical interventions, which are put into a bundle to be used together. Bundles make them easier to remember, and to emphasize that all of them should be done quickly and without hesitation.

Initially there were three bundles– Prevention of PPH, First Response bundle, and Refractory PPH bundle but in Prevention bundle was removed as it was essentially same as Active management of 3rd stage of labor. Unlike general care packages, bundles require full execution and documentation of all components, promoting higher compliance.

First response Bundle

This bundle is a structured set of clinical actions that must be initiated immediately when postpartum hemorrhage is suspected or confirmed. It is the cornerstone of the broader PPH care bundle and aims to **stabilize the patient**, **control bleeding**, and **prevent progression** to shock or death. The first response bundle has been modified to incorporate objective estimation of blood loss. The original bundle proposed by GHI relied just on clinicians' subjective assessment of blood loss.

The acronym was MOTIVE (**M**assage, **O**xytocin, **T**ranexamic acid, **IV** fluids Administration, **E**xamination for identifying and managing the source of bleeding, and **E**scalation to more advanced care, if bleeding persists. Now the bundle is E-MOTIVE, E standing for **estimation** of blood loss.

This bundle is especially vital in **low-resource settings**, where delays in escalation or referral can be fatal. By standardizing the initial response, it empowers nurses, midwives, and doctors to act swiftly and confidently—often before a specialist arrives.

Identification of women who are at risk of adverse outcome by PPH and require initiation of first response bundle has been defined in WHO guidelines as follows –

Objectively measured blood loss of ≥300 ml with any abnormal haemodynamic sign (pulse >100/minute, shock index >1, systolic blood pressure <100mmHg, diastolic blood pressure <60mmHg). Or Objectively measured blood loss >500 ml whichever occurs earlier within first 24 hours with particular vigilance in first 2 hours.

The core actions included in the First Response Bundle, based on WHO guidelines and global best practices are:

1. Call for Help

- Alert senior staff or emergency response team.
- Assign roles: one person leads and others execute tasks (e.g., medication, monitoring, documentation)

2. Assess and Quantify Blood Loss

- Use calibrated drapes or visual estimation
- Record volume and time of onset
- Monitor ongoing loss every 5–10 minutes

3. Administer Uterotonics

- **Oxytocin 10 IU IM/IV** is the first-line drug.
- If oxytocin is unavailable or ineffective, use:
- **Misoprostol 800–1000 mcg rectally**
- **Ergometrine 0.2 mg IM** (if no hypertension)
- **Carboprost 250 mcg IM** (if available)

4. Perform Uterine Massage

- Assess tone of uterus abdominally
- Massage the fundus to stimulate contraction

- Continue for several minutes and reassess tone

5. Administer Tranexamic Acid (TXA)

- **1 gram IV over 10 minutes**, ideally within 3 hours of birth
- Reduces fibrinolysis and stabilizes clot formation

6. Start IV Fluids

- Insert two large-bore IV cannulas
- Begin rapid infusion of **crystalloids (e.g., Ringer's lactate or normal saline)**
- Aim to replace volume and prevent hypovolemic shock

7. Monitor Vital Signs

- Record pulse, blood pressure, respiratory rate, and oxygen saturation every 5–10 minutes
- Watch for signs of shock: cold extremities, rapid pulse, low BP

8. Check for Retained Products or Trauma

- Inspect the placenta and membranes
- Perform gentle vaginal examination for tears or hematomas
- If retained tissue is suspected, prepare for manual removal or refer

9. Apply Bimanual Compression (if needed)

- One hand inside the vagina, one on the abdomen to compress the uterus
- Temporary measure while preparing for further interventions

10. Prepare for Escalation

- If bleeding continues despite above steps:
- Prepare **Uterine Balloon Tamponade (UBT)**
- Apply **Non-pneumatic Anti-Shock Garment (NASG)**
- Arrange **referral or surgical intervention**

Additional context specific interventions

- Oxygen therapy: If saturation <94%, administer via mask
- Blood grouping and cross match: Initiate early, transfusion may be needed
- Antibiotics: If manual removal or invasive procedures are performed

Facility Readiness for First Response Bundle

To implement this bundle effectively, facilities must ensure:

- PPH kits are stocked and accessible in labor rooms
- Staff training includes simulation drills every 3–6 months
- Clear protocols are displayed in delivery areas
- Role cards or lanyards for emergency teams
- Transport and referral systems are functional and responsive

Documentation Checklist

A simple checklist should be used to ensure completion and timing of each step:

Action	Time Done	Staff Initials
Help Called		
Blood Loss Measured		
Uterotonics Given		
Uterine Massage		
TXA Administered		
IV Fluids Started		
Vital Signs Monitored		
Trauma/Tissue Checked		
Bimanual Compression		
Referral Prepared		

Benefits of the First Response Bundle

- Reduces delays in initiating treatment
- Improves survival by stabilizing patients early
- Empowers midwives and nurses to act decisively
- Standardizes care across facilities and regions
- Builds confidence through training and repetition

This bundle is approved for treatment of atonic PPH at all levels of healthcare facilities to be instituted by skilled birth attendant who is adequately equipped and trained.

Refractory Postpartum Hemorrhage Bundle

Refractory postpartum hemorrhage refers to bleeding that continues despite the use of first-line interventions such as uterotonics, uterine massage, tranexamic acid, and IV

fluids. It typically involves blood loss exceeding 1000 mL and may be due to uterine atony, retained placenta, genital tract trauma, or coagulopathy. Refractory PPH is a medical emergency requiring rapid escalation to more invasive and specialized interventions. It complements the First Response Bundle and is part of the WHO-endorsed stepwise approach to PPH management.

Components of the Refractory PPH Bundle

1. **Clinical Interventions**

Uterine Balloon Tamponade (UBT)

A sterile balloon (e.g., Bakri balloon or improvised condom catheter) is inserted into the uterus and inflated to apply pressure and stop bleeding. It is effective for uterine atony and retained products.

Non-pneumatic Anti-Shock Garment (NASG)

It is a reusable garment that compresses the lower body to stabilize circulation and reduce blood loss. Used during transport or while preparing for surgery.

Studies show that timely use of UBT and NASG can reduce maternal mortality by up to 50% in low-resource. In level II and level III settings, if woman is still bleeding, she can be taken for surgical compression sutures followed by internal artery ligation or peripartum hysterectomy if required.

2. **System-Level Actions**

Facility Readiness

- Surgical team on call 24/7
- Blood bank access or emergency donor mobilization
- Sterile operating theatre availability
- Transport protocols for referral to higher-level care

Team Coordination

- Clear escalation criteria (e.g., bleeding >1000 mL, shock signs)
- Role clarity among obstetricians, anesthetists, nurses
- Rapid decision-making and documentation

Training

- Simulation drills should include balloon insertion, NASG application, and mock laparotomy
- Visual aids like posters and videos to reinforce techniques
- Mentorship programs to build surgical confidence in district hospitals

These recommendations are basically for vaginal delivery. The individual interventions should be used for caesarean section as applicable. The interventions should ideally be

initiated within 15 minutes of diagnosis of PPH. Where a woman continues to bleed after receiving all interventions within the PPH treatment bundle, there should be a prompt referral to a higher-level healthcare facility or a senior clinical provider capable of providing further management.

In Uttar Pradesh, the PPH Emergency Care (EmC) bundle was piloted by King George's Medical University (KGMU) with support from FOGSI and Uttar Pradesh Technical Support Unit (UPTSU). The initiative, backed by the Bill & Melinda Gates Foundation and FIGO, demonstrated improved emergency response and maternal survival rates.

In Madhya Pradesh, the AMPLI-PPHI initiative led by JHPIEGO and ACCESS Health in Vidisha district focused on reducing PPH through institutional deliveries and timely administration of misoprostol. The program emphasized community engagement and provider training to strengthen maternal health systems.

