VAGINAL BIRTH AFTER A PREVIOUS CAESAREAN SECTION FUNCTIONAL VS STATIC MARKER

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ABSTRACT

Background: *Primary caesarean section increases the chances of repeat caesarean section. In our society, there is a high prevalence of teenage pregnancy which is a high risk factor for primary caesarean section due to cephalopelvic disproportion. Continuing growth of these adolescents and their pelvic bones, makes their pelves bigger in the next pregnancy with a favourable prospect of vaginal delivery. A reliable method of assessment of these patients to identify those who are suitable for trial of labour is invaluable.*

Aims: *This study was aimed at assessing the reliability of the Head Fitting Test (HFT) compared with Antepartum X-ray Pelvimetry (AXRP) in selecting patients for trial of labour after primary caesarean section.*

Methods: *This was a comparative prospective study of 300 women with a previous lower uterine segment caesarean section who were delivered at Aminu Kano Teaching Hospital, Kano, Nigeria, over a six year period (1998-2003).*

Result: *The sensitivity of HFT was 97.0%, specificity was 96.1%, positive predictive value was 98.0% and negative predictive value 94.2%. The sensitivity of AXRP was 34.7%, specificity 24.0%, positive predictive value 31.3% and negative predictive value 26.9%. The sensitivity of PXRP was 49.3%, specificity 18.7%, positive predictive value 37.8% and negative predictive value 26.9%.*

Conclusion: *HFT was found to be a better method than AXRP in selecting the women with a previous caesarean section, who were suitable for trial of labour and vaginal delivery.*

Keywords: *Vaginal birth; previous caesarean section; Head fitting test; X-ray pelvimetry; outcome of labour.*

INTRODUCTION

The high caesarean section rate in developing countries like Nigeria, is said to be a consequence of inadequate pelvis, secondary to genetic factors, childhood malnutrition and infections/infestations which prevent the females from attaining their full growth potential including their pelvic capacity[1-8].

An adequate pelvis has been said to be an important factor in the successful outcome of labour[2,4,5]. It is the opinion of the authors that the minimum fixed values on X-ray Pelvimetry, below which the women should be delivered by elective repeat caesarean section[2,4], does not take into consideration the smaller size of our babies in the developing countries. The use of AXRP will therefore lead to high caesarean section rate because it is a static marker. The author decided to choose a functional marker the HFT, which relates the size of the fetal head to that of the pelvis in deciding those who will have trial of scar after one previous caesarean section. This method of selection, which can be done easily even in labour, is to be preferred in developing countries where many of our patients are often unbooked[8], and come in labour without prior selection. In our society, childhood marriage and early teenage pregnancies are common, with high incidence of primary caesarean section for cephalo-pelvic disproportion because of incomplete pelvic growth, and eclampsia which is a non-recurrent indication[1,6-8].

The prospects of vaginal delivery in the second pregnancy is as high as 65-80%, because the pelvis continue to grow in these teenagers up to the age of 18 years when it attains optimal obstetric size[7].

Recent studies have shown that AXRP is not useful[2,7]. It is against this background that this study was carried out to look for a more reliable method of determining those who are suitable for trial of labour after one previous caesarean section. The use of HFT that relates the size of fetal head to that of maternal pelvis was proposed by the author.

PATIENT'S SELECTION AND METHODS

Three hundred women with a history of one previous transverse lower uterine segment caesarean section, who were delivered in Aminu Kano Teaching Hospital, Kano, Nigeria between January 1998 and December 2003 were recruited into this prospective study and informed consent were obtained. The exclusion criteria were preterm labour, multiple pregnancy, intrauterine fetal death/anomaly, medical disorders in pregnancy, obstetric complications that required elective repeat caesarean section or discontinuation of labour other than for cephalopelvic disproportion. They were assigned by balloting (which involved picking a piece of paper with hidden inscriptions which determined their group, from among others in a container) to one of two groups viz: Antepartum/Intrapartum HFT group and AXRP group. Each group consisted of 150 women. Both tests were conducted by the same persons. In the first group, Head Fitting Test was done at 36 weeks of gestation, and was repeated in labour after membranes have ruptured between 4-6cm cervical dilation, using the Muller Monroe Kerr's method, which checks for overlap of the fetal head in addition. The second group had AXRP done at 36 weeks gestation using an air gap technique with a single lateral view. The results obtained were noted. The recruited women were allowed to have trial of labour. Labour was managed by the author without knowing their group allocation in order to avoid bias. The mean anteroposterior diameter of the pelvic inlet of 11.07cm, mid cavity of 11.9cm, and outlet of 7.81cm was taken as the minimum value for an adequate pelvis on all the patients in the AXRP group. The results that were obtained were recorded using tabulations and they were subjected to statistical test of significant difference using tests of validity and Chi-square test. Students' test was used to compare means for significant difference. A P-value of < 0.05 was considered significant.

