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Original Articles

Effectiveness of Early Pregnancy Ultrasound in diagnosing Fetal abnormalities in High Risk Women

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Abstract

Objective: To assess the efficacy of 11-14 weeks ultrasound in the diagnosis of fetal abnormalities in high risk women.

Methods: Prospective study conducted at a Teaching hospital in Karachi, Pakistan. One hundred ultrasound (mini-anomaly) scans were performed on 97 high-risk women, between 11-14 weeks of gestation.

Results: The most common indication for the ultrasound scan in the study, was previous history of structural or chromosomal abnormalities (40%) followed by advanced maternal age (22%). Out of 100 ultrasounds performed, two were found to have structural abnormalities at the time of mini-anomaly scan performed at 11-14 weeks. None of the ultrasound scans found to be normal at 11-14 weeks showed an abnormality on the subsequent scans.

Conclusion: Ultrasound scan performed between 11-14 weeks of pregnancy is effective in diagnosing major fetal abnormalities in the high-risk population. It can complement the anomaly scan performed in the second trimester, as some of the abnormalities become evident later in pregnancy (JPMA 54:542;2004).

Introduction

Second trimester ultrasound scan has become an essential part of antenatal care. In cases where a major structural defect is identified, termination of pregnancy is offered.[1,2] The morbidity and mortality of this procedure increases with advancing gestation. Therefore early detection of such abnormalities will result in the reduction of such complications.

The benefits of early pregnancy ultrasound have been described by many workers.[3-5] Timor Tritsch et al.[3] suggested that transvaginal ultrasound done as early as 9-12 weeks, is helpful in the diagnosis of structural abnormalities. As the good quality equipment is becoming available it is possible to perform similar examination by transabdominal route. The role of first trimester ultrasound has been evaluated for the low risk population.[6,7]

We embarked on this study to evaluate the role 11-14 weeks ultrasound in the detection of fetal abnormalities in the high-risk population. This study is part of a bigger project on first trimester screening.

Material and Methods

This is a prospective study conducted in the department of Obstetrics and Gynaecology, at the Aga Khan University Hospital, Karachi, Pakistan. Karachi is the largest city of Pakistan, with an estimated population of 10-12 million belonging to different ethnicity and socio-economic background.

The Aga Khan University Hospital is a tertiary care teaching hospital in the private sector equipped with the latest diagnostic and therapeutic facilities and a well equipped neonatal intensive care unit. About 3000 deliveries take place every year. The services of Prenatal diagnosis has only become available in the last two years. In the depart-ment of Obstetrics and Gynaecology two antenatal ultra-sounds in pregnancy are performed, one at 11-14 weeks and the other between 18-22 weeks. A third trimester ultrasound is requested when indicated.

We performed about 100 ultrasounds on 97 high risk pregnant women in early pregnancy between January 2001-September 2002. The study subjects were seen in the ante-natal clinics, counselled and referred for ultrasound by their respective consultants. A single operator performed all the ultrasounds after obtaining a verbal consent, on a Toshiba Nemio machine, using 3.75 MHz probe. Most of the ultra-sounds were performed by transabdominal route. A trans-vaginal scan was performed in cases where the quality of ultrasound was unacceptable.

For maintaining the quality of the scan, the outcome of each pregnancy was monitored. The variables noted were weight of the baby, apgar scores and any additional abnor-mality at the time of birth.

All the above-mentioned variables along with the ultrasound details and demographic variables including ges-tational age were entered in a database file and analysed by SPSS version 10.

Results

In a two-year period 100 ultrasound scans were per-formed on 97 high risk pregnant women at a mean gestation of 12.4 days. There was one set of twins and of triplets each in this study. The mean maternal age was 30.98 years (range 18-42 years). The study subjects were referred because of their risk factors (Table 1).

The indications of the scans are outlined in Table 2.

Three of the cases were found to have a non-viable pregnancy at the time of the scan. There were two cases of

Results

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Table 1. Details of anatomical survey at the time of scan.

