

A Study of Assessment of Fetal Weight in Term Pregnancy by Hadlocks Formula Using Ultrasound and Comparison with Actual Birth Weight of Baby

Jasleen Mavi*, Alka B. Patil**, Shruti Singh***

Abstract

Introduction: Accurate estimation of foetal weight is of paramount importance in the management of labour and delivery. During the last decade, estimated foetal weight has been incorporated into the standard routine antepartum evaluation of high-risk pregnancies and deliveries. *Aims and Objectives:* To Study fetal weight in term pregnancy by Hadlocks formula using Ultrasound and comparison with actual birth weight of baby. *Methodology:* This was a Study carried out at medical college and hospital from January 2009 to October 2010 in the department of obstetrics and gynecology. Two hundred women at term were studied. The fetal weight was estimated at the time of admission. Fetal birth weight was measured by Hadlock method. The Statistical analysis done by SPSS 17. *Result:* Mean age of mothers was found to be 22.67 years of them 18 years minimum age was seen. Of 52.4 kg as mean weight of study population maximum weight found was 77 kgs. 142 cms was the minimum height found and 154.61 cms mean height of mothers. 59% babies were normally delivered and 24.5% babies were delivered by LSCS. Instrumental vaginal delivery was performed in 16.5% mothers. The Mean \pm SD for Actual birth weight (Grams) was 2643.00 ± 331.14 (Range-2000 to 3615) And Hadlock USG (Grams) Mean \pm SD $2608.45 \pm$

285.94 (Range- 2010 to 3478). Hadlock had mean error of -34.5 gms. There was Significant difference in Birth weight predicted by Hadlock's (USG) and Actual birth weight ($P < 0.03$) Hadlock had error of 100gms in 30.5% babies and only in 10.5% it was more than 200gms. Hadlock determines 95 % accurately birth weight with just 10% error and with 15% error birth weight is accurately determined in 100% babies. Hadlocks (USG) overestimated the birth weight in 41.5% babies, of them 12 and 14% had more weight upto 100 gms. 58.5% babies had their weight underestimated which was 51 to 100 gms and 101 to 150 gms less in 16.5% and 15% babies respectively. *Conclusion:* In our study, Hadlock's formula showed the greatest accuracy in prediction of birth weight but it having some errors so it should be considered combining with the clinical assessment.

Keywords: Hadlock's USG; Birth Weight; Foetal Weight.

Introduction

Accurate estimation of foetal weight is of paramount importance in the management of labour and delivery. During the last decade, estimated foetal weight has been incorporated into the standard routine antepartum evaluation of high-risk pregnancies and deliveries. For instance, management of diabetic pregnancy, vaginal birth after a previous caesarean section, and intrapartum management of fetuses presenting by the breech will be greatly influenced by estimated foetal weight [1,2].

Also, when dealing with anticipated preterm delivery, perinatal counselling on likelihood of survival, the intervention undertaken to postpone preterm delivery,

*Medical Officer,
Panchkula, Haryana.
**Professor & Head,
**Senior Resident, Dept. of
Obstetrics and Gynecology,
ACPM Medical College,
Dhule.
Jasleen Mavi,
Medical Officer, Panchkula,
Haryana - 134001.
E-mail:
dr.jasleen.mavi@gmail.com

optimal route of delivery, or the level of hospital where delivery should occur may be based wholly or in part on the estimation of expected birthweight. Categorization of foetal weight into either small or large for gestational age may lead to timed obstetric interventions that collectively represent significant departure from routine antenatal care [2,3-5]. High rate of perinatal mortality (39–130 per 1,000 total births) is still a major cause for concern in developing countries such as Nigeria [8]. A large portion of this problem is related to birthweight which remains the single most important parameter that determines neonatal survival [6-9].

It is estimated that 16% of liveborn infants have low birthweight, a condition associated with high perinatal morbidity and mortality. Foetal macrosomia is associated with maternal morbidity, shoulder dystocia, birth asphyxia, and birth trauma [10]. An incidence of 1.6% of macrosomia was quoted in Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, in 1991, while 4.9% was reported in 1983 to 1985 series in the Lagos University Teaching Hospital [11].

It has been suggested that accurate estimation of foetal weight would help in successful management of labour and care of the newborn in the neonatal period and help avoidance of complications associated with foetal macrosomia and in low-birthweight babies, thereby decreasing perinatal morbidity and mortality [2-4,12,13].

Ultrasound study forms a very important tool in present day obstetrics. Accurate assessment of fetal weight helps in decision making in preterm fetus, small for gestational age (SGA) fetus, intrauterine growth restriction (IUGA), preterm premature rupture of membranes, large for gestational age (LGA) fetus, macrosomic fetus, previous caesarean sections where the time and route of delivery needs to be planned in advance. The development of real time ultrasound equipment has enabled the obstetrician to screen both high and low risk pregnancies for fetal wellbeing, growth and development and to accurately determine

gestational age [14]. Several investigators have reported formulas and nomograms for estimation of fetal weight using a variety of parameters, including the parietal diameter (BPD) [15], Abdominal circumference (AC) [17], femur length (FL) [15], head circumference (HC), 14 area of the cross section of fetal chest or fetal abdomen and combinations of the above parameters [16].

Aims and Objectives

To Study fetal weight in term pregnancy by Head locks formula using Ultrasound and comparison with actual birth weight of baby.

Methodology

This was a Study carried out at medical college and hospital from January 2009 to October 2010 in the department of obstetrics and gynecology. Two hundred women at term were studied. The fetal weight was estimated at the time of admission. All pregnant women at term were included into study while Multiple gestation, Malpresentation, Polyhydramnios of oligohydramnios, Fibroid or any adnexal masses Any congenital anomalies were excluded from the study. Fetal birth weight was measured by Hadlock method. The Statistical analysis done by SPSS 17.

