

Examine the Accuracy of Ultrasound in Estimation of Fetal Weight Pre and Post-delivery

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ABSTRACT

Aim: To determine the accuracy of ultrasonography in estimation of fetal weight and after deliver birth weight.

Study Design: Prospective, cross-sectional study.

Place and Duration: This research was conducted at Department of Radiology, Sughra Shafi Medical Complex Narowal from 1st January 2018 to 30th June 2018.

Methods: Two hundred and sixty five pregnant women of ages 20 years to 45 years were included. Patient's detailed history including literacy level, socio-economic was noted. Patient's weight, height and parity were also calculated. Fetal weight was examine by using ultrasound and compare it to after delivery birth weight.

Results: There were 144 (54.33%) patients were ages between 20 to 30 years, 90 (33.96%) patients were ages between 30 to 40 years and rest 31 (11.70%) had an ages greater than 40 years. One hundred and ten (41.59%) were literate while rest were illiterate. One hundred and sixty (60.38%) had an urban residency. Patients weight were ranges between 40kg to 90 kg. Minimum fetal weight was observed as 2.30kg while maximum was 3.60kg. Accuracy of ultrasound resulted 45.28%. Error estimation was noted as 45.28% 33.96% and 20.78% as accurate, over and under estimated.

Conclusion: It is concluded that error estimation of fetal weight was observed that is 100 grams of actual birth weight. Moreover, rely only on ultrasonography for estimation fetal weight may lead to obstetrical problems.

Keywords: Ultrasound, Fetal weight, Birth weight

INTRODUCTION

Estimation of fetal weight during pregnancy is very important for delivery management and prenatal care¹. It is also very important for making decision by expertise for mode of delivery². Estimation fetal weight (EFW) is very mark able in electric C-section delivery for those patients whom have macrosomia fetus. Macrosomia has enormous observation and may lead to increase the perinatal mortality and morbidity which can result of genital tract trauma and postpartum bleeding.² Many of studies resulted that those births having with macrosomic fetus having health problems in future.³ Estimation of fetal weight is very helpful in controlling the interval and time of delivery⁴.

Fetal weight estimation contains two methods for prediction of birth weight, through ultrasonic measurement of fetal part and by clinical examination of fetal parts and calculation based on uterine height.^{5,6} The use of ultrasound for estimation of fetal weight in clinically examination is old procedure and currently sonography technique is more efficient and acceptable for measurement of estimated fetal weight and it was reported by a study conducted by Ashraf el al⁷. Several researches have been established for importance of ultrasonography method for fetal weight estimation, intrauterine growth, isoimmunization and macrosomic⁸.

The fetal weight estimation by using ultrasound takes in account of different measurement of fetal body integrated into different formulae. The formula based on

hand abdomen femur measurement showed the lowest percentage error⁹. By using ultrasound technique in prediction of birth weight, sensitivity and specificity was 92.1% and by palpation it was 99.6%.¹⁰ In another research the accuracy of the ultrasound in prediction of birth weight resulted 72.2%¹¹.

By using ultrasonography technique, it is expensive than the other methods and also more time consuming technique but it is more accurate than the other methods for prediction of birth weight. Irrespective of its simple use, ultrasonic estimation of fetal weight could have variation in measurement upto 6 to 11%¹².

This study will be helpful for new graduates and expertise and for betterment of mother and neonatal care.

MATERIALS AND METHODS

This prospective, cross-sectional study was conducted at Department of Radiology, Sughra Shafi Medical Complex Narowal from 1st January 2018 to 30th June 2018. Two hundred and sixty five pregnant women of ages 20 years to 45 years were included. Mothers their pregnancy going to end and admitted for normal vaginal delivery, elective C-section delivery and induction labour was included. After taking informed consent from all pregnant women, patients detailed history was examine. Literacy level, socio-economic status was noted. Patient's weight and age was also calculated. Fetal weight was examine by using Ultrasound and compare it to after delivery birth weight. Ultrasound examination was done by the experience doctors. Patients with preterm labour, rupture membrane, un booked, multiple pregnancies etc were excluded from this study. All statistical data was analyzed by computer software SPSS 16.0.

