



INTRAUTERINE GROWTH RESTRICTION – A REVIEW ARTICLE.

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ABSTRACT:

Intrauterine Growth Restriction (IUGR) is defined as fetal growth less than the normal growth potential of a specific infant because of genetic or environmental factors. The terms IUGR and small for Gestational Age (SGA) are often used alternatively to describe the same problem, although there exists subtle differences between the two. Various maternal, placental, neonatal, environmental and genetic factors are contributing to the preponderance of IUGR infants in Asia. These newborns are unique because of their peculiar and increased risk of immediate and long term complication in comparison with the appropriate gestational age born infants. In this review we would like to present the types of IUGR infants; possible etiology related to maternal, fetal and placental causes; short term and long term neurodevelopment outcomes, and evidence based preventive intervention effective in reducing the IUGR burden. This review also highlights the genetic contribution of the mother to the fetus and placental in the genesis of unexplained or idiopathic Intrauterine Growth Restriction.

KEY WORDS: IUGR, Fetal growth, fetal nutrition.

INTRODUCTION:

IUGR is said to be present in those babies whose birth weight is below the 10 percentile of the average for the gestational age. Growth Restriction can occur in preterm, term or post term babies.

Types of IUGR:

Symmetrical	Asymmetrical
- Uniformly small	- Head larger than abdomen
- Ponderal index normal	- P.I. low
- HC: AC & FL: AC ratio normal	- Elevated
- Etiology: genetic disease or infection	- chronic placental insufficiency
- Total cell number –less	-Total cell number – normal
- Cell size-normal	- Cell size-smaller
- Neonatal course-complicated with poor prognosis	- usually uncomplicated having good prognosis

Etiology:

1) Maternal factors

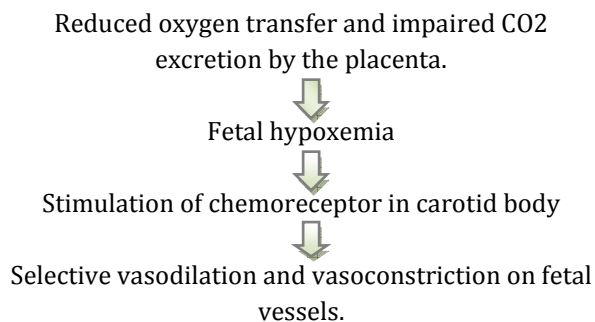
- Constitutional
- Extreme malnutrition & anemia
- Maternal diseases –Anemia, HTN, thrombophilia, heart disease, chronic renal disease
- Drugs & toxins –Alcohol, smoking, cocaine, heroin.

2) Fetal factors

- chromosomal anomaly–Trisomy 16, Trisomy 18 etc
- Structural anomalies
- Either cardiovascular, renal or others.
- Multiple pregnancies
- Infection –TORCH (Toxoplasmosis, rubella, cytomegalovirus and herpes simplex).

- 3) Placental factors
- chronic uteroplacental insufficiency ---
Preeclampsia, hypertension, renal disease, placental abnormalities etc.
 - Single umbilical artery
 - Twins-Twin transfusion

Pathophysiology of asymmetrical IUGR



Vasodilation effects:

- Fetal brain: Brain sparing effect
- Myocardium: No adverse effect on heart.
- Adrenal glands: Increase corticosteroids and catecholamine's

Vasoconstriction effects:

- Renal vessels-impaired urine production and oligohydramnios.
- Splanchnic vessels.
- Limbs –Impaired growth
- Skin – subcutaneous tissue-less fat

Metabolic changes:

Low levels of glucose and amino acids hormones such as thyroxin and insulin.

Prolonged fetal hypoxia:

Respiratory and metabolic academia—may cause fetal death ---if not delivered from hostile environment of uterus.

In Labour – Due to uterine contraction uteroplacental circulation is further compromised resulting in profound asphyxia

- **Clinical features:**

IUGR newborns have typical but varied clinical features

This includes—Weight less than expected for the gestational age.

- Relatively large heads for the size of the body in asymmetrical IUGR.
- Large anterior fontanelle.
- Loss of buccal fat, face has a typical shrunken or wizened appearance (old man look)
- Small or scaphoid appearing abdomen, this umbilical cord often stained with meconium.
- Long finger nail.
- Relatively large hands and feet with increased skin creases.
- Loose folds of skin in the nape of neck, axilla, inter scapular area and groins.
- Diminished breast bud formation and immature female genitalia due to loss of subcutaneous fat.
- Mature sole crease pattern
- Thin ear cartilage.

- **Diagnosis-**

Clinical-

- 1) Weight—poor maternal weight gain or falling weight as evidenced from periodical examination is suggestive of IUGR .Less than 2 kg weight gain per month in second half of pregnancy is highly in favour of IUGR.
- 2) Fundal height--- It will be less than the period of amenorrhoea.LMP must be accurate and fundal height will be deficient at least of four weeks on clinical palpation.
- 3) Symphysis Fundal Height--- Measurement in centimeters closely correlate with gestational age after 24 weeks a lag of 4 cm or more suggests growth restriction.
- 4) Girth of abdomen---Less than expected in that gestational age.
- 5) Uterus ---Full of fetus and irritable
- 6) Fetus --- Head and body is small. The small but hard head at term is suggestive of symmetrical IUGR.
- 7) Liquor –Oligohydramnions.