Conclusion

The bundle approach for postpartum hemorrhage (PPH) is a transformative strategy that integrates evidence-based clinical interventions with systemic improvements to reduce maternal mortality and morbidity. Bundles make sure no important step is missed, helps health workers follow WHO guidelines more easily. Doing all steps together improves teamwork, speed, and results.

Suggested Reading

1. Save Mothers. PPH Emergency Care using a bundle approach (PPH EmC) [Internet]. Massachusetts General Hospital Global Health Innovation Lab; 2021 Available from: https://savemothers.org/pph-emergency-care-using-a-bundle-approach-pph-emc/
2. World Health Organization. WHO recommendations on the assessment of postpartum blood loss and use of a treatment bundle for postpartum haemorrhage [Internet]. Geneva: World Health Organization; 2023 Dec 21 Available from: https://www.who.int/publications/i/item/9789240085398
3. Save Mothers. Training frontline staff in India: Postpartum Hemorrhage Emergency Care using a bundle approach (PPH EmC) [Internet]. 2021 Oct 25 [cited 2025 Oct 4]. Available from: https://savemothers.org/2021/10/25/training-frontline-staff-in-india-postpartum-hemorrhage-emergency-care-using-a-bundle-approach-pph-emc/
4. ACCESS Health International. ACCESS Health joins AMPLI-PPHI initiative to enhance maternal health in India [Internet]. 2023 Jul 6 [cited 2025 Oct 4]. Available from: https://accessh.org/access-health-joins-ampli-pphi-initiative-to-enhance-maternal-health-in-india/

Video Link for Intraoperative Bakri Balloon Insertion during Caesarean Section

Dr Leena N Sreedhar

Chairman & HOD OBSGYN Manipal Hospitals Delhi

CERVICAL CANCER SCREENING: A PRACTICAL GUIDE FOR GYNAECOLOGISTS

Dr. Dipika Loganey, MD, FICOG, FICMCH
Senior Consultant, Obstetrics & Gynaecology

Introduction

Cervical cancer is caused almost entirely by persistent infection with high-risk human papillomavirus (HPV), particularly types 16 and 18. The natural history of disease progression from HPV infection to cervical intraepithelial neoplasia (CIN) and then to invasive carcinoma usually takes 10–15 years, creating a long window for early detection and intervention. Organized cervical cancer screening programs reduce incidence and mortality by 70–80%. The World Health Organization (WHO) has set a global elimination target known as 90–70–90: 90% of girls fully vaccinated by age 15, 70% of women screened at least twice (at 35 and 45 years), and 90% of women with precancer or cancer appropriately treated, to be achieved by 2030.

Screening Methods available

- **Cytology (Pap smear)** has relatively lower sensitivity (~50–60%). It requires repetition every 3 years.
- **Liquid-based cytology (LBC)** improves adequacy and allows reflex HPV testing. It is more accurate but costlier than conventional Pap smear.
- **HPV DNA testing** is the most sensitive method. Self-sampling is possible. If negative, repeat screening every 5 years.
- **Co-testing (HPV and cytology)** is more sensitive but resource-intensive. If both tests are negative, recall in 5 years.
- **VIA and VILI** provide immediate results and are suitable for outreach programs. A screen-and-treat approach is feasible.
- **Colposcopy** is a diagnostic tool, not a primary screening method. It is used for follow-up of abnormal results.
- **Self-sampling strategies** improve coverage and are increasingly validated in studies.

Indian Guidelines (FOGSI GCPR 2024 & Government of India), Table 1

Screening should start at 25 years in good-resource settings and at 30 years in universal or public programs.

Screening should stop at 65 years if the woman has adequate prior negative results (defined as three negative cytology results or two negative HPV results within the last 10 years, with the most recent within 5 years).

Screening is not required for women who have undergone hysterectomy for benign disease and have no history of CIN 2 or higher.

HPV DNA testing is the preferred method. If negative, screening should be repeated every 5 years, and in organized programs the interval may be extended up to 10 years.
Cytology should be performed every 3 years, while co-testing with cytology and HPV should be performed every 5 years.
Visual inspection using acetic acid (VIA) or visual inspection using lugol's iodine (VILI) should be repeated every 3–5 years in low-resource settings, with a minimum of twice in a lifetime (at 35 and 45 years).
Special groups such as women living with HIV should start screening at 25 years and be screened more frequently. Women with a history of CIN 2+ or who are immunocompromised require closer surveillance.

VIA in Low-Resource Settings: Role of Screen-and-Treat

- VIA is low-cost, simple test, and allows a single-visit decision.
- A screen-and-treat approach is recommended, where eligible women who test positive with VIA can be treated on the same day.
- Eligibility for ablative treatment includes: the transformation zone is fully visible, the lesion is small and ectocervical, and there is no suspicion of invasive cancer.
- Women who are not eligible include those who are pregnant, those with large or endocervical lesions, or if invasive cancer is suspected. These women should be referred for colposcopy.
- Government programs in India train ANMs and ASHAs to implement VIA, reducing loss to follow-up in outreach settings.

Table 1: Cervical Cancer Screening Recommendations in India (FOGSI GCPR 2024 and GOI)

Test Method	Interval	Notes
HPV DNA (preferred)	Every 5 years (up to 10 in organized programs)	Most sensitive; allows self-sampling; reflex cytology possible
Cytology (Pap smear / LBC)	Every 3 years	LBC improves adequacy and permits reflex HPV testing; Pap is cheaper but less sensitive
Co-testing (HPV + cytology)	Every 5 years	Increased sensitivity but more resource-intensive
VIA / VILI	Every 3–5 years	Suitable for low-resource programs; immediate results
Minimum (low-resource settings)	Twice in lifetime (at 35 & 45 years)	Endorsed by GOI & WHO as pragmatic baseline

International Guideline Perspective

The WHO recommends screening beginning at 30 years (25 years for WLHIV) using HPV DNA as the preferred test, repeated every 5–10 years.

The United States (USPSTF/ACOG) recommends starting at 21 years with cytology every 3 years. For women aged 30–65, options include cytology every 3 years, HPV every 5 years, or co-testing every 5 years. Screening can stop at 65 years if prior results are adequate.

The UK (NHS) starts screening at 25 years, uses HPV primary testing every 5 years, and stops at 64 years.

Key differences: India continues to allow VIA and cytology due to resource realities, while high-income countries have shifted to HPV primary testing.

Possible Screening Reports (Table 2)

Cytology (Bethesda system): NILM means negative; abnormal includes ASC-US, LSIL, HSIL, and AGC.

HPV DNA: Negative indicates no high-risk HPV detected. Positive indicates HPV16/18 (direct colposcopy) or other high-risk HPV (triage with cytology/VIA).

VIA or VILI: Negative if no acetowhite or iodine-negative areas are seen. Positive if acetowhite lesion or iodine-negative area is present.

Table 2: Summary of Screening Reports

Test	Negative Result	Abnormal / Positive Result
Cytology (Pap / LBC)	NILM	ASC-US, LSIL, HSIL, AGC, carcinoma cells
HPV DNA	No high-risk HPV detected	HPV16/18 positive → colposcopy; Other hrHPV positive → triage
VIA / VILI	No acetowhite lesion	VIA+/VILI+ lesion → treat if eligible or refer

Next Steps after Abnormal Screening (Table 3)

- For ASC-US: Perform reflex HPV testing from the same sample. If HPV is positive, refer for colposcopy. If HPV is negative, return to routine recall.
- For LSIL: Refer directly for colposcopy.
- For HSIL: Immediate colposcopy and biopsy are required, with excision often indicated.