Result

Mean age of mothers was found to be 22.67 years of them 18 years minimum age was seen. Of 52.4 kg as mean weight of study population maximum weight found was 77 kgs. 142 cms was the minimum height found in 154.61 cms mean height of mothers.

59% babies were normally delivered and 24.5% babies were delivered by LSCS. Instrumental vaginal delivery was performed in 16.5% mothers.

Table 1: Showing minimum and maximum distribution of age. Weight and height of the mothers

Parameters	N	Mean±S.D	Minimum	Maximum
Age mother (years)	20	22.67±2.81	18	35
Mother weight(kg)	200	52.80±6.52	40	77
Height of mother(cm)	200	154.61±5.49	142	171

Table 2: Showing mode delivery

Mode of Delivery	Frequency	Present
FTND	118	59%
LSCS	49	24.5%
Instrumental	33	16.5%

Table 3: Showing distribution of actual birth weight and predicted birth weight by Hadlock(USG)

Methods	Mean	Std deviation	Minimum	Maximum
Actual birth weight(Grams)	2643.00	331.14	2000	3615
Hadlock USG(Grams)	2608.45	285.94	2010	3478

The Mean \pm SD for Actual birth weight(Grams) was 2643.00 \pm 331.14 (Range-2000 to 3615).

And Hadlock USG(Grams)Mean \pm SD2608.45 \pm 285.94 (Range-2010 to 3478).

Table 4: Showing error the predicted weight from the actual weight by Hadlock (USG)

Methods	Mean	Std. Deviation	Minimum	Maximum
Error hadlock	34.5	130.4	-364.0	362.0

Table 5: Showing comparisons of predicted birth weight with dependent variable as actual birth weight by Hadlock (USG)

Statistical analysis		Mean difference(A-B)	Std. error	Sig.	95%confidence interval	
(A)method	(B) method				Lower bound	Upper bound
Actual birth weight	Hadlock's(USG)	34.55	37.36	.036355	-38.79	107.88

Table 6: Error in detection of expected weight from the actual birth weight in Hadlock (USG)

Difference Of birth weight	Error Hadlock Freq.	%
50gms	42	21
100gms	61	30.5
150gms	47	23.5
200gms	29	14.5
>200gms	21	10.5
total	200	100

Table 7: showing percentage of accuracy in the Hadlock (USG)

Percent Error from actual weight	Percentage of accuracy by headlock
5%	71.0
10%	95.5
15%	99.9
20%	100.0

Table 8: Showing overestimation and underestimation of birth weight by Hadlock (USG)

Weight in grams	Overestimation of weight		Underestimation of weight	
	Frequency	percent	Frequency	Percent
50gms	24	12.0	18	9.0
51 to 100 gms	28	14.0	33	16.5
101 to 150 gms	17	8.5	30	15.0
151 to 200 gms	11	5.5	18	9.0
>200 gms	3	1.5	18	9.0
Total	83	41.5	117	58.5

There was Significant difference in Birth weight predicted by Hadlock's (USG) and Actual birth weight (P<0.03).

Hadlock had error of 100gms in 30.5% babies and only in 10.5% it was more than 200gms.

Hadlock determines 95% accurately birth weight with just 10% error and with 15% error birth weight is accurately determined in 100% babies.

Hadlocks (USG) overestimated the birth weight in 41.5% babies, of them 12 and 14% had more weight upto 100 gms. 58.5% babies had their weight underestimated which was 51 to 100 gms and 101 to

150 gms less in 16.5% and 15% babies respectively.

Discussion

Ultrasound estimation of fetal weight is of utmost importance in obstetric practice. Accurate estimation helps in management of preterm and small for gestational age(SGA) fetuses. Where the obstetrician can decide the route of delivery based on the neonatal setup available. Also accurate estimation of fetal weight is of utmost importance in large for gestational age (LGA) fetuses and macrosomic fetus where in the

route of delivery can be decided before hand .Ultrasound is painless, noninvasive, simple technique and has potential to screen all the patients. It also provides much valuable information such as biophysical profile, gestational age, lie, position, presentation etc. However, clinical methods are simple, they do not require sophisticated instruments for estimation fetal weight.

In our study we have found that Mean age of mothers was found to be 22.67 years , of them 18 years minimum age was seen. Of 52.4 kg as mean weight of study population maximum weight found was 77 kgs. 59% babies were normally delivered and 24.5% babies were delivered by LSCS. Instrumental vaginal delivery was performed in 16.5% mothers. The Mean \pm SD for Actual birth weight (Grams) was 2643.00 \pm 331.14 (Range-2000 to 3615) And Hadlock USG(Grams) Mean \pm SD 2608.45 \pm 285.94 (Range-2010 to 3478). Hadlock had mean error of -34.5 gms. There was Significant difference in Birth weight predicted by Hadlock's (USG) and Actual birth weight ($P < 0.03$) Hadlock had error of 100gms in 30.5% babies and only in 10.5% it was more than 200gms. Hadlock determines 95 % accurately birth weight with just 10% error and with 15% error birth weight is accurately determined in 100% babies. Hadlocks (USG) overestimated the birth weight in 41.5% babies, of them 12 and 14% had more weight upto 100 gms. 58.5% babies had their weight underestimated which was 51 to 100 gms and 101 to 150 gms less in 16.5% and 15% babies respectively. These findings are comparable with pinto PJ and shetty AP (2004) [18], Sharma R and bhardwaj NA (2002) [19].

Conclusion

In our study, Hadlock's formula showed the greatest accuracy in prediction of birth weight but having some errors so it should be considered combining with the clinical assessment.

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