- **Biophysical:**

- Head circumference (HC) and abdominal circumference (AC) ratios:
 - HC/AC ratio exceeds 1.0 before 32 weeks.
 - It is approximately 1.0 at 32 to 34 weeks.
 - After 34 weeks it fetus is affected b HC/AC ratio exceeds 1.0 before 32 weeks.
 - It is approximately 1.0 at 32 to 34 weeks.
 - After 34 weeks it falls below 1.0.

- If the fetus is affected by asymmetric IUGR the HC remains larger.

- The HC/AC is then elevated.

- In symmetric IUGR both the HC & AC are reduced. The HC/AC ratio remains normal.

Using HC/AC ratio 85% of IUGR fetuses are detected.

- **Femur Length (FL):**
The FL/AC ratio is 22 at all gestational ages from 21 weeks to term.
FL/AC ratio greater than 23.5 suggests IUGR.
- **Amniotic fluid volume:**
A vertical pocket of amniotic fluid < 2 cm suggests IUGR.
- **Doppler velocimetry:**
- **Elevated uterine artery systolic/diastolic (S/D) ratio (>2.6) and or presence of diastolic notch** are associated with IUGR and intrauterine fetal death.
- **Ponderal Index (PI):**
The degree of fetal wasting is judged by fetal PI

PI = (Estimated fetal weight / (crown –heel length)³) x100

PI below 10th percentile is taken as IUGR.

- **Biochemical markers –**
Erythropoietin level in cord blood is high in IUGR fetuses.
- **Prevention of IUGR**
-It should start from preconception period before planning the pregnancy good nutrition is given.
-Alcohol and smoking should be avoided.
-Treatment of any medical disorder

Women with HTN or history of prior growth restrictions, prophylaxis with low dose aspirin starting from early gestation reduces growth restriction in a few percentages of cases.

- **Management during antenatal period:**
- Adequate rest in left lateral position -8 hrs.at night and at least 2 hrs. After lunch.
- Avoid physical activity.
- Good nutritious diet, correction of anemia with iron, folic acid.

- Regular assessment of progress of fetal growth and well-being by clinical and biophysical methods.

- Other drug treatment:

No widely accepted drug therapy is available for IUGR.

- Low dose aspirin (50 mg/daily)
- Nitric oxide donors.
- Antioxidants.
- Intermittent oxygen therapy
- Aspirin, nitric oxide donor & antioxidants act by reducing platelet aggregation in the uteroplacental circulation or acts directly as vasodilators.

ACCORDING TO AYURVEDA:

Etiology & Clinical Features According To Ayurveda-

आहारमाप्नोतियदानगर्भः

शेषंसमाप्नोतिपरिस्त्रुतिवातंस्त्रीप्रसुतेसुचिरेणगर्भपु
ष्टोयदावर्षगणेरपिस्त्र्यात्॥ च.सं.शा.२/१५

Essential factors for fertilization:

ऋतुक्षेत्रअम्बुबीजानांसामग्र्यातअंकुरोयथा॥ सु.सं.शा.२/१५

Among these four fertility factors Bija/ovum factor has a prime role in the pathophysiology of reproduction. In Ayurvedic classics, there is description of etiopathology of Intrauterine Growth Restriction& many remedies are mentioned. Placental insufficiency whether primary or secondary to maternal factors such as Hypertension, poor nutrition, substance abuse etc.is the most common cause of Intrauterine Growth Restriction, which is an important obstetric problem on account of the high associated perinatal mortality & morbidity.

Intrauterine Growth Restriction is diagnosed in the antenatal period by estimating the fetal size & height of the fundus. The measurement in centimeters usually corresponds with the number of weeks of pregnancy after the 20th week. If the measurement is low for the number of weeks, the baby may be smaller than expected.

Due to non-availability of proper diet (nourishment) to the fetus or vaginal discharges (bleeding) after conception the fetus suffers from Sosa (emaciation or dryness). This fetus attains its proper growth or

maturity after years and the woman delivers it after years or prolong delay. Vatu is also said to be a cause for dryness of fetus.

वाताभिपन्नएवशुष्यतिगर्भः।

समातुः कुक्षिंनपुरयतिमन्दंस्पन्दतेच॥ सु.सं.शा.१०/५७

Susruta opines that due to affliction by vatu the fetus gets dried up, dose not fill properly the mother's abdomen and quivers very slowly. Dalhana elaborating the etiology says that due to effect of vayu the fetus has absence of ojas. Further quoting vrddha kasyapa writes that the rasa either flows slowly or does not flow in the rasavahanadi of fetus thus it develops very slowly.

The upwards moving vayu dries rasavahi channels of the fetus, thus it suffers from vata disorders, becomes emaciated and remains in uterus for years together is the opinion of vagbhata I. vagbhata II opines that vayu dries the fetus.

Bhela says that when vatu situated in yoni gets mixed up with sukra and conception takes place with the union of healthy artava and this vitiated sukra, then if bleeding occurs, the fetus gets destroyed and this condition is termed as vatodara.

There are many confounding variables like maternal height and weight, race, foetal sex & birth weight of previous pregnancies, which make the diagnosis of IUGR. The clinical study on Intrauterine Growth Restriction carried out with the special treatment of Ayurveda. i.e.

गर्भशुष्केतुवातेनबालानाचापिशुष्यताम्

सितामधुककाशमर्यैर्हितमुत्थापनेपयः।

गर्भशोषेत्वामगर्भाप्रसहाश्चसदाहिताः॥११॥ चक्रदत्त

CONCLUSION:

Poor socioeconomic status, poor care of the girl child, medical and obstetric disorders complicating pregnancy contribute to a significant proportion of IUGR in developing countries of late genetic factors affecting the mother, placental and fetus are increasingly reported.

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