LATEST 2024 MARROW NEET-SS NOTES

UPDATED OBSGYNE RESIDENCY NOTES

FETAL MEDICINE

INVERTING THE PYRAMID OF ANTENATAL CARE

Active space

Introduction

00:00:17

History :

In early 20th century, hospitalised antenatal care came into action in UK.

In 1930 UK ministry of health passed a memorandum on antenatal clinics : Their conduct and scope. London, His majesty's stationery office, 1930.

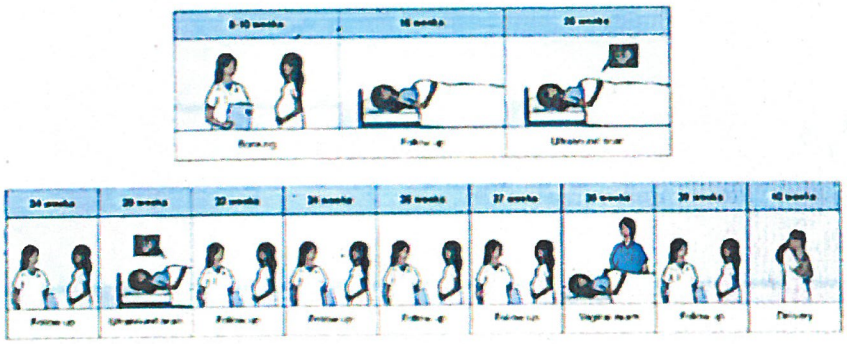
Recommended schedule :

In 1930 :

Gestational age.	Frequency of visits.
Upto 28 weeks.	Every 4 weeks.
28-36 weeks.	Every 2 weeks.
After 36 weeks.	Every 1 week.

In 2023 :

Gestational age.	Frequency of visits.
Upto 28 weeks.	Every 4 weeks.
28-36 weeks.	Every 2 weeks.
After 36 weeks.	Every 1 week.



ANC visit (2023).

ANC visits are more frequent in the second and third trimester because :

- most maternal complications and fetal anomalies are evident at this stage (Acceptable reason).
- most complications cannot be predicted and anomalies cannot be detected early : This is challengeable due to the recent revolution in ANC treatment.

First trimester scan

00:04:16

Integrated evaluation of pregnancy in first trimester including combined evaluation detects most of the major anomalies and defines patient specific risks for most complications.

Combined evaluation includes :

1. maternal demography : Age, race, body mass index (BMI).
2. Biophysical tests.
3. Biochemical tests.

First trimester scan :

Synonymous to NT (Nuchal Translucency) scan, done at 11-14 weeks.

Other uses of first trimester scan :

- Dating the pregnancy.
- Aneuploidy screening.
- Screening of fetal structural anomalies.
- Assessment of chorionicity.
- Screening maternal complications like preeclampsia and still birth.
- Screening fetal complications like IUGR (Intrauterine growth restriction).

Gestational age assessment :

00:08:04

The indication for first trimester scan is gestational age assessment.

Best tool is crown rump length (CRL) and not LMP (Last menstrual Period).

At 10-12 weeks.

Isuog.org guidelines for timing for first trimester scan :

- No reason to offer routine ultrasound simply to confirm an ongoing early pregnancy in the absence of any clinical concerns, pathological symptoms or specific indications.
- It is advisable to offer the first ultrasound scan when gestational age is thought to be between 11 and 13 + 6 weeks gestation, as this provides an opportunity to confirm :
  - i. Viability.
  - ii. Establish gestational age accurately.
  - iii. Determine the number of viable fetuses.

Accurate dating is critical as it influences every decision in pregnancy.

Aneuploidy screening : 00:10:59

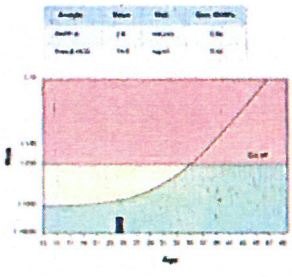
First trimester :
- Double test.
- NT based screening.
- Combined test.
- Ist T Quad.

Second trimester :
- Triple test.
- Quadruple test.
- Genetic sonogram.

Combined :
- Integrated test.
- Sequential screening.
- Contingent screening.

