I. U .G.R.

Significance

I.U.G.R. is a major cause of neonatal morbidity & mortality.

Certain adult diseases including hypertension & diabetes are related to I.U.G.R.

Definition

I.U.G.R. Is defined as failure of the fetus to acheive its genetic growth potential .

S.G.A.: fetus or neonate is below a certain defined centile of weight or size for a particular gestational age (below 3rd or 5th centile) ,and SGA are constitutionally small due to normal genetic influences.

While IUGR indicates that a particular pathological process is operating to modify the intrinsic growth potential of the fetus by reducing its growth rate .

Recent definition of IUGR

- Early-onset growth restriction < 32 weeks.
- AC or EFW <3rd centile or absent EDF in the umbilical artery
- or
- 1) AC/EFW <10th centile combined with
- 2) Uterine artery PI >95th centile and/or
- 3) Umbilical artery PI >95th centile
- Late-onset growth restriction > 32 weeks.

Incidence of IUGR

- 3-5%

Aetiology

1-Reduced fetal growth potential (intrinsic)

A-chromosome defect e.g trisomy 18 , triploidy.

B-single gene defects e.g seckel's synd.

C-structional abn. e.g renal agenesis

D-infection e.g TORCH

Aetiology

2-Reduced fetal growth support (extrinsic)

A- maternal factors :

1.Undernutrition e.g poverty , eating disorders .

2.Maternal hypoxia e.g altitude , cyanotic heart disease .

3.drugs:cigarette smoking , alcohol, cocaine , warfarin, phenytoin, cytotoxic drugs.

1-Reduced utero –placental perfusion: e.g inadequate trophoblast invasion (e.g HT, PET),
Antiphospholipid syn. ,D.M with vascular lesions advanced), sickle cell disease , multiple pregnancy .

2-Reduced feto – placental pefrusion

A-single umbelical artery.

B- twin – twin trasfusion syn.

Complications

Antepartum complications

1- stillbirth (fetal death in IUGR more frequent after 35 weeks of gestation) .

2- oligohydramnios (in severe IUGR due to vasoconstriction in the fetal kidney results in impaired urine production).

3- Antepartum fetal distress.

Intrapartum complications

Intrapartum fetal hypoxia & acidosis

Increased incidence of c/s

Due to marked depletion of energy stores in the liver & subcutaneous tissues .

Neonatal complications

1- Related to perinatal asphyxia & acidosis :

Persistent fetal circulation , meconium aspiration syn. ,hypoxic – ischemic encephalopathy .

2- Metabolic alterations : hypoglycemia , hypocalcemia , hyperviscosity syn. ,hyperbilirubinemia, hypothermia .

Neonatal complications

3- Related to the specific cause of IUGR

Infection , cong. Malformations , chromosomal abn.

Classifications

1- Intrinsic IUGR (symmetric) : due to fetal condition e.g infection , chromosomal abn.

2-Extrinsic (Asymmetric) : due to element outside fetus (placental condition or maternal disease) .

3- Combined IUGR (both intrinsic & extrinsic factors).

4- Idiopathic IUGR.

Comparison of symmetric & Asymm. IUGR

Symmetric	Asymmetric
1-symmetrically small	1-head larger than abdomen
2-Normal ponderal index PI=8 ±2	2-Low ponderal index PI<7
3-Normal head/abd. & femur /abd. Ratio	3-Elevated head / abd.& femur/abd. ratio.

4-Genetic disease , infection .	4-placental vascular insuffiency
5-complicated neonatal Course Poor prognosis	5-benign neonatal course

Diagnosis

1-clinical diagnosis:
A-medical & obs. History
Chronic HT , PET, Ch. Renal disease, twin pregnancy, advanced DM, prior history of delivery of IUGR .
B-Decrease maternal weight gain during pregnancy (insensitive sign).
C- Uterine fundal height :is most common method used .

Symphysis–fundal height

- symphysis–fundal height (SFH), the distance
- from the symphysis pubis to the uterine fundus, is measured
- at each midwife or antenatal attendance from 24 weeks' gestation.
- As a guide, the SFH in centimetres is equal to the
- number of weeks of gestation plus or minus 2 cm.
- After 36 weeks, the acceptable difference increases to 3 cm.

Diagnosis

2- u/s biometry

BPD, head circumference, abd. Circumference,femur length.

Amount of liquor :oligohydramnios.

Diagnosis

3- Doppler waveform analysis

During pregnancy:umbilical & uterine artery have low resistance & low S/D ratio .

In IUGR : decreased or absent diastolic flow or reversed diastolic blood flow.

