

Vacuum Deliveries at the University of Nigeria Teaching Hospital, Enugu.

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Abstract

Context: A timely instrumental vaginal delivery can help to avert a caesarean section. A recent study at the University of Nigeria Teaching Hospital (UNTH) Enugu, found that women with dystocia in the second stage who had caesarean delivery because of the absence of functional vacuum aspirators or inexperience on the part of birth attendants constituted 35% of avoidable caesarean sections.

Objective: To determine the rate, indications and outcome of vacuum deliveries at the University of Nigeria Teaching Hospital Enugu over a five year period (1999-2003).

Methods: A retrospective review of the case notes of all parturients who had vacuum deliveries in the hospital within the study period (January 1999 to December 2003)

Results: There were 87 vacuum deliveries out of 5742 total births giving a vacuum delivery rate of 1.5%. The commonest indication for vacuum extraction was poor maternal effort in the second stage of labour (32.2%). Post-partum haemorrhage was the commonest maternal complication and chignon, the commonest fetal complication. The overall perinatal mortality rate was 6.9% while the corrected perinatal mortality rate (excluding stillbirths) was 2.3%.

Conclusion: The current rate of vacuum delivery at the UNTH is low. The indications are similar to what had been recorded previously. The outcome of the procedure for both mother and baby was good. In order to increase its use and, perhaps, contribute in reducing the currently high caesarean section rate in the hospital, the vacuum equipment should always be in a functional state and the skills taught to younger residents early in their training.

Key Words: Vacuum delivery, Enugu, Nigeria

Introduction

For either fetal or maternal reasons, vacuum extraction may become necessary in order to expedite vaginal delivery or to avert recourse to caesarean section^{1, 2}. World wide, there are conflicting reports on the trend in the general rate of instrumental vaginal delivery. Whereas a decline is reported in the United States³, a relatively constant rate is reported in some other parts of the world such as Scotland and Australia⁴. There appears to be a uniform trend, however, in the pattern of instrumental vaginal delivery. For instance, there is a confirmed trend away from the forceps towards the vacuum extractor in many countries of Europe⁴. A recent survey, similarly, indicates that vacuum extraction has become the primary means to achieve operative vaginal delivery in the United States³. Broadly speaking, the traditional indications for vacuum extraction are delay in the process of labour, distress on the part of the baby or mother and medical conditions requiring shortening of the second stage of labour⁵. The intervention with vacuum extraction would be expected to enhance the outcome of the labour for the mother or the baby or both⁵.

Unfortunately, in places such as the USA where the rate of instrumental vaginal delivery has declined, there has been a rapid increase in the caesarean section rate. For a developing country like Nigeria, this would be a costly trade-off considering that women here have a negative attitude towards caesarean section^{6, 7, 8} and facilities for it are inadequate or fragile⁷.

In sub-Saharan African, publications abound on the relative merits of vacuum delivery and other types of

instrumental vaginal delivery⁹⁻¹³. A previous study at the University of Nigeria Teaching Hospital (UNTH), Enugu listed the contributions of the vacuum extractor to third world obstetrics as its high success rate in the first stage with consequent reduction in caesarean section rate, its equally high success rate in second stage, the ease of mastery by juniors, its versatility and its safety for both mother and fetus¹¹.

At the UNTH, previous reports also indicated a marked preference for vacuum extraction against forceps delivery, with reported vacuum delivery rates of 3.5% and 3.1% in 1988 and 1990 respectively^{10, 11}. The pattern of indications for and complications of, vacuum delivery remained the same in the last two decades.

The caesarean section rate, however, rose steadily during the same period⁸. Thirty-five percent of avoidable caesarean sections were done for delay in the second stage where no instrumental vaginal delivery had been attempted⁸.

In the light of the above, this study reviewed vacuum deliveries at the UNTH given that the high caesarean section rate of 22-24% at this centre calls for exploration of ways to reduce it⁸.

Materials and Methods

The records of births in the University of Nigeria Teaching Hospital Enugu over a five-year period (January 1999 to December 2003) were reviewed. Case

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notes of all parturients who had vacuum extraction were obtained from the medical records department and reviewed. Data abstracted included number of cases, indications for the procedure, complications, Apgar scores of babies, birth attendants as well as the age and parity of the patients. Corresponding data on the number of total births and caesarean sections during the study period were also obtained from the birth register. All the findings were collated and analyzed using descriptive and inferential statistics using Epi-Info Statistical software. Where appropriate, the Chi-square test was used to test for statistical significance at 95% confidence level.