- For AGC: Perform urgent colposcopy and endometrial evaluation in women older than 35 years.
- For HPV16/18 positive: Refer directly to colposcopy.
- For other high-risk HPV positive: Perform triage with cytology or VIA. If triage is negative, repeat in 12 months. If positive, refer for colposcopy.
- For VIA positive and eligible: Provide same-day ablative treatment (cryotherapy or thermal ablation).
- For VIA positive and not eligible: Refer for colposcopy and biopsy.

Table 3: Management of Abnormal Screening Results (Next Steps)

Result	Recommended Next Step
ASC-US	Reflex HPV test; if HPV+ → colposcopy; if HPV– → recall
LSIL	Colposcopy
HSIL	Colposcopy & biopsy; excision if indicated
AGC	Colposcopy + endometrial evaluation
HPV16/18+	Colposcopy
Other hrHPV+	Triage; negative → repeat in 12m; positive → colposcopy
VIA+ eligible	Same-day ablation
VIA+ not eligible	Refer for colposcopy/biopsy

Whom Not to Screen & Special Groups

Do not screen women younger than 21 years, women who have undergone hysterectomy for benign disease without prior CIN2+, or women older than 65 years with adequate prior negative results.

Women living with HIV should start screening at 25 years and repeat every 3 years.

Other immunocompromised women require closer surveillance.

Women with a history of CIN2+ or cervical cancer need prolonged surveillance, often annually, for at least 10 years post-treatment.

Conclusion

Cervical cancer is preventable with vaccination, regular screening, and timely treatment.

HPV DNA testing is the preferred method. Pap cytology every 3 years is acceptable where HPV is not feasible, and VIA screen-and-treat is vital in low-resource settings.

Busy gynecologists can remember: HPV negative → recall 5 years; Pap negative → recall 3 years; HPV16/18 positive → colposcopy; VIA positive and eligible → same-day treatment.

It is equally important to know whom not to screen to avoid unnecessary interventions.

India must transition from opportunistic to organized programs to meet the WHO 90–70–90 targets for cervical cancer elimination.

Suggested Reading

1. Arbyn M, Weiderpass E, Bruni L, et al. Estimates of incidence and mortality of cervical cancer in 2018: Lancet Glob Health. 2020;8(2):e191–203.
2. de Sanjosé S, Quint WG, Alemany L, et al. HPV genotype attribution in invasive cervical cancer: Lancet Oncol. 2010;11(11):1048–56.
3. Vaccarella S, Laversanne M, Ferlay J, Bray F. Cervical cancer in Africa/Asia: Int J Cancer. 2017;141(10):1997–2001.
4. WHO. Global strategy to accelerate elimination of cervical cancer. Geneva: WHO; 2020.
5. FOGSI GCPR. Cervical Cancer Screening. Mumbai: FOGSI; 2024.
6. Govt of India. Operational Framework for Management of Common Cancers. MOHFW; 2021.
7. WHO. Screening and treatment of cervical pre-cancer lesions. Geneva: WHO; 2021 (updated 2023).
8. Arbyn M, Smith SB, Temin S, et al. HPV testing on self-samples: BMJ. 2018;363:k4823.
9. Sankaranarayanan R, Nessa A, Esmy PO, Dangou JM. VIA methods: Best Pract Res Clin Obstet Gynaecol. 2012;26(2):221–32.
10. WHO. Self-care interventions: cervical screening. Geneva: WHO; 2021.
11. USPSTF. Screening for Cervical Cancer: JAMA. 2018;320(7):674–86.
12. NHS Cervical Screening Programme. Public Health England; 2021.
13. Solomon D, Davey D, Kurman R, et al. The 2001 Bethesda System. JAMA. 2002;287(16):2114–9.
14. Massad LS, Einstein MH, Huh WK, et al. 2019 ASCCP Risk-Based Guidelines. J Low Genit Tract Dis. 2020;24(2):102–31.
15. Saslow D, Solomon D, Lawson HW, et al. ACS/ASCCP/ASCP guidelines. CA Cancer J Clin. 2012;62(3):147–72.

Video link for demonstration of VIA &
Video link for demonstration of VILI

Dr Divya Singhal
Chairperson Breast Cancer Awareness Mission, NIGF,
National Coordinator, Breast Committee, FOGSI

Cardiotocography Interpretation & Appropriate Response

Dr Rinku Sen Gupta Dhar
Senior Consultant & Chief Holy Family Hospital

Introduction

CTG is the most widely used objective screening tool to prevent adverse fetal outcomes in both antenatal and intrapartum period. CTGs have a high degree of sensitivity but a low level of specificity which means that they are very good at telling us which fetuses are well but are poor at identifying which fetuses are unwell. The "not normal" CTGs have a high false positive rate almost to the extent of 60%. This can lead to unnecessary operative interventions.

For simplicity of understanding we can divide CTG interpretation into

Anatomy: In this section we need to understand the standard definitions and for how long these morphological features must continue for us to differentiate between normal, not normal & abnormal

Physiology: In this section the anatomy of a CTG strip has to be correlated with normal fetal physiology and the physiological adaptive changes in labor which can make a CTG look" not normal " but we still will not need to intervene. During labour, the fetal circulation system changes because of placental insufficiency during contractions and fetal vagal nerve activation with a decrease in the oxygen concentration of the blood [Therefore, the decrease of baseline FHR with a decrease in the activity of the fetal central nervous system reflects a physiological response to labour progression

Pathophysiology In this last section we need to understand common pathological conditions in labour which can alter the maternal fetal physiology thereby causing morphological CTG changes which actually need rapid response

Anatomy of a CTG (Standard Definitions)

Baseline heart rate: The mean fetal heart rate rounded to increments of five beats per minute during a ten-minute segment, excluding accelerations, deceleration and periods of marked FHR variability. The baseline must be for a minimum of 2 minutes in a ten-minute segment. Otherwise, the baseline for that segment is described as ***indeterminate*.** In tracings with unstable FHR signals, review of previous segments and evaluation of longer time periods may be necessary to determine the baseline. Baseline FHR is considered the lifeline of CTG as all other features of CTG can only be interpreted if Baseline is determinable. Although, a value between 110 to 160 beats per minute is considered normal, each fetus will have its own individual normal depending on maturity, behavioural state & activity. Baseline shifts can happen physiologically.

Tachycardia: a baseline value above 160 bpm lasting more than 10 minutes.
Bradycardia: a drop in the baseline FHR below 110 bpm lasting more than 10 minutes.

Variability: Long term variability (LTV) refers to the oscillation in the FHR signal, evaluated as the average bandwidth amplitude of the signal in 1-minute segments; the fluctuations should be irregular in amplitude and frequency. Variability is documented in beats per minute.

Normal Variability: bandwidth amplitude of 5−25 bpm.

Reduced Variability: a bandwidth amplitude below 5 bpm for more than 50 minutes
Increased Variability (Saltatory Pattern): a bandwidth value exceeding 25 bpm lasting more than 30 minutes.

Short Term Variability (STV): The computerised CTG developed by Dawes and Redman enables measuring the short-term-variation (STV) of the FHR, which cannot be assessed by the naked eye. Short-term FHR variation (STV): sequential epoch-to-epoch variation measured in milliseconds (ms). It is known that reduced STV in antepartum traces is an ominous sign and this can be utilised as an adjunct test to Doppler changes on ultrasound in growth restricted preterm fetuses.

Accelerations: Abrupt (onset to peak in less than 30 seconds) increases in FHR above the baseline, of more than 15 bpm in amplitude, and lasting more than 15 seconds but less than 10 minutes.

Decelerations: Decreases in the FHR below the baseline, of more than 15 bpm in amplitude, and lasting more than 15 seconds Based on the morphological appearances, decelerations should be classified as below, predominantly to determine the likely underlying pathophysiology.

