Original Research Paper

COMPARATIVE STUDY OF FETAL WEIGHT ESTIMATION AT TERM WITH BIRTH WEIGHT

Authors:

[1]Dr Shobha Mukherjee, MS Obstetrics & gynecology (Professor), [2]Dr. Shreshu Yadav, MS Obstetrics & gynecology (Resident), [3]Dr. Aparna Khandelia [3] MS obstetrics & gynecology (Resident)

[1]Department of Obstetrics & Gynecology, Rohilkhand Medical College & Hospital, Bareilly, UP, INDIA
[2]Department of Obstetrics & Gynecology, Rohilkhand Medical College & Hospital, Bareilly, UP, INDIA
[3]Department of Obstetrics & Gynecology, Rohilkhand Medical College & Hospital, Bareilly, UP, INDIA

Corresponding Author:

Dr. Shobha Mukherjee, MS Obstetrics & gynecology (Professor), Department of Obstetrics & Gynecology, Rohilkhand Medical College & Hospital, Bareilly, UP, INDIA.

INTRODUCTION:

The aim of modern obstetrics is to achieve the best quality of life for both mother and newborn .Birth weight along with gestational age is very important indicator for pregnancy outcome.. Assessment of fetal weight in utero leads to an improved prospective management of high risk pregnancies and considerable reduction in perinatal morbidity and mortality. Knowledge of the weight of the fetus in-utero is important in cases of gestational diabetes mellitus, trial of labour in case of vaginal birth after caesarean delivery, intra-partum management of breech presentation, preterm delivery and it's postponement, to decide the optimal delivery route and in detection of intra uterine growth restriction . The burden of extreme fetal weight on maternal and neonatal health has thus necessitated research into accurate ways of estimating fetal weight especially estimation of fetal weight would help in taking appropriate management decisions. Very low birth weight babies delivered vaginally may be predisposed to skull injuries. limb fractures, and trauma to the abdominal organs such as the spleen and liver as a result of prematurity. Causes of large birth weight babies include genetic factors (taller, heavier parents tend to have larger babies), gestational age beyond 40 weeks, excessive maternal weight gain, maternal diabetes and the potential complications associated with vaginal delivery which includes shoulder dystocia, brachial plexus injury, bone injuries, and intra partum asphyxia, while the maternal risks includes birth canal and pelvic floor injuries increased rate of operative vaginal and caesarean deliveries, and postpartum haemorrhage. Complications of low birth weight include low oxygen levels at birth, trouble feeding and gaining weight, infections, breathing problems and immature lungs (infant respiratory distress syndrome), nervous system problems such as bleeding inside the brain (intraventricular haemorrhage), digestive problems such as serious infection of the intestines (necrotizing enterocolitis), sudden infant death syndrome (SIDS) when there is likelihood of delivering a very low birth weight baby (as in preterm delivery), prenatal counseling on likelihood of survival, optimal route of delivery, or the level of hospital. In order to prevent the adverse consequences of macrosomia in such cases, accurate estimation of fetal weight is of utmost importance. Likewise, accurate estimation of fetal weight is also very important in planning for a vaginal birth after a previous cesarean section and in intrapartum management of fetuses presenting breech. In developing countries like India estimation of fetal weight by clinical method is important in managing the high risk pregnancies and in the care of neonate. We intend to compare the various methods (clinical and sonological) of fetal weight estimation at term with the weight of the newborn at birth.

MATERIAL AND METHODS :

This was a prospective study conducted in the department of obstetrics and gynaecology of Rohilkhand medical college and hospital ,Bareilly , between November 2017 to October 2018 after obtaining the approval of ethical committee . This study included all booked , unbooked and referred term cases in whom delivery was anticipatedwithin 72 hours .

INCLUSION CRITERIA:

1. All antenatal term women (37 to 42 weeks gestation)
2. Vertex presentation
3. Singleton pregnancy
4. Patient with reliable date by LMP or by USG

EXCLUSION CRITERIA:

1)Multiple gestation
2)Obese women
3)presentation other than verex
4) preterm and postterm
5) oligihydramnios and polyhydramnios
6) pregnancy with uterine or abdominal mass
7) fetal anomalies
8) intrauterine death

The study consists of estimation of fetal weight using following 4 methods :

1. DAWN'S FORMULA
2. DARE'S FORMULA
3. HADLOCK'S FORMULA
4. JOHNSONS FORMULA

1)DAWNS FORMULA :

$EFW = [L \times (T)^2 \times 1.44]/2$
L : LONGITUDINAL DIAMETER OF THE UTERUS (IN CMS)
T : TRANSVERSE DIAMETER OF THE UTERUS (IN CMS)

2) DARES FORMULA:

$EFW = SFH \times AG$
SFH : SYMPHYSIOFUNDAL HEIGHT
AG = ABDOMINAL GIRTH

3) HADLOCKS FORMULA :

$Log_{10}(EFW) = 1.4787 - 0.003343AC \times FL + 0.001837 BPD^2 + 0.0458AC + 0.158 F$
AC ; ABDOMINAL CIRCUMFERENCE
FL : FEMUR LENGTH
BPD : BIPAREITAL DIAMETER

4)JOHNSONS FORMULA:

$EFW = (SFH - n) \times 155 gms$
n=12 if vertex is at or above the level of ischial spines
n=11 if vertex is below the level of ischial spines

weight of the newborn :
It was documented immediately after birth after drying the baby but before breastfeeding . Weight was measured using electronic weighing machine .After correction of the zero error , baby was placed on the sterile paper in the middle of the weighing pan and weight was noted .