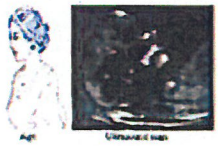
First trimester aneuploidy screening :

1. Double test : maternal demography + serum markers (β HCG and PAPP-A).



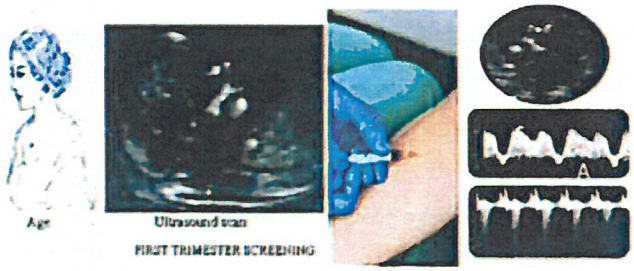
Serum markers.

Double test.



NT based screening.

2. NT based screening : maternal demography + NT scan.
3. Combined test + additional markers : maternal demography + NT scan + bio chemical markers + biophysical markers (Nasal bone, ductus venosus, tricuspid regurgitation).



Combined tests + additional markers.

4. Quadraple test :
- maternal demography.
- Serum biochemical markers : β HCG, PAPP-A, PLGF, AFP.

Second trimester tests :

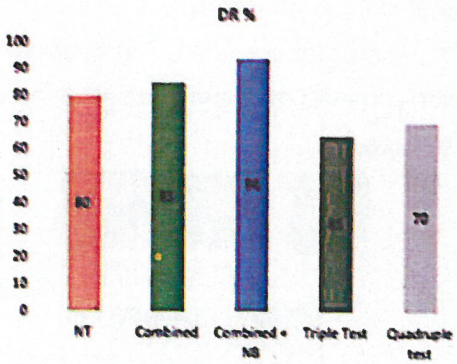
Triple test : AFP + unconjugated estriol (E3) + HCG.

Quadraple test : AFP + unconjugated estriol (E3) + HCG + inhibin.

Note : First trimester screening tests have the best detection rates.

----- Active space -----

Screening method	Detection of T21% (FPR - 3%)
Double test.	50.
NT.	70.
Combined test.	80.
Combined tests + additional markers	92 - 95%.
Triple test.	60.
Quadraple test.	65.
Quadraple + Contingent anomaly	80.
Sequential screening.	90.
Integrated.	93.



Detection rate of various tests.

Anomaly detection

00:14:22

Detection rate of anomalies :

Author	Gestational age (weeks)	Number	Prevalence	Detection rate
Hernadi § Torocsik.	11.	3001.	64(1.6%).	35(55%).
Economides § Brathuhaite.	12-13 weeks 6 days.	1633.	17(1%).	11(65%).
Ottavo et al.	11.	5		4(%).
Carvalho et al.	11-14 weeks.	2853.	130(4.6%).	30(23%).
Tapale et al.	13-14 weeks.	4855.	33(0.7%).	6(18%).

meta analysis (Rossi et al 2013) :

- 19 studies.
- 78,003 fetus.
- Overall detection rate : 51 %.
- When transvaginal scan was added : 64%.

Anomalies in first trimester :

Always detectable	Potentially detectable	Undetectable
Anencephaly	Posterior fossa defects.	Meroencephaly
Alobar holoprosencephaly	Spina bifida.	ACC.
Body stalk anomaly	Facial cleft.	Ventriculomegaly due to infection, hemorrhage.
Omphalocele.	Cardiac defects.	Fetal tumours.
Gastroschisis.	Renal defects.	Fetal ovarian cysts
Megacystis.	Limb defects.	CCAM, Sequestration.
		Duodenal obstruction, small bowel obstruction.

Feedback

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Isuog.org guidelines :

- If we scan the mandatory anatomical structures (Head, stomach, bladder, cord insertion and extremities), we can diagnose the "always detectable" anomalies in the scan.
- On scanning the extended anatomical structures like facial profile, pre maxillary triangle, kidneys and spine, "potentially detectable" anomalies can be detected.

Mandatory anatomical structures.

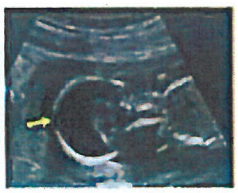
Extended anatomical structures.

- Anomalies in 1st trimester can be detected by comparing with normal CRL picture :

Normal CRL.

Anencephaly.

Normal CRL.

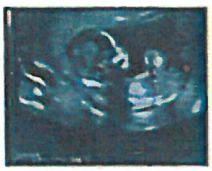


Alobar holoprosencephaly.