Quicklies" or Variable decelerations: characterised by a sudden and an abrupt drop from the baseline, usually reaching the nadir within 30 seconds, with a rapid recovery to the baseline. These are believed to be due to transient hypoxemia of labour and / or due to umbilical cord compression. They are usually not associated with significant hypoxia in fetus.

Tardies" or late decelerations: they are characterised by a gradual drop to the nadir, followed by a slow recovery to the normal baseline and they are believed to be secondary to ongoing utero-placental insufficiency. However many decelerations may not clearly belong to either of the two categories and it is important to see decelerations of any type in the context of the entire clinical dynamic labour process. Therefore, whenever repetitive fetal heart rate decelerations are observed on the CTG trace, the intervening baseline should be scrutinised to confirm it stability and the presence of reassuring variability.

Physiology underlying every CTG strips

Fetal behavioural states are normal physiological states but when the fetus undergoes some of these states the CTG may not show a clearly normal pattern with stable baseline with normal variability and accelerations. Therefore, understanding this will make you avoid unnecessary interventions. This refers to periods of-

Fetal quiescence reflecting deep sleep (no eye movements): Deep sleep can last up to 50 minutes and is associated with a stable baseline, very rare accelerations, and borderline variability.

Active sleep (rapid eye movements): This is the most frequent behavioural state and is represented by a moderate number of accelerations and normal variability.

Wakefulness: Active wakefulness is rarer and represented by a large number of accelerations and normal variability. In this pattern, accelerations may be so frequent as to cause difficulties in baseline estimation (confluence of accelerations), and may give a false impression of a persistently elevated baseline which may persist for up to 20-30 minutes.

FHR Cycling: The alternation of different behavioural states (fetal heart rate **cycling**) is a hallmark of fetal neurological responsiveness and absence of hypoxia/acidosis. Transitions between the different patterns become clearer after 32−34 weeks of gestation, consequent to fetal nervous system maturation.

Pathophysiology underlying CTG strips

Intrapartum Hypoxia leads to fetal adaptive response in the form of decelerations However if the fetus is not able to compensate due to prolonged and repetitive insult it will show decompensatory changes on CTG and this will lead to irreversible hypoxia and metabolic acidosis with possible hypoxic ischemic encephalopathy in baby.

Hypoxic Pathway can be acute, subacute or chronic.

Acute Hypoxia: Presents as a prolonged deceleration lasting for more than 3 minutes.

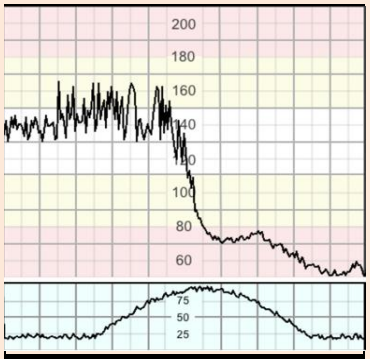
Causes

Intrapartum Accidents (Irreversible)

- Umbilical Cord prolapse
- Placental Abruption
- Uterine Rupture

Iatrogenic causes (reversible)

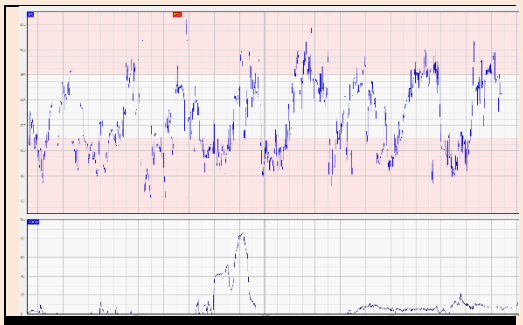
- Maternal Hypotension
- Uterine hyperstimulation or hypertonus (by oxytocin / PGs)



Acute Hypoxia

Subacute Hypoxia

Characterised by reduced time spent at the normal baseline (usually <30 seconds) compared to the longer time spent during decelerations (usually >90 seconds). It is usually associated with the ZigZag pattern caused by uterine hyperstimulation or excessive maternal pushing during second stage of labour.


Subacute Hypoxia

Gradually Evolving Hypoxia

This is the most common type of fetal hypoxic stress during labour

During this process, the fetus undergoes the same changes that a normal adult would be expected to show during exercise ("ABCDE").

This tends to present with the following order:

1. Evidence of hypoxic stress (decelerations)
2. Loss of accelerations **(A)**
3. Exaggerated response to hypoxic stress (decelerations become wider and deeper)
4. Attempted increase in the baseline FHR **(B)** to increase the cardiac output
5. Compensated stress response (**C)-** increased baseline which is stable with reassuring variability.
6. Reduced baseline FHR variability and/ or an unstable "wavy" baseline due to decompensation **(D).**
7. End stage **(E)** due to Terminal heart failure (unstable/ progressive decline in the baseline - "step ladder pattern to death")

Fetuses with loss of compensatory mechanisms may present with repetitive shallow decelerations associated with loss of accelerations, loss of cycling and reduced baseline variability

Chronic Hypoxia /Antenatal Hypoxia

- Presents as a baseline rate at the upper end of normal associated with reduced baseline FHR variability and/ or cycling, blunted cardioprotective reflex responses (shallow decelerations). In addition, suppression of the somatic nervous system activity to reduce oxygen demand results in absence of accelerations.
- This represents a fetus with reduced reserve and increased susceptibility to hypoxic injury during labour. Therefore, clinical presentation may include a history of reduced fetal movements and thick meconium staining of amniotic fluid.
- The following CTG strips (Figure 1) belong to a low risk booked mother at 39 weeks who presented with reduced fetal movements over a period of approximately 3 hours the fetus did not show cyclicity and a diagnosis of chronic Hypoxia was made. The fetus was diagnosed as unfit for labour and an emergency CS was done. Baby had meconium aspiration syndrome and needed assisted ventilation for 2 weeks.

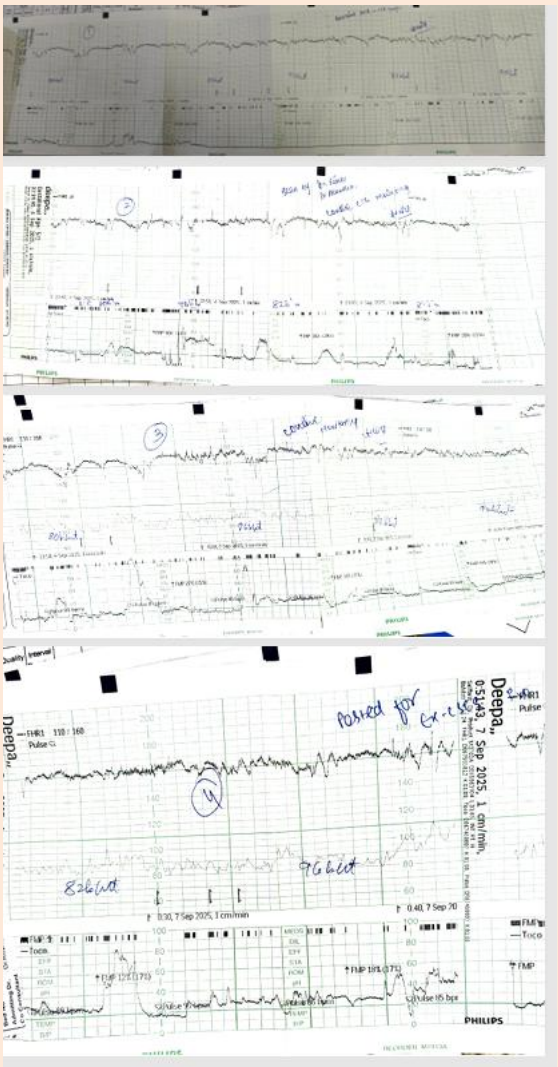


Figure 1: CTG of low risk woman in labour

Common Introspective Questions that need to be addressed in "not Normal CTGs"

