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CLINICAL ARTICLE

Comparison of outcomes between operative vaginal deliveries and spontaneous vaginal deliveries in southeast Nigeria

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ABSTRACT

Objective: To evaluate the incidence of, indications for, and outcome of operative vaginal deliveries compared with spontaneous vaginal deliveries in southeast Nigeria. **Methods:** A retrospective cohort study was conducted involving cases of operative vaginal delivery performed at Ebonyi State University Teaching Hospital over a 10-year period. Data on the procedures were abstracted from the operation notes of the medical records of parturients. **Results:** An incidence of 4.7% (n = 461) was recorded. The most common indications for vacuum and forceps delivery were prolonged second stage of labor (44.9%) and poor maternal effort (27.8%). The only indication for destructive operation was intrauterine fetal death (3.7%). The risk ratio (RR) for hemorrhage/vulvar hematoma was 1.14 (95% confidence interval [CI], 0.53–2.48) for vacuum-assisted delivery and 5.49 (95% CI, 0.82–36.64) for forceps delivery. The RR for genital laceration was 1.21 (95% CI, 0.44–3.30) for vacuum-assisted delivery and 9.41 (95% CI, 1.33–66.65) for forceps delivery. The risk of fetal scalp bruises and caput succedaneum was higher for operative vaginal delivery than for spontaneous vaginal delivery, with no significant difference in maternal morbidity. The perinatal mortality rate was 0.9 per 1000 live births. **Conclusion:** Operative vaginal delivery by experienced healthcare providers is associated with good obstetric outcomes with minimal risk.

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1. Introduction

Operative vaginal delivery (OVD) is an age-long obstetric practice used to expedite vaginal delivery or avert recourse to cesarean delivery [1,2]. The use of instruments to assist vaginal delivery varies between and within countries. However, the incidence of OVD has decreased worldwide, ranging from 2% to 15% [1,3–6]. This has been attributed by some to fear of litigation [7,8] but the danger associated with this trend is the loss of the skills for instrumental vaginal delivery and an increasing rate of cesarean [7].

Destructive operation as an obstetric procedure still has a major role in Sub-Saharan Africa—particularly Nigeria, where many parturients have a strong aversion to abdominal delivery and where obstructed labor following intrauterine fetal death is still a common occurrence [10]. To prevent maternal and perinatal morbidity and mortality, OVD can be used to accelerate vaginal delivery in cases of fetal distress in the second stage of labor, prolonged second stage of labor with poor

maternal effort, and maternal medical conditions requiring shortening of the second stage of labor [3,9,11,12].

The benefits and demerits of OVD have been well documented [13–15]. A recent Cochrane review [16] found that the risks and benefits of 2 forms of OVD (vacuum and forceps) were comparable. Often, the choice of instrument is based on the skill and experience of the care provider, the indication for the procedure, and the availability of functional instruments.

Although there are many publications regarding this topic worldwide, there have been no recent reviews in southeast Nigeria. Therefore, the aim of the present study was to determine the incidence of, the indications for, and the obstetric outcomes associated with OVD at a tertiary healthcare facility over 10 years.

2. Materials and methods

A retrospective cohort study of OVD in southeast Nigeria was conducted at Ebonyi State University Teaching Hospital (EBSUTH), Abakaliki. It included all cases of OVD (vacuum extraction, obstetric forceps, and destructive operations) between January 1, 2002, and December 31, 2011. The study was approved by the hospital research and ethics committee. EBSUTH (now Federal Teaching Hospital Abakaliki) is a tertiary healthcare facility that serves the neighboring

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Nigerian states of Enugu, Cross-Rivers, and Abia. According to the 2008 Nigeria Demographic and Health Survey, Ebonyi had a population of 2.3 million, with approximately 39% of women in the state delivering in the presence of a skilled birth attendant [17].

The obstetrics and gynecology department at the study center has a policy of active management of labor, with augmentation when indicated. Intrapartum fetal surveillance was performed via intermittent auscultation with either Pinard stethoscope or Doppler with fetal heart rate display (Sonicaid One; Huntleigh, Cardiff, UK). Facilities for epidural analgesia, continuous fetal monitoring, and fetal blood sampling were not available in the department during the study period. Perineal infiltration with lidocaine was used for analgesia. Ventouse (plus full complements of the various types and sizes of cups, including silastic cup) was used for vacuum extraction during the study period. Forceps delivery was carried out using Piper, outlet, low, or high forceps. The choice of size/type of cup or type of forceps used was individualized and based on the indication for the procedure. As a departmental protocol, only doctors at the level of senior registrar or higher could conduct OVD. The prerequisite conditions for OVD were met before applying the instruments. Signed informed consent to undergo the procedure was obtained from the participants as part of our protocol. Data on the procedures were abstracted from the operation notes and other medical records of women managed during the study period.

Data on sociodemographic characteristics, OVD, indications, obstetric outcomes, and total births during the study period were collated from the birth register. We compared the maternal and fetal morbidity of women who underwent OVD with those of matched controls who underwent spontaneous vaginal delivery (SVD). The cases and controls were matched for age group, parity, gestational age, date and year of delivery, birth weight, and delivering obstetrician. Prior to the collection of data, postpartum hemorrhage was defined as an estimated blood loss of at least 500 mL for vaginal deliveries or any amount of blood loss sufficient to compromise the hemodynamic state of the parturient.

