

## Fetal Macrosomia

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### Abstract

Preconceptional, conception, antenatal period and intrapartum period are in continuum. For successful obstetric outcome, prepregnancy weight and proper antenatal care are important factors. Newborn whose birthweight exceeds 4000-4500gms is labeled as macrosomia. Prolong labour, arrest of labour, foetal distress, shoulder dystocia, instrumental delivery and increased incidence of cesarean section are associated with macrosomic fetuses. Early detection, watchfull expectancy active interventions are key factors for safe delivery of macrosomic fetuses

**Keywords:** Macrosomia; Diabetes; Cesarean Section; Shoulder Dystocia.

### Introduction

*A baby is something you carry inside you for nine months, in your arms for three years and in your heart till the day you die.* – Mary Mason

Safe and successful pregnancy begins before conception and it continues with appropriate antenatal care without any complications, the goal should always be to provide proper pre conception care which is an integral part of that pregnancy. Antenatal care continues till term to have a good maternal and perinatal outcome without any complications. Pregnancy and child birth have a huge impact on physical, mental, emotional and socioeconomic health of women and families. Pregnancy related health outcomes are influenced by women's health and other factors such as genetic, race, ethnicity, age, and diseases [1].

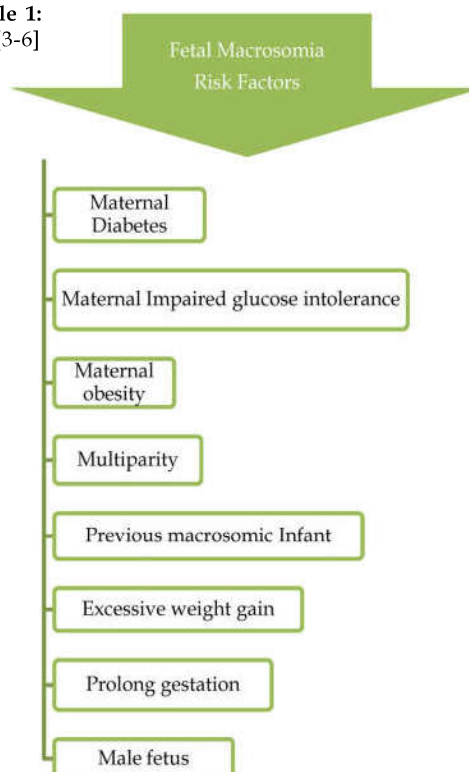
It is important to provide a good pre conceptional counseling, ANC visits following proper examination and investigations to fulfill above mentioned criteria's , to prevent complications such as big size baby also known as macrosomia.

### What is Macrosomia

Macrosomia is described as a newborn that is heavier than average birth weight babies in

community .Generally an infant whose birth weight exceeds 4000-4500gms is labeled as macrosomia [1]. Macrosomia affects between 3-15% of all populations depending upon sample size population [2].

**Table 1:**  
Ref[3-6]



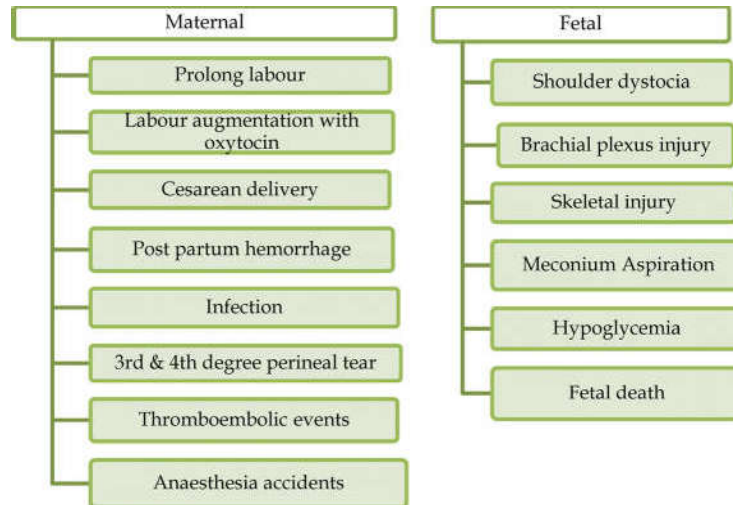


Table 2: Hazards of Macrosomia

#### Syndromes Associated with Macrosomia

- a. Beckwith–Wiedemann syndrome: It is an overgrowth disorder usually present at birth, characterized by a unique feature that consist of

Common features used to define BWS are [6]