Factors associated with cord compression or reduced placental perfusion	Inadequate quality CTG	Uterine Hyperstimulation	Maternal tachycardia Maternal pyrexia	Pharmacological influences
CLINICAL QUESTIONS What is the woman's position? Is the woman hypotensive? Has the woman just had a vaginal examination? Has the woman just used a bedpan? Has the woman been vomiting? Has the woman had a vasovagal episode? Has the woman just had an epidural sited or topped up? Have the membranes just ruptured?	CLINICAL QUESTIONS Poor contact from external transducer? Fetal scalp electrode (FSE) not working or detached?	CLINICAL QUESTIONS Is the woman receiving oxytocin? Has the woman recently received vaginal prostaglandins?	CLINICAL QUESTIONS Maternal infection? Maternal dehydration? Obstructed labour?	CLINICAL QUESTIONS Has the woman just had an opioid? Has the woman just had an epidural sited or topped up? Is the woman chemically dependent? Has the woman received drugs known to suppress her or the fetal CNS (e.g Magnesium Sulphate)?
Change maternal position Check the blood pressure Give a 500mL bolus crystalloid if hypotensive (maximum 1L) Consider vaginal examination to exclude cord prolapse	Check maternal pulse Reposition ultrasound transducer Apply or reapply FSE	Stop or reduce the oxytocin infusion Consider tocolysis Refer to procedure 'Uterine Hyperstimulation' for guidance on oxytocin titration Tocolysis: Terbutaline 250micrograms subcutaneous or IV if access available)	If temperature is greater than or equal to 38 degrees undertake investigation and treatment Check blood pressure, give 500mL crystalloid if dehydrated (max 1L)	

Conclusion

Understanding normal fetal physiological responses to pregnancy and labour and the manifestation of these changes on the CTG is the first step to appropriate interpretation of CTG. Pathological events in labour affect both maternal and fetal clinical parameters and thus correlation of CTG with awareness of the entire clinical picture is crucial for optimum perinatal outcomes.

Suggested Reading

1. Adalina Sacco, Javaid Muglu, Ramesan Navaratnarajah, Matthew Hogg. ST analysis for intrapartum fetal monitoring. The Obstetrician & Gynaecologist 2015; 17:5–12.
2. Afors K, Chandraharan E. Use of continuous electronic fetal monitoring in a preterm fetus: clinical dilemmas and recommendations for practice. J Pregnancy. 2011; 2011:848794.
3. Albertson A, Amer-Wåhlin I, Lowe V, Archer A, Chandraharan E. Incidence of subacute hypoxia during active maternal pushing during labour. RCOG World Congress 2016.
4. Amer-Wahlin I, Arulkumaran S, Hagberg H, Marsál K, Visser GH. Fetal electrocardiogram: ST waveform analysis in intrapartum surveillance. BJOG 2007;114(10): 1191–3.
5. Arulkumaran S, Penna LK, Bhasar Rao K [Eds] (2004) The Management of Labour Orient Longman P 95-96.
6. Ayres-de-Campos D, Spong CY, Chandraharan E, 'FIGO consensus guidelines on intrapartum fetal monitoring: Cardiotocography', FIGO (2015).
7. Bhide A, Chandraharan E, Acharya G. Fetal monitoring in labor: Implications of evidence generated by new systematic review. Acta Obstet Gynecol Scand. 2016 Jan;95(1):5-8.
8. Blix E, Brurberg KG, Reierth E, Reinar LM, Øian P. ST waveform analysis versus cardiotocography alone for intrapartum fetal monitoring: a systematic review and meta-analysis of randomized trials. Acta 2016;95(1):16-27.
9. Chandraharan et al International expert consensus statement on Physiological Interpretation of CTG Eur J of Obs & Gynae Reprod Biol Volume 302, November 2024, Pages 346-355.

Video link for Interpretation of Abnormal Cardiotocograph

Dr Madhulika Sinha
Head Obstetrics & Gynaecology
Aakash Hospital, Dwarka, Delhi

PRENATAL SCREENING FOR ANEUPLOIDY IN FIRST TRIMESTER

Dr. Sumitra Bachani
Professor & Consultant, Fetal Medicine and Genetic Clinic. Department of Obstetrics and Gynecology, VMMC and Safdarjung Hospital, New Delhi

Introduction

The human cells contain 22 pairs of autosomes and a pair of sex chromosomes (gonosomes). Aneuploidy can be due to an extra chromosome (trisomy) or a missing chromosome (monosomy). This results in loss or gain of hundreds of functional genes resulting in adverse outcomes of life such as early pregnancy loss, structural abnormality, intellectual disability, failure to thrive or shorter life span.

Incidence of Chromosomal Abnormality

The prevalence is higher if early pregnancy losses are taken into consideration. Overall incidence of chromosomal abnormality is 1 in 150 live births. The most common aneuploidy is Trisomy 21 (Down's syndrome) followed by Trisomy 18 (Edward syndrome) and Trisomy 13 (Patau syndrome). Amongst gonosomes, most common aneuploidy is Klinefelter syndrome (47, XXY). All of these are related to maternal age, except Monosomy X (Turner Syndrome) which is the only viable monosomy (Table 1).

Table 1: Incidence of chromosomal abnormality in second trimester of pregnancy based on maternal age at term

Age (years)	Trisomy 21	Trisomy 18	Trisomy 13	Sex chromosome aneuploidy
20	1 in 1250	1 in 5000	1 in 10000	1 in 294
25	1 in 1000	1 in 5000	1 in 10000	1 in 294
30	1 in 714	1 in 2500	1 in 5000	1 in 294
35	1 in 294	1 in 1111	1 in 2500	1 in 285
40	1 in 86	1 in 333	1 in 714	1 in 196

All pregnant women have a risk of conceiving a fetus with aneuploidy which is known as the background risk or a priori risk (PR) related to the age. Fortunately, with advances of biochemical markers and ultrasound parameters the background risk can be modified to a final risk indicating if further confirmatory test is required. The screening and detection of aneuploidy in first trimester itself has the advantage for couples to opt for early termination, avoid the medical complications and the psychological impact.

Screening

A screening test is applied to a defined population for identifying individual at risk for a specific disease/condition by simple, rapid, easily available and acceptable method. It is preferable that the test has a high detection rate (DR), correctly identifying individuals who are positive for the disease and a low false positive rate (FPR), identified as high risk for the disease but not diseased to diagnose the high risk population accurately and avoid unnecessary burden of performing a confirmatory test.

Whom to screen: American College of Obstetrics and Gynecology (ACOG) guideline recommends that screening for aneuploidy should be offered to all women.1 Women can accept or decline the test after the pretest counselling.

Pre requisite of screening: Pretest counselling is mandatory before offering the test. Informed non directive counselling should be done explaining the available test options, cost, turnaround time of the test, its benefit, detection rate and false positive rate of the offered test and its implications, availability of post-test counselling and available confirmatory/diagnostic tests if the screen is positive. Cafeteria approach should be practiced while offering screening tests but once the couple has consented a single screening test should be performed and not multiple.

Available screening tests

Single time point screening approaches: They are offered in either first trimester or second trimester. The first trimester screening tests include serum analytes (β-hCG, PAPP-A), ultrasound parameters [Nuchal translucency (NT), Nasal bone (NB), ductus venosus (DV) flow, Tricuspid regurgitation (TR)] and cell free fetal deoxyribonucleic acid (cff DNA). In the second trimester, serum analytes (AFP, Estradiol, Free β-hCG, Inhibin A), ultrasound parameters (soft markers) or Cell Free fetal cff DNA can be offered.

Biochemical screening

Specific serum analyses are measured as standardized mass units which are converted to gestation specific Multiples of Median (MoM). The individual values are compared with the population-based values.

