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ROLE OF *KSHEERBASTI* IN ASYMMETRICAL INTRAUTERINE GROWTH RESTRICTION: A CONCEPTUAL STUDY

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ABSTRACT

Asymmetrical Intrauterine Growth Restriction (IUGR) refers to a form of fetal growth restriction where the fetus exhibits disproportionate growth, characterized by a normal or near-normal head circumference and a relatively smaller abdominal circumference. This type of IUGR is most commonly seen later in pregnancy, typically after 28 weeks of gestation. Although there are many causes but is mainly associated with placental insufficiency, which restricts the fetus's ability to obtain adequate nutrients and oxygen. In response, the fetus enters a state of "fetal adaptive growth," where essential organs like the brain are supplied with nutrients at the expense of non-essential tissues, contributing to the asymmetric growth pattern. In ayurvedic context, asymmetrical IUGR can be very well correlated with *Garbhashosha*. *Ksheera Basti* mentioned in *Sushrut Samhita* for *Garbhakshaya* can be considered as an effective management option in Asymmetrical IUGR.

KEYWORDS: Ayurveda, *Garbhashosha*, Asymmetrical IUGR, *Ksheerbasti.*

INTRODUCTION

Intra Uterine Growth Restriction is said to be present in those babies whose birth weight is below 10th percentile of the average for the gestational age. The growth-restricted fetus is a fetus that fails to reach its growth potential and is at risk for adverse perinatal morbidity and mortality.[1]

Growth restriction is difficult to diagnose and equally difficult to define. Birth weight percentile determines growth based on adjustments for period of gestation, maternal height and weight, race, birth order and gender.

Growth is divided into three consecutive phases.

The initial phase of hyperplasia occurs in the first 16 weeks and is characterized by a rapid increase in cell number.

The second phase, which extends up to 32 weeks, includes both cellular hyperplasia and hypertrophy.

After 32 weeks, fetal growth is by cellular hypertrophy, and it is during this phase that most fetal fat and glycogen deposition takes place.[2]

The corresponding fetal-growth rates during these three phases are 5 g/day at 15 weeks. 15 to 20g/day at 24 weeks, and 30 to 35 g/day at 34 weeks.

Fetal nutrition

1. Till the formation of Placenta

During the first few days after implantation, the nutrition of the blastocyst comes from the interstitial fluid of the endometrium and the surrounding maternal tissue. As the embryo enlarges, more maternal tissue is destroyed and the walls of the capillaries are eroded, the result is that the maternal blood enters the lacunae. With deeper burrowing of the blastocyst into the decidua, the trophoblastic strands branch to form the solid primitive villi that traverse the lacunae. When the cavity of fertilized ovum is lined completely with mesoderm, it is termed as the chorionic vesicle. The syncytio-trophoblast of the chorionic shell is permeated by a system of inter communicating channels or trophoblastic lacunae that contain maternal blood.

2. After the development of Placenta

The placenta plays multiple roles in the development of the pregnancy as an organ of transfer of nutrients and metabolic waste products, performs complex metabolic functions and acts as the paracrine and endocrine arm of the feto-placental unit[3]

As Normal fetal growth is characterized by

- Sequential cellular hyperplasia,
- Hyperplasia and hypertrophy
- Lastly by hypertrophy alone.

Several factors may affect this mechanism and depending upon the time of insult the overall effect may vary. When the insult is early there can be permanent reduction in number of cells. Factors causing dysfunction at cellular or organ system or causing impairment with placental supply of nutrients have different effects on the growth of fetus.

Intra uterine growth restriction represents fetal growth that is less than the potential, optimal rate of growth of a specific fetus. It may also be defined as a failure of the fetus to attain its growth potential. IUGR is variable and can occur due to various fetal maternal & placental causes but the most common cause considered for IUGR is fetal under-nutrition due to placental insufficiency. It is associated with still birth, neonatal death, perinatal morbidity as well as mortality.