RESULTS

A total of 300 women with one previous caesarean section were recruited and divided into groups of 150 each. The first group was allocated to the HFT group while the second were allocated to AXRP group. In the first group, 98 patients (65.3%) had satisfactory HFT, while 52 patients (34.7%) had unsatisfactory HFT. Among the 98 patients

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who had satisfactory HFT, 96 patients (98.0%) had vaginal delivery, while only 2 patients (2.0%) had caesarean section. Among the 52 patients who had unsatisfactory HFT, only 3 patients (5.8%) had vaginal delivery, while 49 (94.2%) had caesarean section. The sensitivity of HFT was found to be 97.0% and the specificity was 96.1%. The positive predictive value was 98.0% and the negative predictive value was 94.2%. PXRP that was done on the 98 patients who had satisfactory HFT after delivery showed that, 37 patients (37.8%) had adequate pelvis and 61(62.2%) had inadequate pelvis. Among the 52 with unsatisfactory HFT, 38 patients (73.1%) had adequate pelvis and 14 patients (26.9%) had inadequate pelvis on PXRP. The sensitivity of PXRP was 49.3% and specificity was 18.7%. The positive predictive value was 37.8% and negative predictive value was 26.9%. Table1.

In AXRP group, 83 patients (55.3%) had adequate pelvis, among them 26 patients (31.3%) had vaginal delivery, while 57 patients (68.7%) had caesarean section, 67 patients (44.7%) had inadequate pelvis, and among them 49 patients (73.1%) had vaginal delivery, while 18 patients (26.9%) had caesarean section. The sensitivity of AXRP was 34.7% and specificity was 24.0%. The positive predictive value was 31.3% and negative predictive value was 26.9%. Vaginal delivery rate of 66.0% was obtained among the HFT group. Table 2.

Vaginal delivery rate after a previous caesarean section in this study was compared with that of other studies. Vaginal delivery rate of 50-66% in this study, did not show statistically significant difference when compared with 67% from Maiduguri, in North Eastern Nigeria ($X^2 = 0.78$, df=1, P > 0.05), but was statistically significantly higher than 41% from other African countries ($X^2 = 6.48$, df =1, P < 0.05), and statistically significantly lower than 70-80% from developed countries ($X^2 = 4.47$, df =1, P < 0.05).

The mean birth weight among the HFT group was 3.1± 0.4Kg, which was not statistically significantly different from the mean birth weight of 3.2± 0.1Kg among the AXRP group (P > 0.05). The average length of stay in the hospital of 22.2± 0.3 hours among the HFT group was not statistically significantly different from 22± 0.5 hours among the AXRP group (P >0.05). Feto-maternal morbidity was minimal and similar in the two groups. There was no maternal or perinatal mortality in the two groups.