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RESULTS

There were 144(54.33%) patients were ages between 20 to 30 years, 90(33.96%) patients were ages between 30 to 40 years and rest 31 (11.70%) had an ages greater than 40 years. 110 (41.59%) were literate while rest were illiterate. 160 (60.38%) had an urban residency and 105 (39.62%) patients were belongs to rural areas. Eighty (30.19%) patients had weight 40 to 49kg, 152 (57.36%) had 50kg to 60kg weight and 33 (12.45%) had weight >60kg (Tables 1-2).

Minimum fetal weight was observed as 2.30kg while maximum was 4.60kg. After birth noted 2.40kg as minimum and 4.50kg as maximum by using weight machine. Accuracy of ultrasound resulted 190 (71.70%) while 75 (28.30%) had an error in estimation. Error estimation was noted as 71.70%, 13.21% and 11.32.% as accurate, over and under estimated (Tables 3-5).

Table 1: Age-wise distribution of mothers

Age (years)	No	%
20 – 30	144	54.33
30 – 40	90	33.96
>40	31	11.71

Table 2: Demographic details of patients

Variable	No.	%
Literacy Level		
Literate	110	41.59
Illiterate	155	58.41
Residency		
Urban	160	60.38
Rural	105	39.62
Weight (kg)		
40 – 49	80	30.19
50 – 60	152	57.36
>60	33	12.45

Table 3: Fetal weight by Ultrasound and by weight machine after birth

Characteristics	Min	Max
Fetal weight in kg	2.30	4.60
After Birth	2.40	4.50

Table 4: Accuracy of ultrasound in EFW

Characteristics	No.	%
True	190	71.70
False	75	28.30

Table 5: Estimation error by USG

Characteristics	No.	%
Accurate	190	71.70
Over estimated	40	15.09
Under estimated	35	13.21

DISCUSSION

Fetal weight estimation is very important in pregnancy management. It helps to predict fetal outcomes and delivery mode. Estimation of fetal weight accurately may reduce the perinatal morbidity and mortality followed by high risk pregnancies such as intrauterine growth retardation, premature labour and macrosomia. Estimation of fetal weight by using ultrasound is most commonly using method.^[9] Weight examination range of 10% of actual birth

weight is considered accurate and mostly studies showed seventy five percent of accuracy by ultrasonography.

In our research the accuracy rate by using ultrasound was 71.70% and these results shows similarity to some other studies in which accuracy rate was greater than 70%¹³. We observed 15.09% as over predicted rate and under estimated rate was 13.21%. We observed 100 grams difference in prediction of fetal weight and after delivery weight by weight measure machine and these results shows little difference to some other studies established regarding estimation of fetal weight¹⁴. We found low estimation error by using ultrasound. But some studies show high estimation error and may lead to stress, anxiety and sometime may lead to obstetrical problems because of not accurately prediction of fetal weight. The difference may be due to environmental changes, genetic factor and misdiagnosed by radiologist and expertise mode of treatment.

In this study, we observed minimum fetal weight 2.30kg while maximum was 4.60kg. After birth noted as 2.40kg as minimum and 4.50kg as maximum by using weight machine, 100 grams difference found in estimation and actual birth weight it may be due to expert radiologist and gynaecologist and better observation and these findings were correlate to some other studies in which EFW and actual birth weight shows minor error.¹⁵ In our study, birth weight was measured immediately after birth but some studies shows results estimation determine up to 14 days prior to delivery.¹⁵ Other studies performed estimation within 7 days^{16,17} or have performed correct for the time lapsed between the ultrasound and delivery by the addition of 25g per day.¹⁸

CONCLUSION

Estimation of fetal weight is very important for the mother and neonatal health care. In this study, we concluded that use of ultrasound in prediction of fetal weight is more accurate than the other methods applies in prediction of fetal weight and error estimation of fetal weight was observed that is 100 grams of actual birth weight. Moreover, rely only on ultrasonography for estimation fetal weight may lead to obstetrical problems. We should have to do more work and studies to achieve the targeted concern.

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