SERIAL FOETAL GROWTH SCAN'S ACCURACY IN ESTIMATING FOETAL BIRTH WEIGHT IN MULTIPLE PREGNANCIES

Fouzia Rasool Memon[1], Samreen Memon[2], Ruth Lawley[3]

[1] Consultant Obstetrician and Gynaecologist, North Cumbria University Hospital, United Kingdom.
[2] Department of Anatomy, Liaquat University of Medical & Health Sciences, Pakistan.
[3] Consultant Obstetrician and Gynaecologist, Cumberland Infirmary, Carlisle, United Kingdom.

Address for Correspondence:
Dr. Fouzia Rasool Memon
Consultant Obstetrician and Gynaecologist, North Cumbria University hospital, United Kingdom.
Email: fouziarasoolbux@yahoo.com
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ABSTRACT

Objectives: To evaluate the role of ultrasonography (USG) in estimating foetal birth weight in twin pregnancies; and to classify the relationship of actual birth weight and estimated birth weight on ultrasonography.

Methodology: It was an observational study on women with twin pregnancies who delivered from January 2009 till August 2018. Out of 27,219 women delivered at North Cumbria University Hospital, United Kingdom, a total of 870 sets of twin pregnancies were identified. We used customised growth chart software made by Perinatal Institute, United Kingdom for the plotting of foetal growth by USG. The estimated foetal birth weight (EFBW) measured on serial growth scans of twin pregnancies closest to the birth date was plotted on the customised growth charts. The EFBW at the time of delivery was predicted by following that centile and the difference between this EFBW and the actual weight was then assessed.

Results: Of the 870 women with twin-pregnancy, majority were aged between 30-39 years (n=478, 55%). Primiparous women accounted for 470 (54%) and majority conceived naturally (n=690, 70%). Dichorionic diamniotic twins accounted for 565 (65%). In accordance with our acceptable standard of 250 grams, the majority of twins 64% of twin 1 and 78% of twin 2, the estimated birth weights by USG were within that standard. In 71% (618/870) of cases, the USG estimated birth weights in twin 1 were larger than the actual birth weight and similar picture was seen in 68% (592/870) of second twin.

Conclusion: Ultrasound was found to be an accurate tool of determining estimated fetal birth weight. The majority of the USG estimated birth weights were within the agreed standard of 250g difference with the actual birth weight.

Key Words: Twin pregnancies, Ultrasonography, Foetal birth weight

INTRODUCTION

The incidence of multiple gestation pregnancies is on the rise which may be due to the complex interplay between genetic and environmental components. Moreover, advanced maternal age and assisted reproductive techniques are recognised risk factors for multiple gestation[1]. Multiple pregnancy accounts for 3% of live births currently and the figures have risen in the last 30 years mainly due to assisted reproductive techniques[2-4].

Obstetric complications such as miscarriage, hypertension, placenta praevia and foetal anomalies are more common in multiple pregnancies[5]. Twins also have a considerably greater risk of perinatal morbidity and mortality universally; and these account for 14% of all infant deaths[6]. Due to the increased risk of complications, these women with twin pregnancies need more surveillance and increased contact with healthcare professionals.

Intrauterine foetal growth restriction (IUGR) remained a major contributing factor for increased perinatal mortality and morbidity regardless of recent improvements in antenatal care. There is plenty of literature available on identification and management of small for dates and IUGR babies but most of the studies have excluded twin pregnancies. However, we are still missing evidence based studies for the diagnosis of normal grown small for gestational age twins. Only few studies are available in literature on the management of normal grown small for gestational age twins and those are mainly based on hospitals and clinicians' individual practices. Ultrasonography has been shown as an invaluable tool in the evaluation of growth discordant, IUGR and small for gestational age (SGA) twin gesta-

tions. It is fairly common to have difference in growth velocity in twin pregnancies[1] and to a certain extent it represents physiological or adaptive variation.

This study aimed to check the difference between the estimated foetal birth weight on ultrasound during pregnancy and the actual weight at delivery and secondly to see whether ultrasonography underestimate or overestimate the weight of the baby. This will be helpful in determining if serial fetal growth scans are accurate in assessing the estimated foetal birth weight (EFBW) in twin pregnancies as there is a strong relationship between perinatal mortality and morbidity and birth weights in twin pregnancies. Moreover, it will help in determining fetal wellbeing during antenatal period using USG and in planning regarding accurate timing of induced deliveries.

METHODOLOGY

This was an observational study of growth disparities between twins in multiple pregnancies booked for antenatal care and delivery North Cumbria University Hospital, Carlisle, from January 2009 till August 2018. Of total 27,219 women registered antenatal ly, 870 women had twin pregnancy which were included in this study. Those women who had higher multiple pregnancies were excluded from the study. We measured estimated weight of each twin in 870 twin pregnancies, henceforth calculated estimated and actual birth weight of 1740 foetuses.Chorionicity of twins was determined on ultrasound in first trimester of pregnancy. Regular foetal growth scans were offered fortnightly to monochorionic diamniotic twins (MCDA) from 16 weeks of gestation onwards and every 4 weeks in dichorionic diamniotic twins (DCDA) from 20 weeks onwards until 36 weeks of gestation. The EFBW measured on serial growth scans of twin pregnancies closest to the birth date was plotted on the customised growth charts. The EFBW at the time of delivery was predicted by following that centile. Then the difference between this EFBW and the actual weight was assessed.

