COMPARISON OF MATERNAL AND INFANT OUTCOME BETWEEN VACUUM EXTRACTION AND FORCEPS DELIVERIES

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ABSTRACT

Objective: To analyze the instrumental deliveries carried out at the Gynae Department during the year 1996 and compare the outcome of ventouse and forceps deliveries.

Patients and Methods: Retrospective case notes review of all instrumental deliveries; carried out during the year 1996.

Results: Three hundred and four instrumental deliveries; of which 258 were ventouse and 46 were forceps deliveries; were assisted. Seventy percent of forceps deliveries were carried out in primigravida as compared to 49% of ventouse deliveries. Fetal distress was the indications in 81.4% of ventouse deliveries as compared to 76% forceps deliveries ($p<0.05$). Prolonged 2nd stages of labor were indications in 6(13%) of forceps and 16(6.2%) of ventouse deliveries. Consultants and senior Gynecologists were more likely to use forceps while registrars use ventouse as their preferred instrument for delivery. Attempted ventouse delivery was successful in 91.4% as compared to 95.7% in forceps ($p<0.05$). Extension of an episiotomy was more likely to occur with ventouse than forceps deliveries while 3rd degree perineal tears occurred more with forceps deliveries. Babies who had attempted ventouse deliveries have lower apgar score at one minute than attempted forceps. No babies required admission to neonatal intensive care unit. There was only one stillbirth in the ventouse delivery group due to intrapartum asphyxia and true knot in the umbilical cord.

Conclusion: Forceps is more likely to be used in the primigravids and prolonged 2nd stage of labor and less likely to fail. Ventouse is more likely to be used by registrars. Extension of an episiotomy and low apgar score at one minute is more likely to occur with ventouse deliveries.

Keywords: Ventouse, vacuum, forceps

INTRODUCTION

Since the introduction of forceps into the art of midwifery in the 18th century, controversial views were expressed regarding its use. Some advocate that prophylactic forceps should be placed on every baby to shorten the 2nd stage of labor, thereby decreasing fetal trauma and protecting the perineum, while others believe that forceps is an anachronism and has no place in modern obstetrics [1]. Assisted deliveries using ventouse have never been as popular as using forceps in certain countries. This has been put down to inadequate training, poorly maintained equipment, poor choice of patients and the innate conservatism of many doctors. There is a little doubt, however, that the right equipment in the right hands can achieve impressive and safe result. [2]. In 1953, Malmstrom of Gotherburg,

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Sweden, presented vacuum extractor which further developed and refined the method for modern obstetric practice [3,4]. The aim of this study was to compare outcome of ventouse and forceps deliveries.

PATIENTS AND METHODS

This was a retrospective study carried out at the Gynae Department, of all instrumental deliveries during the year 1996. The data collected includes, age, parity, birth weight, apgar score, final method of delivery failed instrumental delivery, fetal and maternal morbidity or mortality. Regardless of the ultimate mode of delivery, for the purpose of analysis the women remained in the group to which they were allocated. The aim of this study was to compare the maternal and fetal outcome of forceps and vacuum extraction deliveries.

SPSS version 10.0 was used to analyze the data. Chi square(x2) test with Yates correction and t-test were used for statistical analysis. Difference were regarded as significant at $p<0.05$.

RESULTS

Table-1 shows the characteristics of patients in the two study groups. Nulliparous were more likely to have forceps delivery while multiparous were more likely to be delivered by ventouse. These differences were statistically significant. Fetal distress was the most common indication for instrumental deliveries, 215/258 (83.3%) in ventouse versus 35/46 (76%) in forceps deliveries ($p<0.05$). Prolonged 2nd stage of labor was indicated in 16 (6.2%) cases of ventouse and 6(13%) cases of forceps ($p<0.05$) .In 25 (9.7%) cases of ventouse and 5 (11%) cases of forceps poor maternal effort and maternal distress was the indication for instrumental delivery ($p<0.05$) .These differences were statistically significant. Consultants and senior registrars were more likely to attempt a forceps delivery than a ventouse (10.9%) versus 6.2%) ($p<0.05$), (30.4%0 versus 23.3%) ($p<0.05$). Residents carried out 10 (21.7%) forceps and 39 (15.1%) ventouse deliveries ($p<0.05$). These differences were statistically significant. Registrars used ventouse as their preferred instrument for delivery (55.4%) versus (37%) ($p>0.05$). Attempt at ventouse delivery was successful in 236 (91.4% of cases as compared to 44 (95.7%) of attempted forceps delivery ($p<0.05$).

Cesarean section (CS) had to be carried out in 19(7.6%) cases of ventouse and 2 (4.3%) cases of forceps deliveries ($p<0.05$). Normal delivery was achieved in 3(1.2%) cases of attempted ventouse delivery. These reasons for failure were due to cephalopelvic disproportion 15, leaking membranes [5], and cup detachment [2]. The 2 cases of failed forceps were due to cephalopelvic disproportion.

Table-2 shows the maternal morbidity following instrumental delivery. Patients delivered by ventouse were more likely to have as intacy perineum. Episiotomy was carried out in 87.2% of ventouse and 93.5% of forceps deliveries ($p<0.05$). Ventouse deliveries were likely to have an extension of their episiotomy ($p<0.05$). Blood loss >> 500mls was more likely to be associated with ventouse deliveries ($p<0.05$). These differences were not statistically significant. Forcep deliveries were more likely to sustain 23rd degree perineal tear ($p<0.05$). These differences were statistically significant. Babies delivered by ventouse have low apgar score at one minute (11.6 versus 2.2%) ($p<0.05$). No baby was admitted in neonatal intensive care unit (NICU). Only one baby delivered by ventouse had apgar score of < 7 at 5 minutes. There was only one stillbirth in the ventouse delivery group due to intrapartum asphyxia and true knot in the umbilical cord.