Normal CRL.

Body stalk anomaly.

Normal CRL.



Omphalocele/ gastroschisis.

Normal CRL.

Megacystis.

Prediction of maternal fetal complications

1647b86 08.21.24

ASPRE trial :

Prospective multicentric trial :

N=36,941), conducted in 2 parts.

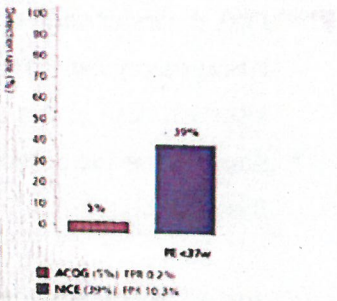
PART 1 :

APSRE trial : Performance of screening for preterm pre-eclampsia

Perform combined pre eclampsia screening for all pregnant women at 11 - 13+6 weeks : Pregnant women with high risk for pre eclampsia are picked up for part 2 after screening.

Combined pre eclampsia screening include :

1. Maternal demography.
2. Biophysical markers : mean arterial pressure, uterine artery pulsatility index (PI).
3. Biochemical marker : PLGF (Placental growth factor).



Detection rate in PART 1.

NICE guidelines : Detection rate is 39%.

ACOG guidelines : Detection rate is 5%.

Multimodal screening based on fetal medicine foundation : Detection rate is 77%.

PART 2 :

High risk patients from part 1 screening is picked up and divided into 2 random groups → One group is given aspirin 150 mg and the other group is given placebo.

Aspirin :

- Dose : 150mg/day → Aspirin resistance is 30% at 81 mg, 5% at 150mg.
- Start : 12 weeks → Placentation unaffected beyond 16 weeks.
- Stop : 36 weeks → Potential hemorrhage in the neonate.
- Time : Bedtime → Lower preeclampsia, fetal growth restriction, preterm birth, intrauterine death.

Prevention rates of preeclampsia with aspirin :

- 5% in pregnant females ≥ 37 weeks.
- 62% in less than <37 weeks.
- 82% in <34 weeks.
- 11% in <32 weeks.

Multifetal pregnancy

00:27:56

Evidence based facts :

- Best time to determine chorionicity by USG : First trimester of pregnancy

(11–14 weeks).

- Lambda sign : Seen in 100% of dichorionic twins at 10–14 weeks.
- Sensitivity and specificity for determining monochorionicity : 100% and 99.8%, respectively.
- First trimester scan is the best time to label pregnancies when the membrane insertion close to the cervix is seen.
- Sac A is the sac overlying the cervix and sac B is the sac seen away from the cervix.

Lambda sign.

T sign.

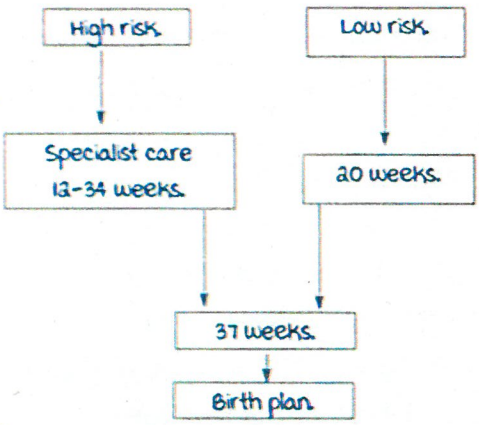
Inverted pyramid of antenatal care 00:30:56

Patient specific risk :

At the end of 14 weeks based on the investigations done in the first trimester : Patient can be triaged into low and high risk.

Inverted pyramid of antenatal care :

- Increased frequency of ANC visit in first trimester leads to risk categorisation in patients.
- In later trimesters of pregnancy, patient is given specialised care and has fewer visits in the second and third trimester.
- Complications in pregnancy are avoided by assessing the risk in early period of pregnancy.



Inverted pyramid.

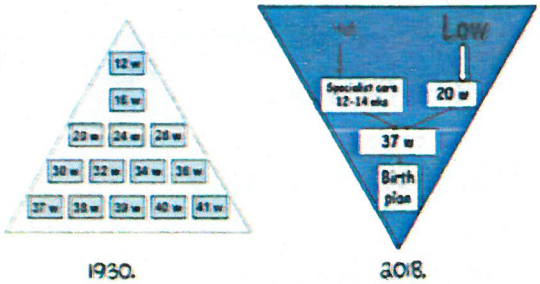
Limitations :

It depends on :

- Good quality first trimester USG scan centre.
- Quality of the lab for which biochemical samples are sent.