Statistical analysis was performed using Epi Info version 7.0 (Centers for Disease Control and Prevention, Atlanta, GA, USA). The incidence of OVD for the study period was calculated from the number of cases of OVD and the total number of births obtained from the hospital birth register. Conclusions were drawn by means of simple percentages and inferential statistics using risk ratios (RRs) and 95% confidence intervals (CIs). The Fisher exact test was used to determine statistical significance, with $P < 0.05$ considered to be significant.

3. Results

During the study period, there were 9828 deliveries at the study center, of which 461 were OVDs—giving an incidence of 4.7%. There were 498 cases of OVD during the study period but only 461 were suitable

Table 1
Sociodemographic characteristics of women who underwent operative vaginal delivery (n = 461).^a

Variable	Destructive operation (n = 17)	Vacuum (n = 437)	Forceps (n = 7)
Age, y			
<20	1 (5.9)	43 (9.8)	2 (28.6)
20–24	5 (29.4)	119 (27.2)	3 (42.8)
25–29	5 (29.4)	148 (33.9)	2 (28.6)
30–34	4 (23.5)	96 (22.0)	0 (0.0)
35–39	2 (11.8)	31 (7.1)	0 (0.0)
Parity			
0	9 (52.9)	213 (48.7)	4 (57.1)
1	4 (23.5)	89 (20.4)	2 (28.6)
2	1 (5.9)	44 (10.1)	1 (14.3)
3	1 (5.9)	22 (5.0)	0 (0.0)
4	1 (5.9)	20 (4.6)	0 (0.0)
≥5	1 (5.9)	49 (11.2)	0 (0.0)

^a Values are given as number (percentage).

Table 2
Indications for operative vaginal delivery (n = 461).^a

Indication	Operative vaginal delivery
Fetal distress	24 (5.2)
Poor maternal effort	128 (27.8)
Prolonged second stage	207 (44.9)
Persistent OPP	28 (6.0)
Pre-eclampsia/eclampsia	51 (11.1)
Anemic heart failure	6 (1.3)
Intrauterine fetal death	17 (3.7)

Abbreviation: OPP, occipitoposterior position.

^a Values are given as number (percentage).

for analysis after the exclusion of 37 cases involving incomplete records. There were 461 matched controls who underwent SVD. In the study group, there were 437 (4.4%) vacuum-assisted deliveries, 7 (0.1%) forceps deliveries, and 17 (0.2%) destructive operations. The age distribution of the women is shown in Table 1. The mean age of parturients was 27.0 ± 2.0 years. Most of the women who underwent OVD were primigravidae (49%). The most common indication for OVD was delayed second stage of labor (44.9%) (Table 2); 44.5% of OVDs for delayed second stage were vacuum assisted. Destructive operations were performed only in cases of intrauterine fetal death, while forceps deliveries were conducted for pre-eclampsia/eclampsia in 0.7% of cases. Mean birth weight was 2.7 ± 0.32 kg. The majority (85.7%) of infants delivered by OVD weighed between 2.5 and 3.9 kg (Table 3).

Fourteen (3.0%) women experienced hemorrhage/vulvar hematoma, while 54 (11.7%) infants had caput succedaneum (Table 4). Most deaths recorded under destructive operations were not from the procedure itself; the deaths necessitated the procedure and were all stillbirths (macerated and fresh). Table 4 also shows a comparison of maternal and perinatal morbidity between women who underwent SVD and those who underwent OVD. The RR for genital laceration was 1.21 (95% CI, 0.44–3.30) with vacuum-assisted delivery and 9.41 (95% CI, 1.33–66.65) with forceps delivery ($P = 0.01$). The RR for hemorrhage/vulvar hematoma was 1.14 (95% CI, 0.53–2.48) with vacuum-assisted delivery and 5.49 (95% CI, 0.82–36.64) with forceps delivery ($P < 0.001$). Caput succedaneum was more common in the OVD than the SVD group (RR 11.39 [95% CI, 4.6–28.22]; $P < 0.001$). Scalp bruises/lacerations and need for neonatal resuscitation at birth were more common in the OVD than in the SVD group (Table 4). There was a steady decline in the practice of OVD during the study period (Fig. 1).

4. Discussion

The incidence of OVD in the present study was 4.7% of the total births. This is higher than the 2.0% recorded at the University of Maiduguri Teaching Hospital, Nigeria, in 2005 but lower than the 10.5% at another Nigerian center and in some high-resource countries [3,13,18]. However, it is still within the worldwide incidence of 2%–15% [1,3–6,19]. The variation in incidence in various health institutions and the decline in practice in recent times, as noted in the present study, could be attributed to variation in practice protocol, litigation, non-availability of functional equipment, and the declining skills of providers in conducting OVD [5,

Table 3
Birth weight of infants delivered by operative vaginal delivery (n = 461).^a

Birth weight, kg	Destructive operation (n = 17)	Vacuum (n = 437)	Forceps (n = 7)
<2.5	5 (29.4)	40 (9.2)	2 (28.6)
2.5–3.9	12 (70.6)	378 (86.5)	5 (71.4)
≥4.0	0 (0.0)	19 (4.3)	0 (0.0)

^a Values are given as number (percentage).

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