Results

There were 87 vacuum deliveries during the study period. The number of total deliveries was 5724, giving a vacuum delivery rate of 1:66 deliveries or 1.5%. Table 1 shows the vacuum delivery rate per year. The rate decreased from 2.0% in 1999 to 1.4% in 2003. The difference was, however, not statistically significant ($p>0.05$). There were 1,242 caesarean sections during the study period giving a caesarean delivery rate of 1:4.6 total deliveries or 21.7%. The mean age of parturients that had vacuum deliveries was 28.5 years \pm 2.8 SD and mean parity 2.4 \pm 0.6 SD. Table 2 shows the indications for vacuum extraction. The commonest

Table 1:
Yearly rate of vacuum deliveries at the UNTH, Enugu

Year	Total deliveries	Vacuum deliveries	Rate of vacuum deliveries (%)
1999	986	20	1: 49.3 (2.0%)
2000	1315	18	1: 73 (1.4%)
2001	1428	20	1: 71.4 (1.4%)
2002	883	14	1: 63.1 (1.6%)
2003	1112	15	1: 74 (1.4%)
Total	5724	87	1: 66 (1.5%)

Table 2:
Indications for vacuum deliveries in Enugu

Indication	Number of cases	Percentage
1 Poor maternal effort in second stage	28	32.3%
2 Prolonged second stage	20	23%
3 Fetal distress in second stage	18	20.7%
4 Prolonged first stage	4	4.6%
5 Preclampsia/eclampsia	4	4.6%
6 Fetal distress in first stage	2	2.3%
7 Cardiac disease	0	0.0%
8 Unstated	9	10.4%
Total	87	100%

Table 3:
Age and parity distribution of patients

Age in years	Parity			Total (%)
	Primigravidae	Para 1 5	Above Para 5	
15 - 20	2	5	-	7 (8.01%)
21 - 25	5	13	-	18 (20.7%)
26 - 30	7	22	3	32 (36.8%)
31 - 35	5	8	7	20 (23%)
36 - 40	1	2	5	8 (9.2%)
41 - 45	-	-	2	2 (2.3%)
Total (%)	20 (23%)	50 (57.5%)	17 (19.5%)	87 (100%)

indications were poor maternal effort in the second stage of labour (32.2%), prolonged second stage of labour (23%) and fetal distress (23%). With respect to the rank of the medical personnel who performed the vacuum deliveries, 52 (59.8%) of the cases were done by senior registrars, 24 (27.6%) by registrars, 7 (8.0%) by consultants, and 2 (2.3%) by senior house officers. In 2 (2.3%) cases, the rank of the surgeon was not stated. Neither midwives nor house officers were involved.

Table 3 shows the age and parity distribution of the patients. Primigravidae constituted 23.0% of the patients and multigravida 77%. Seventy (80.5%) of the patients were aged 21-35 years.

Regarding maternal complications, postpartum haemorrhage and perineal laceration occurred in 14 (16.1%) and 7 (8.1%) of vacuum deliveries respectively. There was no maternal death following the procedure. Fetal complications included chignon in 68 (78.2%), scalp abrasion in 5 (5.8%), cephalhaematoma in 2 (2.3%) and jaundice in 2 (2.3%) of cases. There were 6 perinatal deaths: 4 still births and 2 early neonatal deaths giving a perinatal mortality of 69 per thousand and a corrected perinatal mortality (excluding stillbirths) of 23 per thousand. At one minute after birth, 79 (90.8%) of the babies had Apgar scores of 6 or greater, 4 (4.6%) had Apgar scores of 1-5, while 4 (4.6%) had an Apgar score of 0. At 5 minutes, 82 (94.2%) babies had Apgar scores of 6 or higher, 1 (1.2%) had an Apgar score of 4 while 4 (4.6%) had an Apgar score of 0.

