Original Research Article

Study of immediate maternal and neonatal effects of forceps and vacuum assisted deliveries

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Abstract

Background: There is a concern about the dramatically rising rates of caesarean delivery worldwide as unnecessary caesarean sections are associated with increased maternal and perinatal morbidity. When prerequisites have been met, the appropriate indications for consideration of either forceps delivery or vacuum extraction are prolonged second stage, nonreassuring fetal heart rate tracing, or shortening of the second stage of labor for maternal benefit. The aim of the present study was to assess the maternal and neonatal outcome following vacuum and forceps-assisted deliveries in term pregnancies. **Material and Methods:** This was a prospective observational study conducted in women undergone instrumental delivery in our hospital. **Results:** After applying inclusion and exclusion criteria 60 patients each from ventouse and forceps group were included in present study. Instrumental delivery was common in less than 25 year age group, nulliparous (primigravida), 37-40 weeks gestational age, with birth-weight (2,501–3,000 grams) patients. Most common indications were fetal distress (28), prolonged second stage (26) and poor maternal effects (22Perineal trauma (third and fourth degree perineal tear, periurethral tear, episiotomy extension, cervical tear, vaginal wall tear, extension to fornices) was more common in forceps delivery group as compared to ventouse. Similarly post-partum haemorrhage and need of blood transfusion was more in forceps as compared to ventouse. Neonatal hyperbilirubinemia and cephalhematoma was more in ventouse delivery while instrumental marks and bruising was common in forceps delivery group. **Conclusion:** Ventouse delivery is less traumatic to mother as compared to forceps. Neonatal outcome is similar in both. Forceps and ventouse assisted vaginal deliveries can reduce the unwarranted and raised caesarean section rates, also reduce second stage fetal morbidity and mortality. Proper technique and skill are major factors which can reduce maternal and neonatal trauma due to instrumental delivery.

Key Word: Vacuum extraction, Forceps, Maternal morbidity, Neonatal outcome.

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INTRODUCTION

There is a concern about the dramatically rising rates of caesarean delivery worldwide as unnecessary caesarean sections are associated with increased maternal and perinatal morbidity.[1,2] While the literature has delineated benefits of spontaneous vaginal birth over cesarean with respect to maternal and neonatal morbidity, shorter recovery, and decreased costs, less clear is the question of operative vaginal delivery as compared to cesarean section in the second stage of labor, particularly from a low station[3]. When prerequisites have been met, the appropriate indications for consideration of either forceps delivery or vacuum extraction are prolonged second stage, non reassuring fetal heart rate tracing, or shortening of the second stage of labor for maternal benefit. During the last decade, the rate of operative vaginal delivery has remained stable, whereas the rate of vacuum has increased against forceps application, because of the new designs of vacuum cups with reduced risk of injury to the fetus and increased instrumental success rate

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[4].Complications due to instrumental delivery can be minor complication like laceration of vagina and perineum and major complication associated with traumatic haemorrhage, bladder injury and pelvic muscle injury in mother, while cephalhematomas, retinal hemorrhages and intracranial hemorrhages are noted in neonates[5]. Extreme care in patient selection, skilful use of obstetric forceps with strict adherence to universal guidelines can avert or reduce the maternal and neonatal complications.The aim of the present study was to assess the maternal and neonatal outcome following vacuum and forceps-assisted deliveries in term pregnancies.

MATERIAL AND METHODS

This was a prospective observational study conducted in department of obstetrics and gynaecology, Katuri Medical College and Hospital, Guntur. Study was conducted over a period of 1 year. Institutional ethical committee clearance was taken for present study. Women undergone instrumental delivery in our hospital were included in the study. Exclusion criteria from both the groups were cases ofmultiple pregnancy, preterm (<34 wks of gestation) and breech presentation (for forceps in after cominghead). The various indications for instrumental delivery were fetal distress, non-progress in second stage of labor, to cut short second stage of labor, poor maternal efforts. After case selection, written and informed consent was taken, prerequisites fulfilled and women were assigned for either vacuum or forceps application depending upon choice of obstetrician on duty. Silastic cups were used for vacuum extraction, while short curved outlet Wrigley's forceps was used for forceps deliveries. A written informed consent was taken for participation in present study. History (demographic, symptomatology, obstetric, past, etc) and examination findings were noted from case records. Important points were of parity, gestational age, station of fetal head at the commencement of extraction, presentation, indications. Maternal morbidity was analysed in terms of perineal, vaginal, cervical lacerations, episiotomy extension, urinary in continence, traumatic postpartum haemorrhage. Neonatal morbidity was analysed in terms of low Apgar score, unexplained convulsions, jaundice, scalp and facial injuries, cephalhematoma, birth asphyxia, neonatalsepsis, etc. Maternal and neonatal follow up was kept for 7 days. Data was entered in Microsoft excel sheet and analysed. Statistical analysis was done using descriptive statistics.

RESULTS

After applying inclusion and exclusion criteria 60 patients each from ventouse and forceps group were included in present study. Instrumental delivery was common in less than 25 year age group, nulliparous (primigravida), 37-40 weeks gestational age, with birth-weight (2,501–3,000 grams) patients.

Table 1: general characteristic

Characteristics	Ventouse (n =60)	Forceps (n =60)
Age distribution (Age in years)		
< 25	32	39
26–30	17	13
31–35	9	7
> 35	2	1
Parity		
0	47	53
1-2	7	6
3 or more	4	1
Gestational age (weeks)		
< 37	2	1
37–40	47	44
> 40	11	15
Birth weight (gm)		
< 2,000	1	2
2,001–2,500	13	11
2,501–3,000	33	24
3,001–3,500	11	16
3,501–4,000	2	5
> 4,000 – –	--	2

Most common indications were fetal distress (28), prolonged second stage (26) and poor maternal effects(22).