- Macroglossia (large tongue),
  - Macrosomia (above average birth weight and length),
  - Midline abdominal wall defects (omphalocele/exomphalos, umbilical hernia, diastasis recti),
  - Otic dysplasia
  - Localized gigantism,
  - Neonatal hypoglycemia (low blood sugar after birth).
  - Hepatoblastoma
- b. Marshall-Smith Syndrome, discovered in 1971 (Marshall, Graham, Scott, Boner, & Smith), is characterized by unusual accelerated skeletal maturation (usually starting before birth) and symptoms like conspicuous physical characteristics, respiratory difficulties, and mental retardation [7].
- c. Perlman syndrome (renal hamartomas, nephroblastomatosis and fetal gigantism) is a rare overgrowth disorder present at birth. It is characterized by polyhydramnios and fetal overgrowth, including macrocephaly, neonatal macrosomia, visceromegaly, dysmorphic facial features, and an increased risk for Wilms' tumor at an early age. The prognosis for Perlman syndrome is poor and it is associated with a high neonatal mortality [9].

- d. Weaver syndrome (also called Weaver-Smith syndrome) is an extremely rare congenital disorder associated with rapid growth beginning in the prenatal period and continuing through the toddler and youth years. It is characterized by advanced osseous maturation, and distinctive craniofacial, skeletal, and neurological abnormalities [10].
- e. Sotos syndrome (cerebral gigantism or Sotos-Dodge syndrome) is a rare genetic disorder characterized by excessive physical growth during the first years of life. Excessive growth often starts in infancy and continues into the early teen years. The disorder may be accompanied by autism [11].

#### Diagnosis

A Diagnosis of Macrosomia can not be Made until Baby is Born.[12-13]

Estimated weight of fetus by Johnsons formula :-

Weight in gram = [Mc Donald measurement of symphisiofundal height in cms - x] × 155

X= 13 when presenting part was not engaged

X=12 when presenting part at 0 station

X= 11 when presenting part is + 1 station

Dawn's formula:-states that weight (grams) = longitudinal diameter of the uterus × transverse diameter of the uterus × 1.44/2. Measurements are made with pelvimeter. Double abdominal wall thickness was also measured by pelvimeter. If Double abdominal wall thickness was more than 3 cm, the excess was deducted from the longitudinal diameter.

*Obstetrical ultrasonography:-* Early expectations that this method might provide an objective standard for identifying foetus of abnormal size for gestation age was recently undermined by prospective studies that showed sonographic estimates of foetal weight to be no better than clinical palpation for predicting foetal weight

#### *Laboratory Diagnosis*

- Glucose tolerance test at 24-28 weeks of gestation screens for gestational diabetes
  - Early glucose screening is necessary for women with risk factors for development of diabetes .
1. Obesity
  2. Strong family history of diabetes
  3. Previous pregnancy affected by macrosomia & gestational diabetes
- In insulin controlled diabetic mother ,serial testing for presumed macroscopic fetus is indicated with.
1. Non stress test – Biweekly
  2. Contraction stress test-weekly
  3. Biophysical profile.
- Neonatal evaluation for hypoglycemia, polycythemia, hyperbilirubinemia & electrolyte abnormalities.(maternal hypoglycemia is most common cause of macrosomic newborn)

#### *Prevention*

Although no interventions has been proven to significantly reduce risk of macrosomia, several potentially useful strategies may be helpful:-

#### *Schedule a Preconceptional Appointment*

When a women seeks advice in preconceptional period she may refer to health care provider such as registered dietitian or health care specialist who can help changing life style and reach a healthy weight before pregnancy

#### *Monitor Weight Gain*

Gaining 11-15 kg during pregnancy often support baby growth and development.

#### *Diabetes in Pregnancy*

Strict glucose control with insulin therapy.

#### *Interventions*

Management strategies for suspected fetal macrosomia include early induction of labor and elective cesarean section.

*Early Induction of Labor:-* Patients with chances of having big size baby should have continuous monitoring of baby weight by repeated USG and allow the baby to gain about 230 gms (8.1 oz) per week up to 37 complete weeks by planning elective induction of labor before or near term which helps preventing macrosomia and its complications [8-9]. However, Friesen et al suggest that induction actually increases the cesarean section rate without favorably altering perinatal outcomes [10-13].

Weeks JW et al compared the outcomes of patients in whom macrosomia was suspected before delivery to those in whom it was not. The authors found that the risk of cesarean section was substantially higher (52 versus 30 percent) in pregnancies in which macrosomia was suspected, even after controlling for birth weight and other confounding variables. More importantly, the difference in the cesarean section rate was attributable to a greater proportion of failed inductions for macrosomia in the group in which it was suspected. Another observational study compared the outcomes of infants with suspected macrosomia who were managed with induction versus expectantly. Again, the rate of cesarean section was substantially higher (57 versus 31 percent) in the group that underwent elective induction [13].