- the concept of ‘brainsparing’
- involves redistribution of blood by dilatation of the cerebral vessels, thus increasing substrate and oxygen supply to the brain, in response to fetal chemoreceptor or baroreceptor stimulation.

- results in
- a reduction in fetal MCA PI.
- this is associated with increasing impedance in the
- umbilical artery.

Cerebroplacental ratio

- By using the ratio of MCA to umbilical artery Doppler PI –
- the cerebroplacental ratio.
- Reduced CPR in IUGR

Diagnosis

4- Amniocentesis

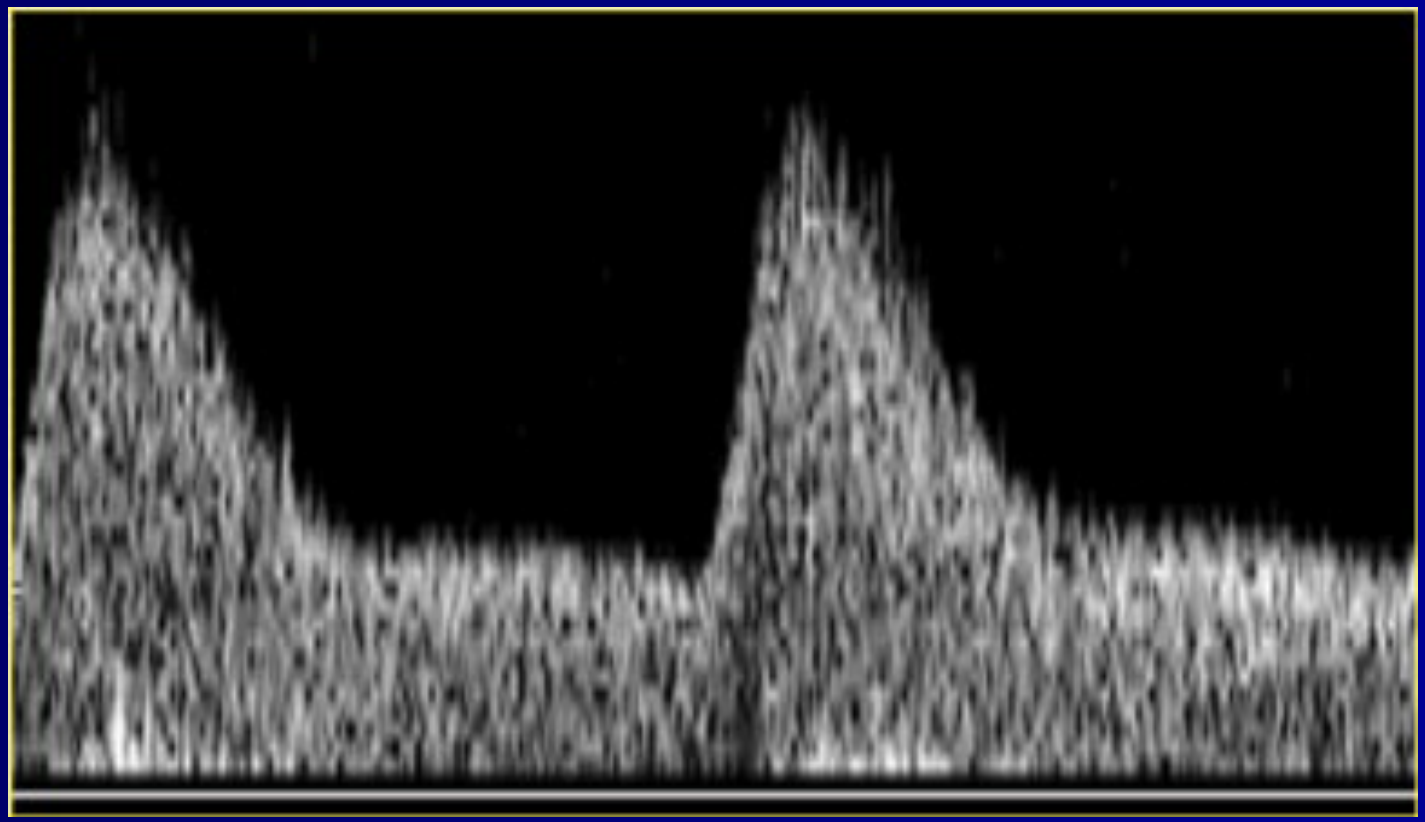
Every week after 36 weeks for fetal lung maturation.