The patient's data was collected through the electronic patient admission system, clinical coding of surgical cases and special care baby unit. Obstetric ultrasound scan data were obtained from the hospital's obstetric ultrasound electronic record, while the outcome details which included birth details were obtained from their maternity notes. The follow up protocols are our hospital protocols which are based on National Institute of Clinical Excellence, United Kingdom (NICE) guidelines for the management of multiple pregnancy. The information was recorded on a proforma and statistical analysis was obtained through SPSS software.

RESULTS

Of the 870 women with twin-pregnancy, majority were aged between 30-39 years (n=478, 55%). According to pre-pregnancy BMI, 496 (57%) were overweight while 287 (33%) were normal weight. Primiparous women accounted for 470 (54%). The majority of women conceived naturally (n=690, 70%). Dichorionic diam-

Table 1: Demographic characteristics of patients

Characteristics		Frequency	Percentage
Maternal Age (years)	<20	60	7%
	20-29	270	31%
	30-39	478	55%
	$\geq$40	62	7%
Parity	Primigravida	470	54%
	Multiparous	400	46%
Previous Birth Modes	Vaginal delivery	328	82%
	Caesarean section	72	18%
BMI	<18.5	35	4%
	18.5-24.9	287	33%
	25-29.9	496	57%
	30 and above	52	6%
Conception	Spontaneous conception	609	70%
	Assisted Conception (IVF*/ICSI**)	261	30%
Chorionicity	DCDA***	565	65%
	MCDA****	305	35%

*In-vitro fertilisation, **Intracytoplasmic sperm injection,***Dichorionic diamniotic; ****Monochrionic diamniotic

Table 2: Frequency of estimated foetal weight to actual birth weight using ultrasonography

Serial Scans	Estimated Foetal Weight within 250grams of Actual Birth Weight	Estimated Foetal Weight within 50grams of Actual Birth Weight
Twin 1	557/870 (64%)	218/870 (25%)
Twin 2	679/870 (78%)	157/870 (18%)

niotic twins made the majority and accounted for 565 (65%). The characteristics of participants are shown in Table 1.

In accordance with our acceptable standard of 250 grams, the majority of twins 64% of twin 1 and 78% of twin 2, the estimated birth weights by USG were within that standard, Table 2. In 71% (618/870) of cases, the USG estimated birth weights in twin 1 were larger than the actual birth weight and similar picture was seen in 68% (592/870) of second twin. There was no significant difference between dichorionic and monochorionic twins when compared for estimated foetal weight by ultrasound and actual birth weight. EFBW was larger in 80% (244/305) of twin 1 and 70% (214/305) of twin 2 in MCDA and 67% (379/565) of twin 1 and 67% (379/565) of twin 2 in DCDA twins.

DISCUSSION

Ultrasound is the most widely used non-invasive method for the diagnosis and management planning of twins. In up-to-date clinical practice, the frequency of ultrasonographic assessment is determined according to the chorionicity and growth patterns in twin pregnancies. In uncomplicated twin pregnancies serial growth scans are offered every fortnightly from 16 weeks gestation in MCDA twins and after every four weeks in DCDA twins from 20 weeks of gestation[12]. This study determined the accurateness of ultrasonographic prediction of birth weight and definite weight at birth. In general, the predictive accuracy in our study was good which is contradicted in another study by Khalil[13] which showed that in singleton pregnancies predictive accuracy of foetal growth on ultrasound is better than in twin pregnancies. So far, only few studies have addressed the reliability of fetal growth velocities determined on serial ultrasound scans in these high risk pregnancies. Neves et al[18] identified that in twin gestations the prediction of foetal birth weight discordance on ultrasound is limited which is contrary to our study as in our study majority of the estimated foetal weights on ultrasound were accurate.

However in literature it is evident that ultrasound estimated foetal weight measurement has an overall adequate accurateness in forecasting birth weight discordance in twin pregnancy which is consistent with our study[19]. Dimassi et al[20] also confirmed in his study that ultrasound is an effective examination to estimate twins weight. Still large scale studies are needed to evaluate further on the use of ultrasonography in predicting accurate foetal birth weight in twin pregnancies.

CONCLUSION

Ultrasound was found to be an accurate tool of determining estimated fetal birth weight. Its use during antenatal period determines fetal wellbeing and provide help in planning regarding accurate timing of induced deliveries. The majority of the USG estimated birth weights were within the agreed standard of 250g difference within the actual birth weight, however, birth weight might be predicted slightly bigger by USG.

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CONTRIBUTORS

FRM conceived the idea, planned the study and drafted the manuscript. SM and RL helped acquisition of data, did statistical analysis and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.