DISCUSSION

The vacuum extractor has advantages over forceps for certain types of delivery. Birth trauma is significantly more likely to

occur with the vacuum extractor than forceps [5]. Vaginal and cervical tears which are usually caused by accidental inclusion of these tissues into the cup are prevented the cup is checked all around to ensure that vaginal skin and soft tissues are not sucked in when vacuum has been established. The more obvious fetal injury is the formation of the chignon, abrasions and lacerations of the fetal scalp. These are usually minor and self limiting.

Cephalhematomas apart from causing neonatal jaundice is rarely of clinical significance [3]. The one perinatal death in this study was related to the indication for the procedure "severe fetal distress" and not to the instrument used. Early resort to CS may have saved the baby. The most common cause of failure is a presmptive diagnosis of cephalopelvic disproportion on the basis of failure of the presenting part to descend. Problems with the apparatus, the rubber tubing and washers or the leaking machine were the second leading cause. Failure to time traction effort carefully with contractions or performance of oblique pulls outside of the pelvic curve leading to cup detachment are common causes for vacuum extraction failure and predispose to injury [6]. The sudden detachment of the vacuum extractor is especially dangerous [7].

The long term outcomes of infants delivered by vacuum extractor have been studied, and these infants had normal neurological development at 5-6 years of age [4]. There is no data on the theoretical remote complication of genital prolapse later in life [3]. Failed forceps occur when an attempt to deliver a baby by forceps is unsuccessful and the operator encounners difficulties in the use of forceps and resorts to CS. Attempt at forceps delivery failed in only 2 cases in which the diagnosis of cephalopelvic disproportion was made due to failure of presenting part to descend despite proper application. The procedure had to be abandoned with resort to CS. If a failed forceps should occur, it is wise to ask for help. Resort to CS early is better and safer than attempting another instrumental delivery.

Table-1: Characteristics of patients in the two study groups.

Variable	Ventouse	Forceps	p-value
Age (M±SD) (years)	25.6 ± 6	24.6 ± 6	>0.05
Nulliparous (%)	126 (49)	32 (49)	<0.05
Multiparous (5)	132 (51)	14 (30)	
Birthweight (M±SD)gms	3330±440	3270±490	>0.05

M-mean, SD- standard deviation

Table-2: Maternal morbidity following instrumental delivery

Trauma	Ventouse N= 258(5)	Forceps N=46(5)	p-value
Intact perineum (%)	17 (6.6)		<0.05*
Episiotomy	225 (87.2)	43 (93.5)	<0.05*
Episiotomy+ extension	15 (5.8)	-	<0.05*
Third degree perneal tear	(0.4)	3 (6.5)	<0.05*
Blood loss > 500	22 (8.5)	2 (4.3)	<0.05*

**Significant*

Meta-analysis of the randomized controlled trials indicate that use of forceps was significantly less likely to fail, more likely to be associated with maternal perineal or vaginal trauma, and less likely to be associated with cephalhematoma. Intracranial hemorrhage, skull fracture, retinal hemorrhage and rarely, subgaleal hemorrhage, do occur with vacuum extraction. With the exception of cephalhematoma, there are no clear differences in neonatal morbidity [6,8,9]. There were no significant differences in neurological status on the first and 5th day between the forceps and ventouse extraction groups. Thus in low extraction with no signs of fetal asphyxia, either method can be used with safety if the obstetrician is familiar with both methods of operative vaginal delivery [10]. Vacuum extractions have replaced forceps for many institutions in which assistance is required to achieve vaginal delivery [11]. Increasingly registrars go through obstetric training with insufficient training in obstetric forceps delivery. This was associated with a steady increase in the CS rate throughout the world [12]. The Armed Forces Hospital is no exception. There

was a dramatic increase in the total number of deliveries from 1377 in 1979 to 7404 in the year 2000; Forceps deliveries showed a steady decline from 12.8% in 1979 to 0.6% on 2000, while ventouse deliveries increased from 0.1% in 1979 to 3.4% in 2000. The decline in forceps deliveries from 12.8% in 1979 to <1% in year 2000 was associated with steady increase in CS from 6.7% in 1979 to 14.6% in year 2000. Vacuum extractor is a relatively easy instrument to use, and for this reason is at some risk of being misused [9]. This may explain the higher failure rate of ventouse when compared to forceps. There was a significant increase in the frequency of neonatal resuscitation and increase in base deficit for the umbilical artery, increased rate of admission to NICU and increase in the risk of birth trauma in midpelvic deliveries [13]. Admission to NICU was not required in any baby of the two groups. There was no significant increase in short term neonatal morbidity in the forceps groups, while maternal morbidity was higher in the cesarean delivery group [14].

In conclusion, the key for successful attempt at instrumental delivery are skill, experience and awareness that application of forceps or vacuum extractor is not a commitment to vaginal delivery. The true success is the outcome of the healthiest child and mother by whatever route. Only outlet forceps have a place in modern obstetrics today.

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