5- Cordocentesis

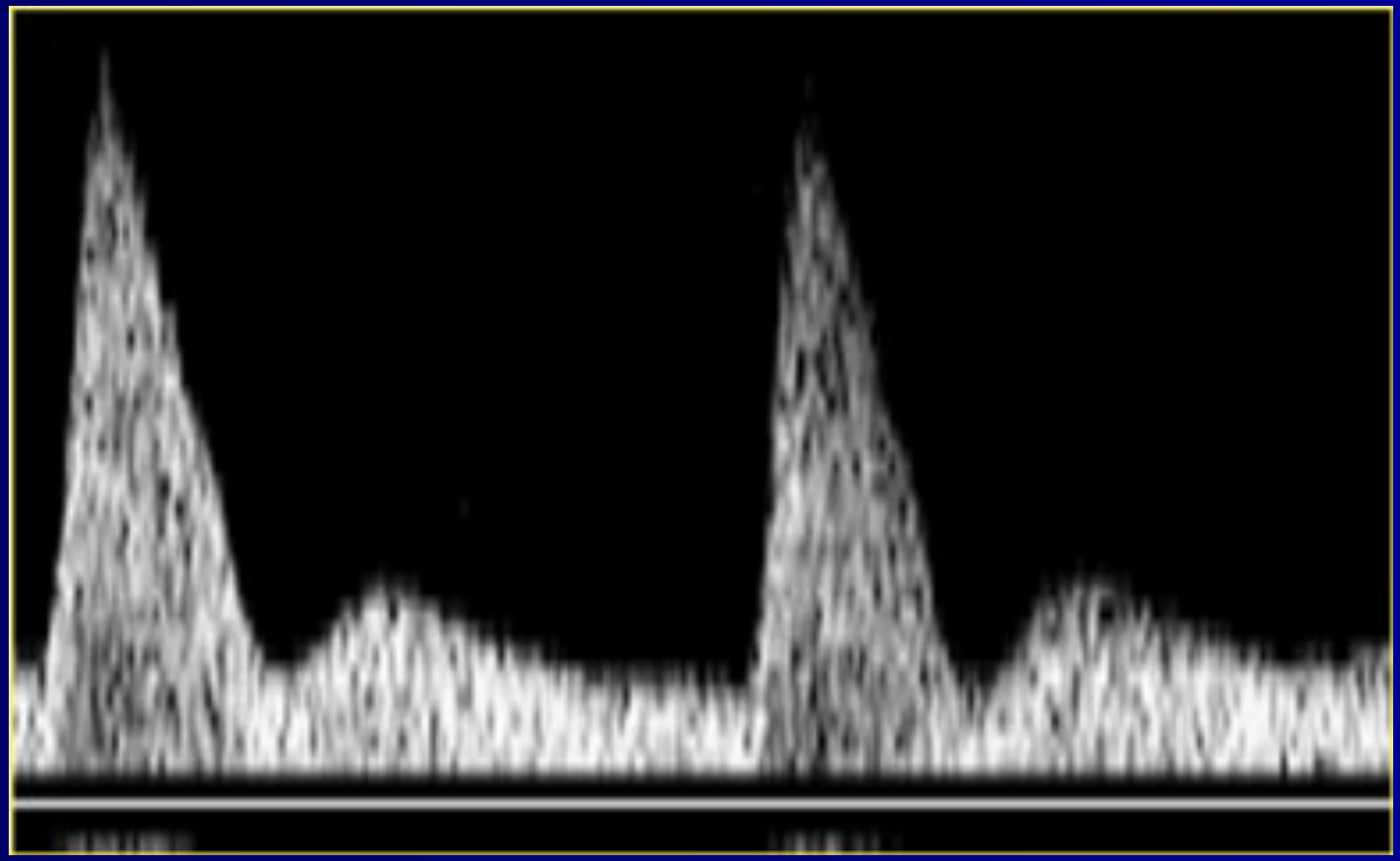
Umbilical cord blood sampling (rarely indicated).

For rapid determination of fetal karyotype when chromosomal defect is suspected .