Table 1: Outcome of Labour in the Head Fitting Test Group Related To Postpartum X-Ray Pelvimetry

Head Fitting Test	Vaginal delivery	Caesarean section	Total	Postpartum X-ray Pelvimetry	
				Adequate	Inadequate
Satisfactory	96	2	98	37	61
Unsatisfactory	3	49	52	38	14
Total	99	51	150	75	75

Head Fitting Test	Postpartum X-Ray Pelvimetry
Sensitivity = 97.0%	Sensitivity = 49.3%
Specificity = 96.1%	Specificity = 18.7%
Positive predictive value = 98.0%	Positive predictive value = 37.8%
Negative predictive value = 94.2%	Negative predictive value = 26.9%
Vaginal delivery rate = 66.0%	

Table 2: Outcome of Labour in the Antepartum X-Ray Pelvimetry Group

Outcome	Adequate	Inadequate	Total
Vaginal delivery	26	49	75
Caesarean section	57	18	75
Total	83	67	150

Sensitivity = 34.7%
Specificity = 24.0%
Positive predictive value = 31.3%
Negative predictive value = 26.9%
Vaginal delivery rate = 50.0%

DISCUSSION

This study showed that HFT is an effective method of identifying those women with a history of previous delivery by caesarean section that can achieve a vaginal delivery, and disproves the hypothesis that routine AXRP is an effective method of identifying these women. The ineffectiveness of AXRP has been reported by many authors[2,4,5,7]. In the HFT group, PXRP result showed that if AXRP was used to select these women with satisfactory HFT, 61 (62.2%) of them would have had elective caesarean section, while only 37 (37.8%) would have been allowed to have trial of labour, as against 96 patients (98.0%) who had vaginal delivery and only 2 (2.0%) who had emergency caesarean section among the 98 women who had satisfactory HFT, showing that HFT is a better method than AXRP selecting women with a history of a previous caesarean section for trial of labour. If AXRP was used to select these women with unsatisfactory HFT, 38 (73.1%) of them would have been allowed to have trial of labour while 14 (26.9%) of them would have had elective caesarean section as shown by PXRP result, while only 3 (5.8%) had vaginal delivery and 49 (94.2%) had emergency caesarean section. This showed that HFT is a better method of identifying those women who will benefit from elective caesarean section.

In the AXRP group, the pelvic diameters that were used were the minimum average diameters that were found in Nigerian women[4]. The outcome of labour in the AXRP group showed that it is a poor predictor and is similar to that of other studies[2,3,4,5]. The sensitivity, specificity, positive predictive value and negative predictive value of AXRP are similar to that of PXRP, but lower than that of Head Fitting Test. This further confirmed that HFT is a better method than AXRP in identifying those women who should be allowed to have trial of labour in their next pregnancy after a previous caesarean section. Conventional x-ray pelvimetry using an air gap technique with a single lateral view was used, because it is a relatively low radiation dose alternative where computed Tomography (CT) is not available or as in our unit affordable[4,5]. The advent of newer technologies in imaging such as CT pelvimetry or Magnetic resonance imaging which results in no irradiation, have not yielded better results compared to X-ray pelvimetry[4,5].

Vaginal delivery rate after one previous caesarean section of 66.0% and 50% which were recorded in the HFT group and AXRP group respectively, are similar to 67.0% among teenagers in Maiduguri[7], but higher than 41.6% that was reported from some African counties[2]. It is however lower than 70 85% reported from developed countries[7]. This may be because of the peculiarities of the African pelvis, where socio-economic deprivation result in high prevalence of cephalopelvic disproportion[1,2,6-8]. In the developed nations, there is a lower prevalence of cephalopelvic disproportion due to favourable socio-economic conditions, and most caesarean sections are done for non-recurrent indications[2,3].

The birth weight of the babies was similar in the two groups perhaps because the women were all from the same population. The average length of stay in the hospital was similar in two groups; feto-maternal morbidity was minimal and similar in two groups; and there were no maternal or perinatal deaths in the two groups.

The reason for the good feto-maternal outcome was probably because the labour was meticulously monitored using partograph with the action line plotted two hours to the right of the alert line. It has been found that when the action line is plotted two hours to the right of the alert line instead of the usual four hours, the occurrence of ruptured uterus and fetal distress is reduced to an insignificant minimum, without increasing the caesarean section rate, when monitoring labour in women with a previous caesarean section[9]. Trial of labour in these women should only be conducted in centres where facilities for caesarean section and blood transfusion services are available 24 hours of the day, and labour must be monitored by experienced attendants[2,3,7].

In conclusion, HFT was found to be a better predictor of vaginal birth than AXRP in women with primary caesarean section having trial of scar.

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