#### *Elective Cesarean Section*

According to parks et al Elective cesarean section for suspected macrosomia has been proposed as a way to spare the parturient an unproductive labor and to prevent birth trauma. As it is difficult to predict macrosomia and the favorable outcome for most women who undergo a trial of labor imply that a large number of unnecessary cesarean sections would have to be performed to prevent a single bad outcome in the pregnancy complicated by suspected fetal macrosomia. A recent decision analysis estimated that to prevent one case of permanent brachial plexus injury 3,700 women with an estimated fetal weight of 4,500 g would need to have an elective cesarean section for suspected macrosomia [15-18].

#### *Management of Suspected Fetal Macrosomia*

The medical literature confirms that prediction of fetal macrosomia is difficult. According to Hall et al, ultrasound estimation of fetal weight adds little additional useful information. What obstetritian really want to predict is not macrosomia, per se, but the

serious complications that physicians mistakenly associate as occurring only with macrosomia, such as brachial plexus injury or shoulder dystocia.

Such complications, however, are not determined by birth weight alone, but by a complex and poorly understood relationship between fetal and maternal anatomy and other factors. Moreover, the vast majority of macrosomic infants who are delivered vaginally do very well, even if they experience shoulder dystocia. The weight estimate of the suspected macrosomic fetus should be recognized as uncertain. The patient's obstetric history, her progress during labor, the adequacy of her pelvis and other evidence suggestive of fetopelvic disproportion should be used in determining an intervention, such as cesarean section [22].

#### *Fetal Macrosomia in Special Populations.*

##### *Vaginal Birth after Cesarean Section*

Vaginal birth after cesarean section (VBAC) was once recommended to be avoided in women whose fetuses were estimated to weigh more than 4,000 gm. However, a study in 1989 compared the sequelae of VBAC of macrosomic and nonmacrosomic infants and noted no higher risk of uterine rupture in the women delivering infants in the macrosomic group. The 1999 VBAC Technical Bulletin of the American College of Obstetricians and "suspected macrosomia," though admittedly controversial, is on that list.

##### *Mothers with Diabetes*

Rouse et al address diabetic and non diabetic fetal macrosomia separately because infants of mothers with diabetes are at a greater risk of shoulder dystocia than infants of mothers who do not have diabetes. This is probably because of the disproportionate growth of the fetal chest and shoulders compared with the fetal head. Itzhak M, et al. have made different recommendations for treatment strategies, ranging from expectant management, to elective induction before the due date, to elective cesarean section for estimated fetal weights greater than 4,000 g, 4,250 g (9 lb, 6 oz), or 4,500 g. would be required to prevent one permanent brachial plexus injury. Presumably, elective induction for suspected macrosomia in pregnancies complicated by diabetes has the same increased risk of cesarean delivery as it does in pregnancies with no diabetes. In addition, the higher risk of neonatal respiratory distress syndrome in infants of mothers with diabetes should be considered [20-23].

#### *Previous Shoulder Dystocia*

Two observational studies done by Lewis DF have examined the risk of recurrence of shoulder dystocia in subsequent deliveries. One study 20 of 93 patients showed a recurrence rate of 1.25 percent. Another study of 747 patients showed a recurrence when interpreted in the context of the uncertainty of the effectiveness of interventions for suspected macrosomia, suggest that for most women with a history of shoulder dystocia, expectant management usually is the most appropriate option.

## **Discussion**

According to literature, foetuses above 4000gm are labeled as macrosomia. Foetal macrosomia has been always associated with neonatal and maternal morbidity. Hence prediction and early diagnosis of macrosomia are mainstay to achieve safe and successful pregnancy outcome. Pre pregnancy obesity should be considered as one of the predictor for macrosomia. Antenatal increase in BMI of 25% or greater is a most sensitive predictor of foetal macrosomia, other predictors being maternal diabetes, maternal impaired glucose tolerance, multiparity, previous history of macrosomic baby, postmaturity .

Diagnosis is achieved by proper history, doing regular antenatal assessment , timely assessment by ultrasonography, Johnsons formula or DAWN'S formula can be used to calculate estimated fetal weight at early labour.

## **Conclusion**

Prolonged labour , arrest of labour, foetal distress, shoulder dystocia instrumental delivery and increase incidence of cesarean section are complications of macrosomic fetuses. Early detection, watchful expectancy and active intervention in complications are key factors for safe delivery of macrosomic fetuses.

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