This can be overcome by :

- Training properly.
- Tie up with the specialised person/centre.



1930. 2018.

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PRENATAL SCREENING & DIAGNOSIS OF ANEUPLOIDY

Introduction :

Prenatal screening is done to mainly r/o :

1. Down syndrome.
2. Edwards syndrome.
3. Patau syndrome.
4. Other aneuploidies.
5. Preeclampsia risk of preterm birth, fetal demise.

Sir Gregor Johann Mendel.

Historic contributions :

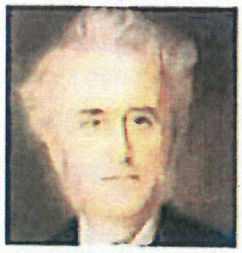
Sir Gregor Johann Mendel :

- Discovered laws of inheritance.
- For monogenic disorders.
- Not a/w aneuploidies.

Sir John Hilton Edwards.

Sir John Hilton Edwards :

- Described Trisomy 18 (Edwards syndrome).
- Obvious abnormalities on USG.



Sir Langdon down.

Sir Langdon Down :

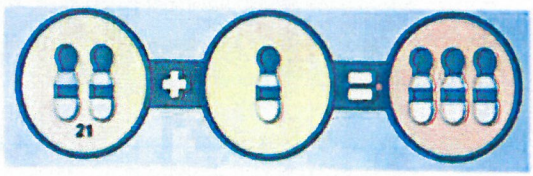
- Described Trisomy 21 (Down syndrome).
- No obvious early abnormalities on USG.

Down syndrome : Screening

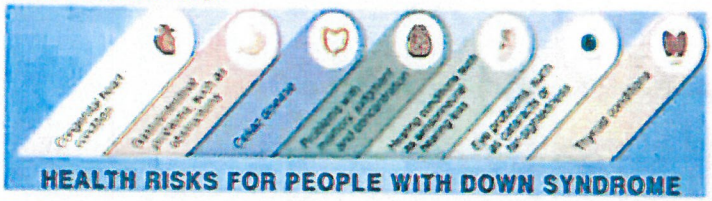
00:11:55

Features :

- Intellectual disability > 95%.
- CHD 30 to 40%.
- GIT atresias 20%.
- Hypotonia.
- Learning disabilities.
- Alzheimer's disease.
- Leukemia (15 to 20x risk).



Trisomy 21.



Note :

- 50% of fetuses are viable.
- 60% can be structurally normal
- Ultrasound alone cannot pick up all Down Syndrome with accuracy.
- Incidence of Down 1 : 600
- Life expectancy for people with down syndrome has increased dramatically from 25 years in 1983 to 60 years today.

Strategies of prevention :

Primary prevention :

- Avoid late pregnancies.
- Pre implantation diagnosis.

Secondary prevention (Informed choice) :

- Screening : CVS/amnio if screen positive.
- Option of termination if found affected.

Risk of down syndrome with age :

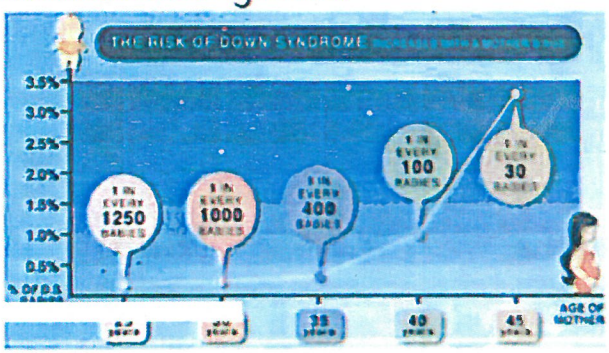
- more prevalent among mothers of older age.
- Exponential rise in prevalence beyond 35 yrs of age.
- Advanced maternal age : Strongest epidemiological link.
- 0.6 to 41 per 1,000 between age 15 and 45.

Genotype surprise :

i) 95% are trisomy 21 d/t gametocyte accidents : Not able to predict, hence universal testing irrespective of age.

ii) 1% mosaic down syndrome.

iii) 4 to 5% translocation down syndrome.



Note :

AIIMS pediatrics cohort → 842 cases

67% occurred in women <35 years.

D/t early completion of family in our indian culture before 35 years.