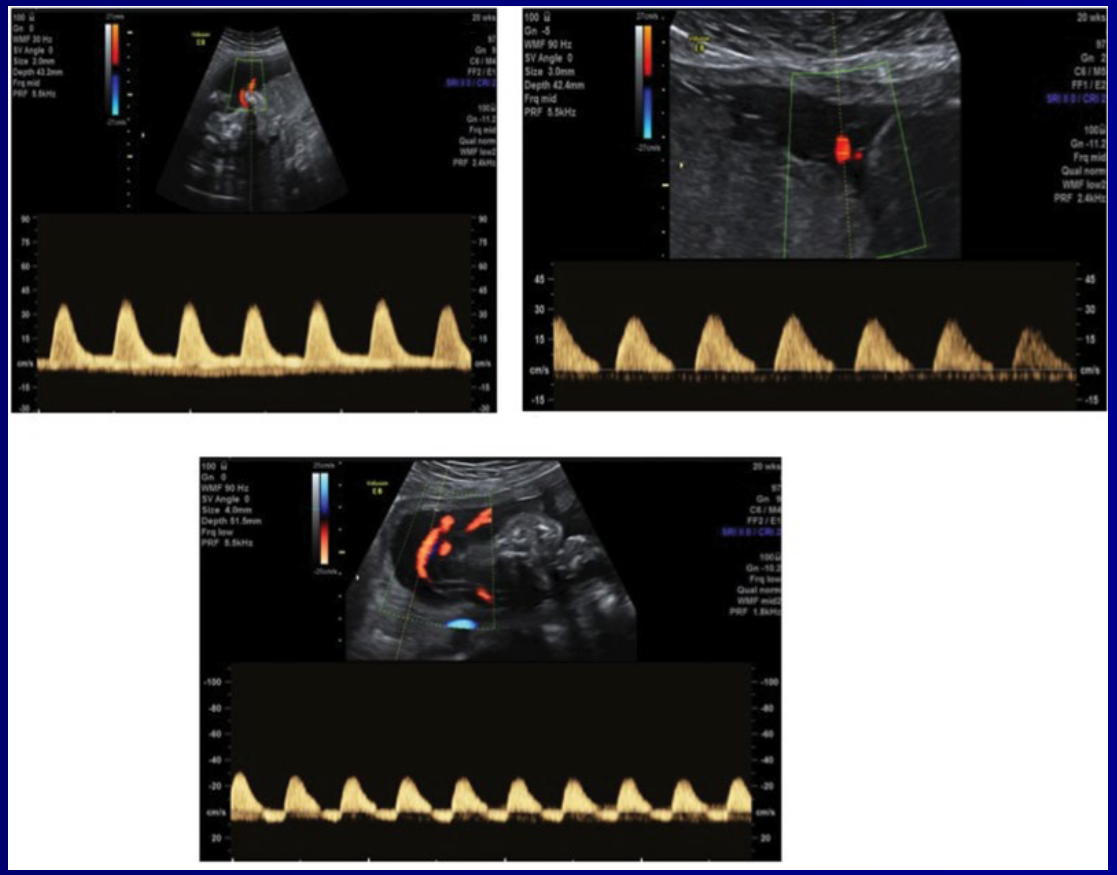
(a) Normal uterine artery Doppler waveforms



(b) abnormal uterine artery Doppler waveforms. The waveform in (b) has reduced diastolic flow velocities and an early diastolic notch.



Umbilical artery Doppler waveforms: (a) normal; (b) absent end-diastolic flow; (c) reversed end-diastolic flow.



Management

1. At present no accepted treatment available for growth restriction related to placental dysfunction .
2. Obvious adverse factors :smoking, alcohol &drug abuse should be stopped.
3. Health of the mother should be maximized

(optimal control of DM, thyroid dysfunction, HT).

4. When growth restriction is severe & the fetus is considered too immature to be delivered :bed rest in hospital is advised to

to maximize placental blood flow.

5. Antepartum assesment of fetal wellbeing

By fetal biometry every 2 weeks ,

Doppler u/s & fetal cardiotocography (NST).

Absence of blood flow in the umbilical artery or reversed flow (i.e back towards the heart requires delivery in the near future or when NST is non- reactive .

NST daily in severe cases .

Less severe cases : NST weekly or twice weekly .

No effective drug therapy for IUGR has yet been found .Small studies suggested aspirin , nitric oxide donors , or anti- oxidants may be helpful in some cases .

These drugs may act by reducing platelet activation in the utero- placental circulation , o may be acting directly as vasodilators.

Labour

- Because of the high incidence of hypoxia & acidosis , labour & delivery should be aggresively managed .
- Continuous fetal heart monitoring (scalp monitoring electrode & uterine pressure catheter .
- Shorten the second stage of labour by forceps .
- Epidural anesthesia is the method of choice for pain relieve .

Labour

- Pediatrician should be present at delivery .
- Placenta need careful examination by pathologist :for cause of IUGR .

Prognosis

1. The length of the insult seems to be more important than its severity in terms of both somatic growth & neurologic development .so the earlier in pregnancy that IUGR is detected the greater the probability of developmental problems later in life .
2. The probability of developmental problems is lower when there is catch – up growth during the first 6 months of life .

Prognosis

3. The worst prognosis is for babies with IUGR caused by congenital infections or chromosomal defects .
4. A link between IUGR & the adult incidence of both hypertension & DM has now been established .

- Thank you