First trimester analytes: It includes free human chorionic gonadotropin (β-hCG) and pregnancy associated plasma protein A (PAPP-A). The test is commonly called the “Dual marker” as two analytes are used and is performed between 11 and 13+6 weeks of gestation.

Second trimester analytes: Maternal serum Alpha fetoprotein (AFP), β-hCG, Unconjugated estriol (uE3) and Inhibin-A. This test is known as the “Quadruple marker” performed between 15 – 20+6 weeks of gestation. This marker provides a risk cut off for Trisomy 21, Trisomy 18 and also for neural tube defect (NTD).

First trimester screening

Serum screening: The absolute values of PAPP and β-hCG are converted to multiples of the median (MoMs) as per the gestational age. Whereas PAPP-A level decreases in all aneuploidy, β-hCG increases in T21 and the levels are low in T18 and T13 (Table 2). Maternal age, obstetric history, history of smoking along with the serum analytes are assessed using a validated software [Fetal Medicine Foundation (FMF) certified]. The final risk is reported as a ratio. The DR (Detection rate) of this test is 70% for Trisomy 21 with 5% FPR (false-positive rate).

Table 2: Levels of β-hCG and PAPP-A in aneuploidy

β-hCG	Median MoM	PAPP-A	Median MoM
Euploid	1.0	**Euploid**	1.0
Trisomy 21	2.0	**Trisomy 21**	0.5
Trisomy 18	0.2	**Trisomy 18**	0.2
Trisomy 13	0.5	**Trisomy 13**	0.3

Combined first trimester screening: The detection rate for T21 can be further improved when first trimester ultrasound parameters are included in the analysis. Inclusion of only NT increases the DR to 82-87% and further adding NB or DV flow or TR increases DR to 93-96% with 2.5% FPR.

Combined first and second trimester approaches: This includes integrated screening (NT measurement, first trimester serum analytes followed by second trimester serum analytes), integrated serum screening (NT measurement not available), sequential and contingent screening.

Integrated screening: Antenatal woman undergoes the first trimester combined screening followed by second trimester serum analytes. She receives a single result after the second trimester screening. If only first trimester and second serum screening is done without NT and integrated, it is known as an integrated serum screen. In this test, it is important to counsel the woman that results will be only available after the second trimester screening, and high risk women who want results earlier can opt for a different test.

Sequential Screening: The result of the combined first trimester screen is disclosed to the woman allowing for earlier confirmatory testing if needed. If the first trimester screening result is low risk, they are informed and the second trimester serum screening is done following which the final risk is calculated.

Contingent Screening: Pregnancy is classified into high risk, intermediate risk, and low risk based on first trimester screening results. High risk women are offered invasive testing or cff DNA. Low risk women are counselled for no further screening. Women with intermediate risk undergo second trimester screening and a combined final risk is calculated. This leads to a higher DR with lower FPR. Efficacy of screening tests for trisomy 21 is shown in Table 3.

Table 3: Detection rate for trisomy 21 with false positive rate for different screening methods

Screening test	**Detection rate for Trisomy 21 (%)**	**False positive rate (%)**
First trimester (11- 13+6)		
Dual marker (PAPP-A and free β-hCG)	70	5
Nuchal translucency	70	5
Combined FTS (Maternal age, Dual marker, NT)	82-87	5
Combined FTS + NB or TR or DV flow	93- 96	2.5
Expanded first trimester screen ((Maternal age, Dual marker, NT, NB, PlGF)	98	1.2
Second trimester (16-20+6 weeks)		
Quad screen (AFP, UE3, hCG, Inhibin A)	81	5
Serum integrated test (PAPP-A, AFP, UE3, hCG, Inhibin A)	88	5
Full integrated test (PAPP-A, NT, AFP, UE3, hCG, Inhibin A)	96	5
Stepwise sequential screening (PAPP-A, free beta HCG, NT then quad screen)	95	5
Contingentsequential screening (PAPP-A, hCG, NT then quad screen)	88 - 94	5

Post-test counselling: Post-test counselling must be conducted after the test results are available. Based on the latter the women may be either in low risk, intermediate or high risk group. Various societies like Fetal Medicine Foundation (FMF,) Association of Obstetricians &

Gynaecologists of Delhi, Fetal Medicine Subcommittee have developed cutoffs for defining the risk categories (Table 4).

Table 4: Risk categorization by different societies

Risk categorization for Trisomy 21	FMF	AOGD
High Risk	≥ 1:50	<1: 250
Intermediate Risk	1:51-1:1000	1:250-1:1500
Low Risk	<1:1000	< 1: 1500

Those in high risk are offered invasive testing for confirmation which can be a chorionic villus biopsy or amniocentesis. Options of termination if diagnosis of aneuploidy is confirmed are also discussed.

Non-invasive prenatal screen (NIPS): Cell-free fetal DNA (cff DNA) is released into maternal circulation from placental trophoblastic cells undergoing programmed cell death. The fetal component of the total cell free DNA increases with gestational age and it comprises of 3-13%. This DNA can be used to test for fetal aneuploidy and can be performed any time after nine weeks of gestation till term. Minimum fetal fraction required to report the test is 4%. Women who have cff DNA screening findings that are unreported, unclear, or uninterpretable (a "no call" test result) should be offered comprehensive ultrasound evaluation invasive testing in addition to additional genetic counselling. A meta-analysis evaluating its performance reports a greater than 99% DR for fetal trisomy 21, 98% DR for fetal trisomy 18, and 99% detection rate for fetal trisomy 13 with a combined FPR of 0.13%. When reported as negative it reduces the priori risk by a factor of 300 for trisomy 21 and 50 for trisomy 13 and 18. It is a known fact that age related risk or the background risk for trisomy 13,18 and 21 increases significantly with higher maternal age and so does the positive predictive value of NIPS. (Table 5) A high percentage of twin pregnancies and 1-5% singleton pregnancies fail to generate a report (“no call”) after first sampling due to low fetal fraction. Main causes for the same are maternal obesity, test performed before ten weeks, maternal use of low molecular weight heparin (LMWH) and aneuploidy. A repeat sampling after proper counselling is the next desired step and it provides result in 60-70% cases.

NIPS should not be offered in cases where malformations are reported, higher order pregnancy than twin, organ transplant from male donor, stem cell transplant and known maternal chromosomal aberration. It should be used with caution in cases of vanishing twin pregnancy and history of blood transfusion.

Table 5: Effect of maternal age on positive predictive value (PPV) of cell free DNA screening for common aneuploidies at 10 weeks

Aneuploidy	Maternal age	Age related risk	PPV
Trisomy 21	20	1:804	38-80%
	35	1:187	73-95%
	40	1:51	91-99%
Trisomy 18	20	1:1993	11-41%
	35	1:465	34-75%
	40	1:126	66-92%
Trisomy 13	20	1:6347	5-13%
	35	1:1481	17-40%
	40	1:401	43-71%

Currently NIPS is being offered as part of the contingent screen to women who have an intermediate risk for aneuploidy. However, a positive test still needs to be confirmed by invasive testing and termination of pregnancy should not be offered based on NIPS alone.

Ultrasound screening

Ultrasound is another important modality of screening. The subtle findings in ultrasound which points towards the possibility of aneuploidy are called the “soft markers” and the list is quite long. Their presence does not necessarily mean any abnormality but indicates higher risk of certain underlying genetic or structural abnormality. The presence of soft marker is used to modify the A priori risk and arrive at the final risk depending on the likelihood ratio of the marker.

First trimester ultrasound: It is performed from 11 to 13+6 weeks gestation when the Crown Rump Length (CRL) is between 45-84 mm (Figure 1).