RESULTS :

This lomgitudinal cross sectional study consisted of 150 patients who were admitted for delivery at Rohilkhand medical college and hospital , Bareilly .

1. **Distribution of cases according to birth weight**

Birth weight (gms)	Number of cases (n)	Percentage (%)
<2000	16	4.6%
2001-2500	65	18.6%
2501- 3000	140	40%
3001- 3500	99	28.2%
>3501	30	8.6%
Total	350	100%

Table 1 shows that among 350 babies , 16 (4.6%) were below 2000gms , 65 (18.6%) were between 2000-2500 gms , 140 (40%) were between 2501 – 3000 gms , 99 (28.2%) were between 3001-3500 gms and remaining 30(8.6%) were above 3501 gms .

2. **Distribution of mode of delivery in the study population** :

Mode of delivery	Number of case (n)	Percentage(%)
Normal vaginal delivery	195	55.8%
LSCS	145	41..4%
FORCEPS	10	2.8%

Among 350 patients 195(55.8%) had vaginal delivery 145 (41.4%) delivered by LSCS and 10 (2.8%) had instrumental delivery.

3. **Correlation of birth weight with mode of delivery**

Actual birth weight	NVD	LSCS	FORCEPS
<2000gms	6	6	0
2001- 2500gms	42	26	1
2501- 3000gms	80	53	7
3001-3500gms	50	48	1
>3500gms	17	12	1

Table 3 shows that among 12 babies below 2000gms birth weight delivered vaginally and 6 required caesarean section , out of 69 babies between 2001-2500gms of weight 42 delivered vaginally and 26 by LSCS and 1 by forceps delivery , out of 140 babies in between 2501-3000 gms 80 by vaginal delivery 53 by LSCS and 7 by forceps delivery , out of 99 babies in between 3001-3500 gms of weight 50 delivered vaginally and 48 by LSCS and 1 by forceps delivery , out of 30 babies above 3500gms 17 delivered vaginally and 12 by LSCS and 1 by forceps delivery .

DISCUSSION:

Accurate estimation of fetal weight can help the obstetrician in knowing the salvagibility of the baby outside the uterus,as birth weight is the principle variable effecting the survival of neonate.Estimation of fetal weight has been incorporated into the standard routine antepartum evaluation of high risk pregnancies and deliveries.Alot of studies has been done to find out the accurate method for fetal weight detection in utero.They include clinical and ultrasound estimation. 350 women were included to fulfil the inclusion criteria.

1.In this study majority of women were of reproductive age group which is 25-35yrs of age,Minimum age was 18yrs and maximum age was 40yrs.In study conducted by Bhandary Amritha et at out of 200 women 90 were primigravida and 110 were multigravida.In our study Among 350 patients 139 werev primigravida and 211 were multigravida

2.Bhandary Amritha et al. in their study found that average error in grams was least (224.37) by Dare's formula when compared with other method. Hadlock had an average error of (299.11) and Johnson's had average error of (292.51).

Studies	Primigravida	Multigravida	Total
Bhandary Amritha et al	90	110	200
Present study	139	211	350

Average error was maximum by Dawn's formula (464.35). Anupama et al found that least average error (305.92) in grams was by dare's formula, followed by hadlock's with 307.85gms average error. The maximum average error was by Dare's formula 574.97gms. In our study we found that the average error was least with Dare's formula(202.3) followed by Hadlok's formula(213.8) aant the maximum average error was with Dawn's formula(387.6). All the three studies had similar result when compared. The difference between average error between Hdlock's and Dare's was not statically significant.

3.Bhandary Amritha et al in their study found that standard deviation of prediction error was least for Hadlock's formula (258.48) followed by Dare's formula(277.66), then johnson's formula (309.98) and was maximum for Dawn's formula(442.56). Anupama k et al found that standard deviation for prediction error was least with Hadlock's formula(127.16), followed by Johnson's formula(185.1)band maximum bu Dawn's formula(291.73)

In our study we found that standard deviation of prediction errorwas least for Dare's formula(212.4) followed by Hadlock's formula (238.6), then Johnson's formula(302.4) and was maximum for Dawn's formula(364.2)

CONCLUSION:

Fetal weight estimation has become increasingly important especially for the prevention of prematurity, evaluation of fetopelvic disproportion, decision for mode of delivery, induction of labour before term, in complication of pregnancy and in detection of intrauterine growth retardation. we in our study found out that accuracy doesn't improve with technology. Of all the three clinical methods Dare's formula has better predictable result than the other two methods. Conclusion of this study will add up to evidence provided by earlier investigation that clinical methods are equally reliable, cheap and easier to teach and can go a long way in aiding decision-making process in resource poor developing nations without compromising on the results in term of fetal and maternal well being methods.

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