Head and brain

Heart , four chamber view and its position

Stomach bubble and its position

Umbilical cord insertion and anterior abdominal wall

Extremities including the position of hands and feet and number of digits

Spine

Bladder and kidneys.

The indications of the scans are outlined in Table 2.

Table 2. Indications of the scans.

Indication	No.
Advanced maternal age	22
Previous history of Down's syndrome	7
Family history of chromosomal abnormalities	3
Previous history of congenital abnormality	29
Previous pregnancy complicated by miscarriage, Intrauterine death or neonatal death.	18
Previous child with cerebral Palsy	4
History of bleeding in the current pregnancy	2
Multiple Pregnancy	5
Abnormality detected on scan in the present pregnancy	1
Pregnancy complications like Diabetes	2
Previous history of Thalasemia/ Cystic fibrosis	5
Discrepancy in dates	2
Total	100

Three of the cases were found to have a non-viable pregnancy at the time of the scan. There were two cases of fetal abnormalities and the rest of the ultrasounds were normal. In one case the fetus had megacystis which increased in size. In the other case the fetus had encephalocoele, khyphoscoliosis and early onset fetal growth restriction. Following counselling both couples opted for termination of pregnancy but declined autopsy. The abnormalities were confirmed postnatally in the patient with encephalocoele and khyphosis. A huge abdominal mass was seen after termination in the one with Megacystis. No additional abnormality was seen on the subsequent scans.

Seven percent of the women were lost to follow up. The remaining 93% pregnancies were followed till delivery. No additional abnormality was seen in any of the cases postnatally.

Discussion

Our study demonstrates that 11-14 weeks ultrasound is effective in diagnosing fetal abnormalities in the high-risk population. Both fetal abnormalities were detected by the early scan and no additional abnormality was found on subsequent ultrasound scans. Den Hollander and co-workers[8] have also found the 11-14 weeks ultrasound to be 91% effective. While others have reported this to be between 57-89%.[7,9,10]

The incidence of missed abortions was found to be 3% in the study sample. This is consistent with the findings of the other studies.[10] The advantage of early diagnosis of missed abortion helps in planning for the elective treatment and hence reduces the chances of bleeding and emergency evacuation of retained products of conception.

A single operator performed all the ultrasounds after receiving extensive training. This is because the sensitivity for detection of fetal abnormalities increases after a learning curve of 3-4 years.[11] Operators with varying experience would have affected the of this study.

Cranial defects, being early onset fetal abnormalities, can be diagnosed in the first trimester. In this study encephalocoele was detected as early as 12 weeks. Ossification of skull is not complete before 11 weeks of gestation, therefore this diagnosis is made beyond this period. Encephalocoele can be isolated or be a part of Meckel Gruber Syndrome. The diagnosis of this syndrome is therefore possible at the first trimester scan. It is difficult in the second trimester due to oligohydramnios.[12]

Fetal bladder is also seen successfully at this stage. Half of the cases of megacystis found at 10-14 weeks of gestation, resolves spontaneously. The rest of the cases are due to chromosomal abnormality or obstructive uropathy.[13] The decision of termination of pregnancy was made on the basis of increasing size of the bladder and severe oligohydramnios. As the autopsy was not performed in this case, the exact diagnosis could not be established.

In conclusion, early ultrasound is effective in diagnosing fetal abnormalities in the high risk population. It not only provides reassurance in case of a normal ultrasound but also enables a decision on early termination if there is an abnormality. Autopsy remains the most important investigation to confirm prenatal diagnosis and aids in future coun-

important investigation to confirm prenatal diagnosis and aids in future counselling. This study has the limitation that autopsies could not be performed to confirm the diagnosis after the termination of pregnancy. We recommend that early ultrasound should be used to complement the 18-23 weeks scans as the natural history of certain abnormalities does not allow early diagnosis.

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