Nuchal translucency (NT): The collection of fluid under the skin behind the fetal neck is detected in ultrasound in the first trimester. The value of NT is expressed in relation with the CRL and the percentile is calculated. The NT should always be interpreted in relation to the CRL and NT which is more than 99th centile for that CRL is reported as abnormal (Figure 2).

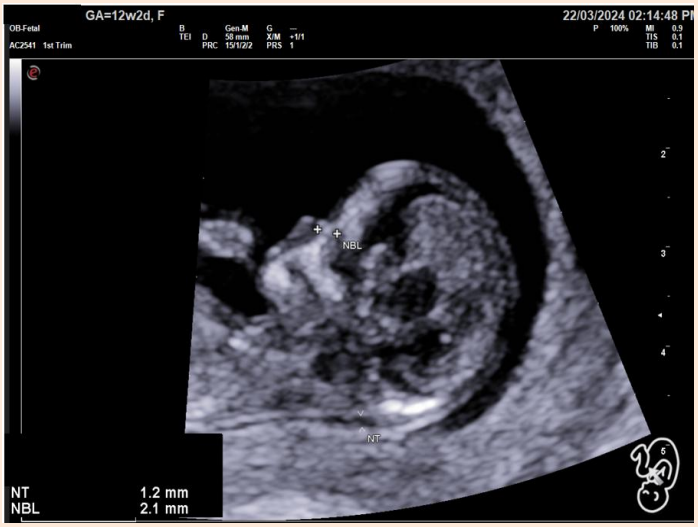


Figure 1: Crown rump length (CRL 59.7mm corresponding to 12 week 3 days)

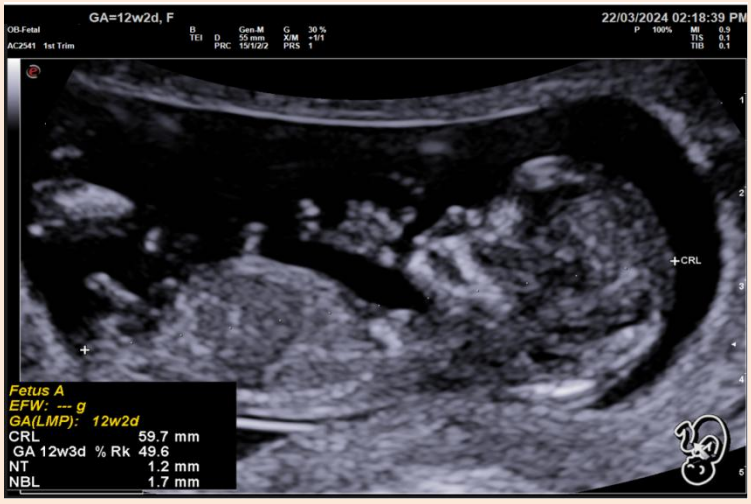


Figure 2: Nuchal translucency (for CRL 59.7 mm, NT 1.2 mm is at 23 percentile)

When used as a part of combined first trimester screening the value of NT in MoM should be considered. Thickened NT can be associated with chromosomal abnormalities, single gene defects and fetal cardiac malformations. The translucency usually reduces in majority or it can evolve into either a thickened nuchal or cystic hygroma. Few cases can develop generalized hydrops (Figure 3).

The measurement of NT should be as per the FMF guideline as explained below.

fetus should be imaged in mid sagittal section and the echogenic nasal bone and rectangular palate must be seen separately. The image should be appropriately zoomed such that more than 75% of fetal head and upper thorax should occupy the whole screen. The fetal head should be in line with the spine and fetus should be in a neutral position without extreme flexion and extension. There should be some amniotic fluid above the fetal neck ventrally.

The thickest part of translucency must always be measured and the calipers placed on the line that defines the nuchal translucency – the caliper's crossbar should merge with the white border

line and not within the nuchal fluid. An isolated increased NT has a DR of 70% with FPR of 5% for trisomy 21.

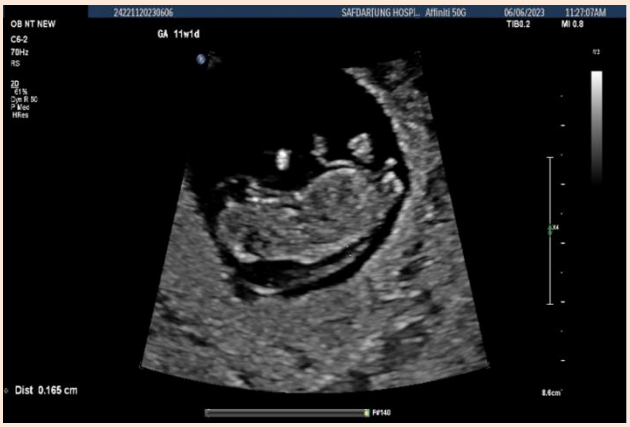


Figure 3: Cystic hygroma

Nasal bone (NB): The NB measurement should also follow the FMF guideline. It is obtained in the same plane as NT. The ultrasound transducer should be placed parallel to the direction of the nose and tilted from one side to the other of fetal nose to obtain the correct view. Three distinct lines should be seen at the level of the fetal nose, the top line represents the skin, the bottom one which is thicker and more echogenic than the overlying skin represents the nasal bone, a third line in front of the bone and at a higher level than the skin represents the tip of the nose. If the second line is more echogenic than the overlying skin then it can be measured as the fetal nasal bone and considered absent if it is either not visible or its echogenicity is the same or less than that of the skin (Figure 2). The association of absent nasal bone and aneuploidy is shown in Table 6.

Tricuspid regurgitation (TR): An apical four-chamber view of the fetal heart is obtained in fetal quiescence and zoomed so that the fetal thorax occupies the whole screen. The gate of the pulsed doppler (2-3 mm) should be placed such that it is across the tricuspid valve. The sweep speed should be high (2-3 cm/s) to get widely spread out waveform and the angle at which the beam is insonated over the direction of flow should be less than 300 for correct assessment (Figure 4). Regurgitation is seen during approximately half of systole and with a velocity more than 60 cm/s is abnormal. Association of TR with aneuploidy is shown in Table 7.

Table 6: Association of absent nasal bone and aneuploidy

Absent Nasal bone	**Frequency (%)**
Euploid fetus	1-3
Trisomy 21	60
Trisomy 18	50
Trisomy 13	40

Table 7: Association of tricuspid regurgitation and aneuploidy

Tricuspid regurgitation	Frequency (%)
Euploid fetus	1
Trisomy 21	55
Trisomy 18	30
Trisomy 13	30

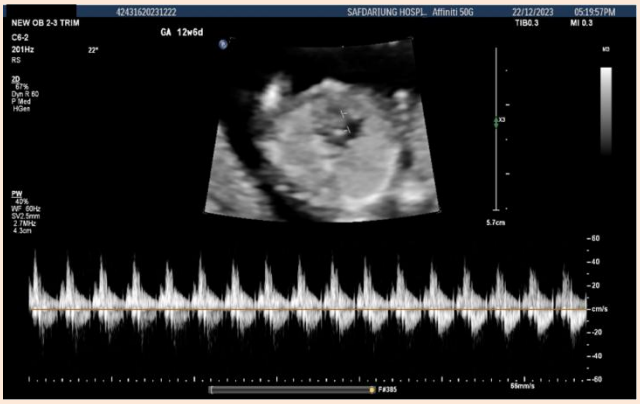


Figure 4: Tricuspid regurgitation

Ductus venous (DV) "a' wave: It is a short vessel connecting the intrahepatic umbilical vein to the inferior vena cava at its inlet to the heart. A right ventral mid-sagittal view of the fetal trunk is obtained in fetal quiescence and zoomed so that the fetal thorax and abdomen occupy the

whole screen. Colour flow mapping is used to demonstrate the umbilical vein, ductus venosus and fetal heart. The pulsed Doppler gate (0.5-1.0 mm) is placed on the ductus venosus in the aliasing area with insonation angle less than 30 degrees, using low frequency (50-70 Hz) filter to allow visualization of the whole waveform and the high sweep speed (2-3 cm/s) so that the waveforms are widely spread for better assessment of the a-wave (Figure 5).