When the hyperplasia and hypertrophy in the second trimester and hypertrophy in third trimesters take place in a sub-optimal manner it results in deficient growth in the fetal weight, size and maturation of the fetal metabolism, which is called as Intra-Uterine Growth Restriction[4]

Anthropometric measurements of USS like Ponderal Index (PI). Mid Arm Circumference (MAC), Chest Circumference and Head Circumference are the diagnostic tools for accessing IUGR

- In asymmetrical IUGR fetus the HC remains larger.
- An increase in fetal AC less than 10mm in 14 days has sensitivity of 85% and specificity of 74% for identification of IUGR.
- Normally HC\AC ratio ecceeds1.0 before 32 weeks. It is approximately 1.0 at 32 to 34 weeks
  After 34 weeks it falls below, if the fetus is affected by asymmetrical IUGR the HC remains larger. The HC\AC is then elevated.
- FL/AC ratio greater than 23.5 suggest IUGR
- Acceleration of placental maturation may occur with IUGR.
- A vertical pocket ofamniotic fluid >2cm is considered normal.
  Asymmetrical IUGR is commonly associated with oligohydroamnios.

- **Amniotic Fluid Index**

Between 5 and 25cm is normal. Value less than 5cm is suggestive of oligohydroamnios.[5]

- **Doppler Ultrasonography[6]**

Doppler flow studies are important parameters for fetal biometry in identifying the IUGR fetuses at risk of adverse outcome. Doppler now velocity wave forms are obtained from arterial and venous beds in the fetus. Arterial Doppler waveforms are helpful to assess the downstream vascular resistance. In the normal fetus umbilical artery shows presence of diastolic flow by 15 weeks gestation. As the placental resistance decreases with advancing gestation due to trophoblastic invasion, diastolic flow increases. The arterial Doppler waveform is use to measure the peak systolic(S), peak diastolic(D) and mean (M) volumes. From these values S\D ratio, pulsatility index (PI) {PI (S-D)\M) or Resistance Index (RI) (RI=(S-D)/S) are calculated.

- **Ponderal index**

The degree of fetal wasting is judged by fetal Pl. The index is determined by dividing the estimated fetal weight (g) by the third power of crown-heel length (cm) [(weight(g)\length cm3 ×100]. PI below the 10th percentile is taken as fetal growth restriction.

Clinically, IUGR can be diagnosed by

Serial measurement of fundal height and abdomen girth and maternal weight gain. Symphysis fundal height is the distance between the symphysis pubis and the highest point over the uterine fundus, normally increase by 1cm\week between 14th and 32 weeks.A lag in fundal height of 4 weeks is suggestive of moderate IUGR. A lag of >6 weeks is suggestive of severe IUGR.

Documentation of the girth of the abdomen in the last trimester should form a routine part of abdominal examination. Normally, the girth increases steadily up to term. If girth diminishes beyond term or earlier, it arouses suspicion of placental insufficiency.

IN AYURVEDIC CONTEXT

Aacharya Sushrut has equating germination of seed with achievement of conception as for the germination of seed there is requirement of proper *Kala, Beeja, Kshetra* and *Ambu*.[7]

Acharya Charka has described that *Garbha* is the combination of different *Bhava* and these are *Matrij, Pitrij, Aatmaja, Satmyaja Rasaja* and *Satvaja*.[8]

Right from the time of conception till delivery, it is the mother who carries and provides nourishment the fetus. The fetus derives all its merits and defects from the mother during this period.

At the initial stage till the organogenesis of *Garbha* , when specific parts of *Garbha* are not explicated, the *Garbha* obtains its survival by *Upasneha* and *Upasweda*

processes. *Upasneha* is unctuousness and *Upasweda* is moistness. The substances which are having more fluidity and thin in nature are absorbed by *Upasweda* process. *Acharya Charka* has also explained that what-so- ever diet the pregnant woman consumes the rasa formed from this *Aahara* performs three functions, nourishment of the mother's body, formation of *Stanya* and nourishment of the fetus.

When the body parts become conspicuous a part of nourishment is obtained through *Nabhinadi*. *Acharya Charka* has explained that The fetal *Nabhi* is attached to the *Nabhinadi*, *Nabhinadi* to the *Apra* and *Apra* to the mother's heart. The mother's heart immerses the *Apra* (with *Rakta*) through running and oozing vessels. Mother's diet contains all the *Rasa*, thus the rasa derived from this diet.[9]

In Ayurvedic context, there is no direct terminology as *Garbhashosha*. Broadly *Garbhashosha* has been mentioned as a symptom under diseased conditions like *Nagodara* and *Upvishtaka*[10], *Upshushka*[11], *Vatabhipannagarbha*[12], *Garbhakshaya*.[13] Line of management mentioned in Ayurvedic texts for these conditions are *Ghrita*, milk and meat soup treated with *Jivaniya, Vrihaniya, Madhur* and *Vatahara* drugs to enhances the fetal growth and development.] *Acharya Sushruta* mentioned about *Ksheerbasti* in *Garbhhakshaya*.[14]

Ksheerbasti is a therapeutic procedure in Ayurveda, which involves the application of medicated milk (*Ksheer*) into specific areas of the body, typically through the use of specially designed vessels or techniques. The therapy is considered a form of Panchakarma (detoxification and rejuvenation treatment), and it is aimed at balancing the *Doshas*, especially *Vata* and *Pitta*, to restore harmony in the body. Medicated milk, combined with various herbal ingredients, is thought to nourish tissues, improve circulation, and enhance the overall vitality of the individual.