Discussion

The vacuum delivery rate of 1.5% found in this study is similar to those reported in Ile-Ife (1.6%)⁹ and Ilorin (1.7%)¹², but lower than the 3.5% and 3.1% previously reported at the UNTH^{10,11,13}. Compared to the previous studies, the apparent decline in vacuum delivery rate in this study is statistically significant ($P < 0.05$). Also compared to the vacuum delivery rate of 10.5% in developed countries, the vacuum delivery rate found in this study is low. The higher rate found in developed world may be, partly, due to the greater use of epidural analgesia during labour in the developed countries. The current low rate of use at the UNTH and other Nigerian centres⁹ may not be unrelated to bureaucratic delays in repairing or replacing the vacuum equipment in the hospitals when it goes bad. This often results in a greater resort to caesarean section as been observed previously⁸. Besides, the low participation of junior residents and midwives who are usually on the ground in the labour ward may suggest that lack of skills in the case of residents or in the case of midwives both lack of skills and their exclusion from performing vacuum delivery may have contributed to the low rate of vacuum delivery. The caesarean section rate in this study was, undoubtedly, high at 21.4% but close to the 25.0% found in a previous study⁸. In a previous study, the commonest

indications for caesarean section at the UNTH were found to be previous caesarean sections and dystocia/cephalopelvic disproportion⁸. One-tenth of the cases of dystocia/cephalopelvic disproportion were adjudged avoidable and 35% of these were cases that ought to have been delivered by instrumental vaginal procedures.

Although, this study did not provide direct evidence that the high caesarean section rate was necessarily because of the low rate of vacuum deliveries, it is safe to assume from the findings in this study that it might have been contributory. The high caesarean section rate at UNTH is, however, partly due to a referral bias being a tertiary care centre.

Poor maternal effort in the second stage was the commonest indication for vacuum extraction in this study thereby upstaging prolonged second stage of labour as is currently advocated⁵. According to the labour ward protocol at this centre, poor maternal effort in this study refers to the inability of a parturient to make good expulsive effort in a second stage of labour despite augmentation with syntocinon.

The 86% second stage vacuum extraction found in this study is in agreement with the findings of previous workers^{9,10,12}. First stage vacuum extraction, however, is thought to be safe in skilled hands^{13,14}. Nevertheless, it is still controversial¹³ and is less preferred because of its difficulty and the increased complications associated with it.

The staff who carried out vacuum extractions in the present study were more experienced specialists in contrast to those recorded in previous studies at the UNTH^{10,11}. Senior registrars and consultants carried out the procedure in 67.8% of cases in this study compared to 30.8-37% the earlier studies.

Vacuum delivery occurred more in multigravida (77%) than in primigravida (23%). Given that poor maternal effort was the commonest indication for vacuum delivery, this finding is surprising considering that primigravidae are less experienced than multigravidae in the labour process. In previous studies at the UNTH, the incidence was more or less equal in both categories of women^{10,11,13}. In the study by Ogunniyi et al⁹, nullipara expectedly, constituted 78.4% and multigravida 19.7%. The explanation for the increased use of vacuum extraction in multigravida is not immediately clear. It might be that the multigravida constituted a greater proportion of parturients at this centre or that complications that might necessitate vacuum delivery such as malposition¹⁵ were commoner with multigravid parturients.

Maternal complications ranged from post partum haemorrhage to perineal laceration. Fetal complications were mild. These were in keeping with previous studies. However, the post-partum haemorrhage rate of 16.1% was high. This may be due to

the high rate of prolonged labour and perineal tears both of which predispose to post-partum haemorrhage. The explanation for the high rate of perineal tears and scalp abrasion was not provided by the study. However they might have been the result of faulty technique or faulty equipment either of which might have led to difficult vacuum delivery¹⁵. Although there were 6 perinatal deaths, asphyxia was, however, more likely to be related to the fetal and maternal condition necessitating the vacuum delivery than to the procedure itself¹.

Although the vacuum extractor has been described as the instrument of choice in instrumental vaginal delivery¹⁴, the use of vacuum and forceps should really

be complimentary. The low rate of maternal complications, ease of learning and use make vacuum extraction the more attractive alternative^{3, 5, 16, 21}, except in those peculiar conditions in which vacuum extraction is contra-indicated such as the after-coming head of a breech-presenting baby⁴.

In conclusion, the current rate of vacuum delivery at the UNTH is low. The indications and maternal/fetal outcomes are similar to what had been recorded previously. In order to increase its use and perhaps contribute in reducing the currently high caesarean section rate in the hospital, the vacuum equipment should always be in a functional state and the skills taught to younger residents early in their training.

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