

Intrauterine Fetal Growth Restriction

Presented by
Dr.Tamer Borg

1

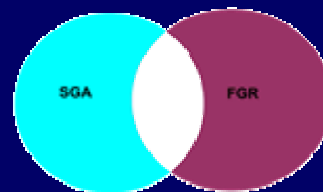
- Traditionally F.G.R. has been synonymous with S.G.A.
- A fetus is said to be S.G.A. if its biometry or estimated weight falls below the 10th percentile as defined by W.H.O.

2

- Recently it is evident that not all fetus who are S.G.A. suffer from F.G.R.
More than **50%** of S.G.A. fetus will be healthy small babies
- Also **70%** of fetus suffering from reduced growth velocity will have a birth weight considered appropriate for gestational age with no adverse neonatal outcomes

3

- THEREFORE, IT IS LOGICAL TO CONCENTRATE ON DIAGNOSIS OF S.G.A. FETUS WHO ARE TRULY GROWTH RESTRICTED



4

AETIOLOGY

I.FETAL:

GENETIC:

- 20% of S.G.A. in the 2nd trimester have chromosomal abnormality {*triploidy and trisomy 18 are the most prevalent*}.
- Confined placental mosaicism *e.g.uniparental disomy of chromosome 16*
- Hereditary syndromes *e.g.Leprechaunism and osteogenesis imperfecta*

INFECTIONS:

accounts for 10% of causes of F.G.R. mainly C.M.V.and rubella.H.I.V. and varicella zooster are still under study.

5

II.MATERNAL:

- NUTRITIONAL:
bmi<19,anorectics
- PHARMACOLOGICAL:
Smoking
Alcohol
Drug Abuse
Beta Blockers
Anticonvulsants
- DISEASES:
Preeclampsia
Sickle Cell Anemia
Antiphospholipid Syndrome
Thrombophilias
May Be In Hypertension,D.M.& Postdate
- DEFECTIVE PLACENTATION: At Vascular Or Cellular Level

6

- Fetal biometry allows further categorization of F.G.R. into asymmetrical & symmetrical implying a maternal cause for the former and fetal cause for the later.
- **BUT**, it should be remembered that early onset placental dysfunction can lead to symmetrical F.G.R.

7

WHAT ARE WE WORRIED ABOUT IN F.G.R.?

- 20%-40% of unexplained still birth and I.U.F.D. shows evidence of F.G.R.
- 14% of the comments on substandard care of the 8TH CESDI report were related to F.G.R.
- Higher incidence of intrapartum hypoxia
- Higher incidence of neonatal metabolic complications
- Long term neuromotor dysfunction
- Increased needs for special education and deficit academic achievements
- Long term follow up of the British 1970s cohort found a significant decrease in professional attainment ,managerial jobs & lower incomes among this cohort
- BARKER'S HYPOTHESIS of fetal programming?

8

Diagnosis

THE FOUR GOLDEN RULES IN DIAGNOSIS

- 1-Accurate estimation of the gestational age is a prerequisite

9

F.ARIAS description of reliability of E.D.D.

• Excellent dates:

- 1-patients with adequate clinical information **PLUS** U/S. exam. Between 16 and 24 weeks in agreement with the clinical estimation

- 2-patients with inadequate clinical information **BUT** with two U/S. between 16 to 24 weeks showing similar E.D.D.

• Good dates:

- 1-patients with adequate clinical information **AND** one confirming U/S .after 24 weeks of gestation

- 2-patients with inadequate clinical information **BUT** with two U/S. showing E.D.D.

• Poor dates:

- any other clinical situation

10

Diagnosis

THE FOUR GOLDEN RULES IN DIAGNOSIS

- 1-Accurate estimation of the gestational age is a prerequisite
- 2-Attempts should be made to diagnose growth restricted fetuses rather than healthy S.G.A. fetuses
- 3-The growth trend is more valuable in predicting fetal outcome than a single measurement of fetal size
- 4-Attention should be paid to important variables as: maternal height, weight, ethnicity, parity & fetal gender

11

Methods employed to detect S.G.A.

Abdominal palpation:

- Physical examination of the abdomen detects only 30% of S.G.A. fetuses

- **Symphyseal fundal height** (S.F.H.) shows variable sensitivities {27%-86%} and specificities {80-93%}

- The use of serial assessment of S.F.H. and customized charts adjusted for physiological variables as: weight, height, gender & race, result in improved sensitivity and is considered appropriate for diagnosis of S.G.A. fetuses in low risk women

Ultrasound:

- Abdominal circumference (AC.) & estimated fetal weight (EFW.) are the most accurate diagnostic measurements to diagnose S.G.A.
- Several studies have compared variable formulas for estimating fetal weight. They concluded that **Shepard and Aoki s** formulas are the recommended for estimating fetal weight between 2080_4430gm. The **Hadlock s** formula may be more appropriate when the fetus is expected to be very small

13

- The use of **customized ultrasound charts** shows better sensitivity, lower false positive & better prediction of perinatal outcome
- **Serial measurement** of AC.&EFW. Are superior to single estimates or ratio measurements as:ponderal index, head to abdominal circumference or femur length to abdominal circumference

14

- If initial assessment was appropriate for gestational age, a **4 week** measurement interval was shown to be superior to a 2 week interval
- **Fortnightly** scans should be undertaken where linear growth velocity is not maintained or where the (AC.) is below the 3rd percentile.
- The use of a less frequent interval can lead to a high number of false positive

15

Biophysical tests:

- Despite the good association between **amniotic fluid volume** and neonatal morphology, the likelihood ratios remain low[2.4 for positive,0.7 for negative}
- Although **Doppler studies** are the corner stone in the surveillance of S.G.A. fetuses, its use is not recommended for screening of low risk or unselected population

16

Prediction of F.G.R.