The therapy is traditionally used for conditions related to debility, poor digestion, and metabolic imbalances. In the context of pregnancy, *Ksheerbasti* is believed to enhance the health of the uterus, improve blood flow to the placenta, and provide nourishment to the fetus, which are essential factors in managing IUGR.

Role of *Ksheerbasti* in IUGR

1. Improvement in Maternal Health: IUGR is often associated with underlying maternal health issues, such as malnutrition, hormonal imbalances, and poor circulation. *Ksheerbasti* is believed to restore the balance of the doshas, particularly *Vata*, which is linked to the nervous system, and *Pitta*, which governs metabolic functions. By improving the overall health of the mother, the therapy may create an environment that is more conducive to fetal growth. Enhanced maternal health may lead to improved nutrition delivery and better placental function, both of which are critical in reducing the risk of IUGR.

2. Enhanced Nutrient Absorption: Ayurveda posits that the digestive system (agni) plays a pivotal role in nutrient assimilation. In cases of IUGR, maternal malnutrition or digestive inefficiencies may hinder nutrient absorption, directly affecting fetal growth. *Ksheerbasti* is believed to strengthen *Agni* (digestive fire) and improve nutrient assimilation, ensuring that the mother receives the necessary nourishment for herself and her baby. This, in turn, can help in reducing the likelihood of growth restriction.

3. Promoting Blood Circulation: Proper blood circulation is vital for delivering oxygen and nutrients to the fetus. Soothing and nourishing properties may help improve blood flow, particularly to the pelvic region and uterus, leading to enhanced placental circulation. A well-nourished placenta supports optimal fetal growth, reducing the risks associated with IUGR.

4. Stress Reduction: Stress is known to contribute to pregnancy complications, including IUGR. Ayurvedic treatments, including *Ksheerbasti*, often have a calming effect on the nervous system, helping to alleviate stress. By reducing maternal stress and anxiety, *Ksheerbasti* may contribute to a healthier intrauterine environment, supporting optimal fetal development.

5. Restoration of Hormonal Balance: Hormonal imbalances can contribute to conditions like IUGR. *Ksheerbasti*, through its ability to balance the doshas, may help regulate hormonal levels, particularly those responsible for reproductive health. This can contribute to the overall well-being of the pregnancy and reduce the chances of restricted fetal growth.[15]

RESULT AND DISCUSSION

Symphysis Fundal Height normally increases by 1cm/week between 14 and 32 weeks. A lag in fundal height of more than 3 weeks is suggestive IUGR. SFH is fairly sensitive parameter (30-80%). Abdominal girth normally increases steadily upto term. If abdominal girth & maternal wight decreases or remain static, then it will arouses suspicion of IUGR. Normally, HC/AC ratio exceeds 1.0 before 32 weeks. It is approximately 1.0 at 32-34 weeks and it falls below 1.0 after 34 weeks, but In Asymmetrical IUGR the HC remains larger. The HC/AC ratio is elevated. FL is not affected in asymmetrical IUGR but FL/AC greater than 23.5 suggests Asymmetrical IUGR.[16]

Ksheerabasti acts as *Brimhana Niruha Basti*. *Ksheera* is considered to have properties like *Madhura, Sheeta, Snigdha, Stanya* and *Pushtikarka*, which can help to improve body weight and fetal growth. *Ksheera* and *Ghrita* are considered to have high nutritional value which contains carbohydrates, proteins, fat and calcium.

The *Rasayana* drugs (*Ksheera*, *Ghrita*) acts at the level of *Rasa* which helps in the nourishment of pregnant woman as well as fetus by improving tissue perfusion.[17]

CONCLUSION

Asymmetric IUGR is associated with several risks both during pregnancy and after birth so It requires careful management to minimize risks and ensure the best possible outcomes for both the mother and the baby. *Ksheerbasti* can be considered as an effective preparation which can be safely administered during pregnancy & It has no adverse effect on mother as well as on fetus.

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