Table 2: Indications for application.

Indications	Ventouse (n =60)	Forceps (n =60)	p-value
Prolonged second stage	15	11	
Poor maternal effort	10	12	
Fetal distress	8	20	Significant
Previous LSCS	8	3	
Pre-eclampsia	6	3	
Severe anemia	5	2	
Eclampsia	3	3	
Maternal distress	3	3	
Heart disease	2	3	

All forceps delivery patients were given episiotomy, while only two third of ventouse delivery patients required episiotomy. Perineal trauma (third and fourth degree perineal tear, periurethral tear, episiotomy extension, cervical tear, vaginal wall tear, extension to fornices) was more common in forceps delivery group as compared to ventouse. Similarly post-partum haemorrhage and need of blood transfusion was more in forceps as compared to ventouse. No laparotomy or maternal mortality noted in present study.

Table 3: Maternal complications and Morbidity

	Ventouse (n =60)	Forceps (n =60)	p-value
Episiotomy	40	60	Significant
Blood transfusion needed	11	15	
Third and fourth degree perineal tear	3	13	
Periurethral tear	2	12	Significant
Post-partum haemorrhage	8	11	
Episiotomy extension	6	6	
Cervical tear	4	6	
Vaginal wall tear	3	5	
Extension to fornices	0	4	Significant

No serious neonatal injuries were noted in present study. Total 4 perinatal morbidities were noted, all were referred pateints with prolonged second stage, immediately after primary assessment instrumental delivery was done. Neonatal hyperbilirubinemia and cephalhematoma was more in ventouse delivery while instrumental marks and bruising was common in forceps delivery group.

Table 4: Neonatal complications and Morbidity

	Ventouse (n =60)	Forceps (n =60)	p-value
Neonatal ICU admissions	15	13	
Neonatal hyperbilirubinemia	10	3	
Cephalhematoma	7	2	Significant
Instrumental marks and bruising	4	13	Significant
Use of phototherapy	4	1	
Feeding difficulty	2	1	
Convulsions	1	3	
Perinatal mortality	1	3	
Subconjunctival hemorrhage	0	4	

DISCUSSION

Primary goal of instrumental delivery is to assist the spontaneous vaginal birth providing minimum maternal and neonatal morbidity. High level of clinical and technical skills and therefore, adequate training is necessary for the use of both instruments. Primipara mother was about 3.5 times more likely risk for a complication of instrumental delivery than multipara mother. We also noted similar findings. A possible explanation for this may be due to a higher tendency to second stage delays in primigravida mother. Even though the exact mechanism is not justified primipara women had a high risk for perineal injuries[6]. We also noted similar findings. Primiparity, episiotomy, absence of CTG, age of mother, hospital visit type, type of instrumental delivery, low instrumentation were identified variable. However, after fitting those variables in multivariable logistic regression model; episiotomy, Primiparity and forceps-assisted instrumental vaginal delivery were a statistically significant association with maternal complication related to instrumental delivery[7]. Mothers who had forceps delivery were 3.4 times more

likely to develop maternal complication than those mothers who had vacuum delivery. These findings are in accordance with the Cochrane database review study that maternal morbidity was less in vacuum extraction compared to forceps delivery[8]. This is evidenced by vacuum extraction was associated with less pain at delivery and less likely to cause serious injury on the mother[9]. Vacuum extractor is less likely to achieve a successful vaginal delivery and to cause serious maternal injury than applying the forceps. Although the vacuum is associated with a greater incidence of cephalohematoma, other facial/cranial injuries are more common with forceps[10]. Studies for for instrumental delivery noted most common indication as prolonged 2nd stage of labor[11] , other study noted most common indication fetal distress followed by poor maternal efforts[12]. Singh A *et al* had cutting short of 2nd stage of labor (i.e., where prolonged bearing down is detrimental for the mother in cases of hypertension, heart disease etc.) was the chief indication followed by prolonged second stage[13]. In our study common indications were fetal distress followed by prolonged second stage and poor maternal effects. Most trials comparing maternal and fetal effects of vacuum extractor and forceps delivery agreed upon the maternal benefits of vacuum extractor over forceps, namely less maternal soft tissue trauma, decreased requirement of regional or general anesthesia, and decreased blood loss[14]. Protective effect of episiotomy was shown for maternal complication related to instrumental delivery. Women who had an episiotomy during instrumental delivery were 86% lower maternal complication compared to women who didn't have episiotomy[7].Mothers who had episiotomy were about 86% less risk for maternal complication of instrumental delivery than those who had no episiotomy. This is also true that mediolateral episiotomy protected significantly for anal sphincter damage in both vacuum extraction and forceps delivery. Mediolateral episiotomy in operative vaginal delivery strongly protects the occurrence of anal sphincter lesions. We also preferred to give episiotomy for all forceps patients, but for ventouse episiotomy can be individualised. A review of the literature yields divergent views about the effects of vacuum extraction on the newborn. However, most authors agree that serious neonatal injuries are rare with vacuum extraction. Neonatal well-being assessed by Apgar scores was no different among the two groups, consistent with other reports[15,16].Early literature reported increased operative vaginal delivery related retinal hemorrhage, cephalohematoma, facial injury, or maternal lacerations. Also increased intracranial hemorrhage rates with forceps or vacuum use compared to pre-labor cesarean delivery were noted[17].

CONCLUSION

Ventouse delivery is less traumatic to mother as compared to forceps. Neonatal outcome is similar in both. Forceps and ventouse assisted vaginal deliveries can reduce the unwarranted and raised caesarean section rates, also reduce second stage fetal morbidity and mortality. Proper technique and skill are major factors which can reduce maternal and neonatal trauma due to instrumental delivery.

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