High pulsatility index (>95th centile) and reversal of "a" wave is pathological, however, in 80% of cases the fetal outcome is normal (Figure 6). Apart from aneuploidy, common causes of an abnormal ductus are fetal cardiac defects. Association of DV with different aneuploidies is depicted in Table 8.

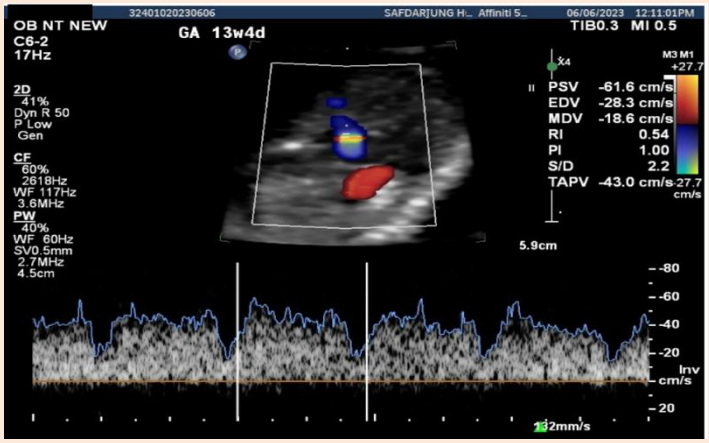


Figure 5: Ductus venosus, normal flow

Table 8: Association of reversed "a-wave" in DV with aneuploidy

Reversed "a-wave" in DV	Frequency (%)
Euploid fetus	3
Trisomy 21	65
Trisomy 18	55
Trisomy 13	55

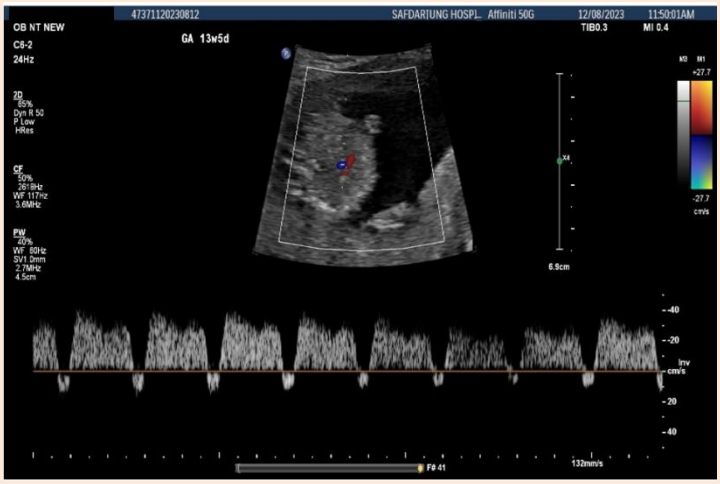


Figure 6: Ductus Venosus, Reversed "a-wave"

Special situations

Multifetal pregnancy: With wide used of ART the incidence of multifetal pregnancy has increased in recent past. Another aspect is that spontaneous multifetal pregnancies and aneuploidy both are related to advanced maternal age.

Screening for T21 in twin pregnancy

Combined first trimester screening should be offered for twin pregnancies.

In monochorionic twin pregnancy the risk is estimated per pregnancy.

In dichorionic twin pregnancy the risk for each fetus is estimated separately.

NIPS can also be offered and the sensitivity for detecting trisomy 21 is as good as in singleton pregnancy.

Screening for T21 in triplet pregnancy

Serum screening should not be offered.

Maternal age and NT are used for risk calculation.

Depending on chorionicity, risk is estimated in similar way as in twin pregnancy.

Pregnancy with ART

The method used for ART is important. IVF conceptions are to be mentioned in the software during analysis of combined first trimester screening.

If donor ovum is used, the maternal age of the donor is to be considered.

If NIPS is used, that fetal fraction is lesser when frozen embryo transfer is done compared to fresh embryo transfer, increasing the chance of a “no call”.

Conclusion

Prenatal screening should be universally and routinely offered to each pregnant woman. A detailed informed non-directive pretest counselling is a key component. A single test is to be performed after offering and discussing about merits and demerits of all available options. It should be emphasized that NIPS can’t replace the combined first trimester screening or first trimester ultrasound to be precise. Screen positive women should be counselled and offered a diagnostic test suitable according to the clinical scenario. Multiple pregnancy and in vitro fertilization conceptions can opt for case specific screening.

Suggested Reading

1. American College of Obstetricians and Gynecologists’ Committee on Practice Bulletins—Obstetrics; Committee on Genetics; Society for Maternal-Fetal Medicine. Screening for Fetal Chromosomal Abnormalities: ACOG Practice Bulletin, Number 226. Obstet Gynecol 2020;136(4):e48-e69.
2. Nussbaum RL, McInnes RR, Willard HF. Principles of clinical cytogenetics and genome analysis. In: Thompson & Thompson genetics in medicine. 8th ed. Philadelphia, PA: Elsevier; 2016. p.57–74.
3. Kagan KO, Wright D, Valencia C, Maiz N, Nicolaides KH. Screening for trisomies 21, 18 and 13 by maternal age, fetal nuchal translucency, fetal heart rate, free beta-hCG and pregnancy-associated plasma protein-A. Hum Reprod 2008;23(9):1968-75.

4. The Fetal Medicine Foundation. Available from https://fetalmedicine.org/. Last accessed on March 3 ,2024.
5. Guideline book 2017. Available from http://aogd.org/Guideline%20Book%202017.pdf. Last accessed on March 10, 2024.
6. Ashoor G, Syngelaki A, Poon LC, Rezende JC, Nicolaides KH. Fetal fraction in maternal plasma cell-free DNA at 11–13 weeks' gestation: relation to maternal and fetal characteristics. Ultrasound Obstet Gynecol 2013;41:26–32.
7. Wang E, Batey A, Struble C, Musci T, Song K, Oliphant A. Gestational age and maternal weight effects on fetal cell-free DNA in maternal plasma. Prenat Diagn 2013;33:662–6.
8. Gil MM, Accurti V, Santacruz B, Plana MN, Nicolaides KH. Analysis of cell-free DNA in maternal blood in screening for aneuploidies: updated meta-analysis. Ultrasound Obstet Gynecol 2017;50:302–14.

Video Link for Interpretation of Nuchal Thickness Scan

Dr Bhavna Anand
HOD Fetal Medicine, Manipal Hospital Delhi

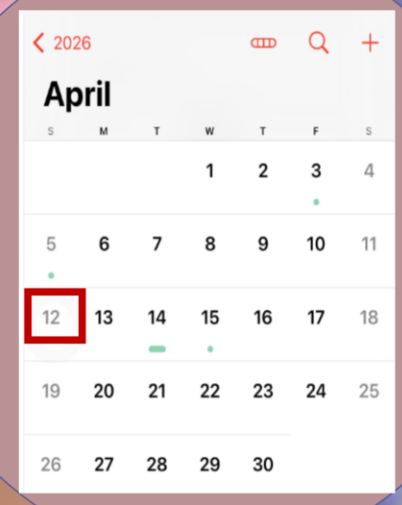
Upcoming Activities

Gestational Diabetes Awareness Month

PPH DRILLS

NEXT NEWSLETTER WILL BE RELEASED IN JANUARY 2026

Block Your Dates for Annual Conference Delhi Chapter



NIGF DELHI CHAPTER ANNUAL CONFERENCE ON 12TH APRIL 2026