Currently ,these tests are limited to select certain risk groups for intense fetal monitoring and simple measures as smoking cessation

1-RISK ASSESSMENT: by history and examination

2-MATERNAL SERUM SCREENING: the most promising is AFP.A level of 2.5 or more MOM. is associated with 5 fold increase in risk of F.G.R.

3-ULTRASOUND MARKERS: the best is abnormal uterine artery Doppler or the so called notching of waveform is associated with a 3 fold increase of the risk of F.G.R.

Management of S.G.A.

Umbilical artery Doppler acts as the primary surveillance tool

- In a Cochrane systematic review of 11 RCTs (year 2000)conducted in pregnancies complicated by F.G.R.,the use of umbilical artery Doppler wave form (UADW) analysis significantly improved several pregnancies outcomes and reduced perinatal mortality rates (odds ratio 0.71,95% CI 0.5-1.01)
- Although UADW studies are pivotal in the assessment of S.G.A. , fetuses with normal Doppler studies but S.G.A. requires further assessment

18

Applications of other tests of fetal well being

- A systematic review with meta analysis of 18 studies with other 10000 patients (year 1999) found that antepartum **AFI** of ≤ 5 cm was associated with an increased risk of an Apgar score of < 7 at 5 minutes
- Given the absence of benefit of **biophysical profile** from RCTs , it can not be recommended for routine monitoring in low risk pregnancies or for primary surveillance in S.G.A. fetuses .

19

- However when primary surveillance with umbilical artery Doppler is found to be abnormal biophysical profile is likely to be useful given its good negative predictive value in high risk population
- A systematic review of randomized trial (year 2000) showed that the use of **CTG** was associated with increase in perenatal mortality rate when used to assess low risk pregnancies

20

- Recently, other Doppler wave forms analysis shows promise in the assessment of S.G.A. with abnormal umbilical artery Doppler such as, the use of **venous Doppler** ,reversal of flow in the inferior vena cava & **ductus venosus** or the loss of sparing of the **middle cerebral artery**
- However , the value of these parameters has yet to be evaluated in randomized controlled trials

21

Time of Delivery

- The GRIT trial attempted to uniform the practice of the timing of delivery of S.G.A. fetuses. 49 European obstetricians were asked when they would advise delivery in a growth restricted fetus . Over 50% would recommend :
 - 1- Delivery in the presence of reversed end diastolic flow beyond 29 weeks
 - 2- Delivery in the presence of absent end diastolic flow beyond 32 weeks
 - 3- Delivery in the presence of severely reduced end diastolic flow beyond 35 weeks

22

- The primary results from the GRIT study found no difference in death or disability if babies at earlier gestations were assigned to immediate or delayed delivery.
- These results do not support the idea that early delivery may prevent terminal hypoxia

23

Algorithm for the management of established S.G.A. fetuses

Group A: S.G.A. with normal AFI. and normal umbilical Doppler

- *in the absence of risk factors → rescan in 4 weeks
- *in the presence of risk factors → rescan in 2 weeks
- *if E.F.W. is less than 3rd centile or in the presence of polyhydraminos → consider karyotyping and screening for congenital infections

24

Group B: S.G.A. with normal umbilical Doppler BUT reduced AFI.

*if more than 37 weeks →consider delivery

*if less than 37 weeks →manage as for group A with risk factors

25

Group C: S.G.A. with reduced end diastolic flow

*if greater than 35-37 weeks

→consider delivery

*if less than 35 weeks

→ monitor as in-patient

→give antenatal steroids

→repeat Doppler weekly

→repeat growth scan /2weeks

→consider BPP&CTG twice weekly

26

Group D: S.G.A. with absent or reversed end diastolic flow

*give antenatal steroids

*if more than 32 weeks →consider delivery

*if less than 32 weeks →monitor as in-patient [GRIT results]

→ daily CTG

→consider weekly multi vessel Doppler

→deliver if two successive non reactive CTG OR if there is umbilical vein pulsations or reversed flow in ductus venosus

27

Mode of delivery

- There is no data to justify a policy of elective cesarean section for all cases of F.G.R.
- However, intrapartum monitoring with continuous CTG. is recommended

The Dublin trial??

28

Antenatal treatment

- **Bed rest:** never been evaluated in RCTs
- **Dietary supplementations:** no data to suggest its role in established cases
- **Plasma volume expansion:** no data to suggest its role in established cases
- **Abdominal decompression:** no data to suggest its role in established cases
- **Anticoagulants:** no data to suggest its role in established cases
- **Betamimetics:** studies failed to find a role
- **Aspirin:** the CLASP study found no benefit
- **OXYGEN THERAPY:** promising results with humidified 40% needs further evaluation
- **Under trials:** growth factors, electostimulation...

29

THANK YOU

30