

# Comparison of Maternal and Neonatal Outcome in Forceps versus Ventouse Assisted Vaginal Delivery

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## ABSTRACT

**Objectives:** To compare the maternal and neonatal outcome following ventouse and forceps- assisted vaginal deliveries in singleton term pregnancies. **Study Design:** A cross-sectional study. **Duration and Place of study:** It was conducted at the Ob/Gynae unit-III of Jinnah hospital, Lahore from June 2011 to May 2013. **Patients and Methods:** All patients who underwent instrumental vaginal delivery during this period, fulfilling the inclusion criteria were studied. Main maternal outcomes were perineal tears while the main neonatal outcomes were Apgar score at 1 minute and at 5 minutes after birth. Neonatal outcome included record of cephalhematoma, shoulder dystocia and need for admission to NICU. In addition to the above, maternal age, gestational age, parity and booking status were also recorded along with the indication for instrumental vaginal delivery for both ventouse and forceps delivery groups. Data was entered into SPSS-15. Percentages were calculated for all the above variables except maternal age and gestational age for which mean  $\pm$  SD were calculated. Chi -square test was used for qualitative variables to assess any difference between the two groups. P-value of equal to or  $<0.05$  considered to be significant. **Results:** A total of 80 patients underwent ventouse delivery while 120 patients with forceps delivery were included. Mean maternal ages were  $25.7 \pm 4.33$  yrs and

$25.05 \pm 3.47$  yrs in ventouse and forceps group respectively. 54(67%) and 95(79.16%) were primiparous in ventouse and forceps group respectively. 35(43.7%) were booked cases in ventouse group while this number was 53(44.2%) in forceps group. Fetal distress was the commonest indication of instrument application in 60(75%) and 108(90%) cases in ventouse and forceps group respectively. 16(20%) and 35(29.16%) neonates had Apgar score of  $<7$  at 1 minute in ventouse and forceps group respectively. Apgar score of  $<7$  at 5 minute was observed in 10(12.5%) of ventouse group while 14(11%) of forceps group. 2.5 % (n=2) and 1.66% (n=2) of neonates had shoulder dystocia in ventouse and forceps group respectively. Cephalhematoma was observed in 4(5%) of ventouse group while it was 1.5% (n=2) in forceps group. 11% (n=9) and 10% (n=12) of neonates admitted to NICU in ventouse and forceps group respectively. No case of maternal 3<sup>rd</sup> degree perineal tear observed in ventouse group while 3(2.5%) of patients had 3<sup>rd</sup> degree perineal tears in forceps group. **Conclusion:** Forceps deliveries are more associated with maternal morbidity while neonatal trauma is commoner among those delivered by vacuum extraction however there seems to be no difference in neonatal admission to NICU. **Key Words:** Maternal and neonatal outcome, Forceps, Ventouse.

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## INTRODUCTION

The history of forceps delivery dates back as far

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as 1500 BC, being originally used following fetal demise to save the mother's life. The ventouse however was first described in 1954 and modified in 1969.<sup>1</sup> The incidence of instrumental vaginal delivery ranges between 10-15% in UK and depends upon institution and the population.<sup>2</sup> Commonest indications of instrumental vaginal delivery include delay in the second stage of labor,

poor maternal effort and fetal distress including cord prolapse in the second stage of labor.

Maternal indications include severe cardiac, respiratory or hypertensive disease or intracranial pathology where bearing down effort may be detrimental for her health.<sup>3</sup> The use of forceps is in practice since decades however the trend shift is seen in the direction of ventouse. The rapid acceptance of the ventouse is due to perceived lesser incidence of maternal trauma and minimal training requirements.<sup>4</sup>

Review of the literature suggests differential maternal and neonatal outcomes and complication rates between the two methods. Both are associated with increased risk of maternal and neonatal injury when compared to normal spontaneous vaginal deliveries.<sup>5</sup> There are studies favoring the time tested outlet forceps to be better instrumental method but on the other hand there is some evidence which suggest its pitfalls.<sup>6</sup> The literature also include studies in which forceps delivery has been termed as better modality of operative vaginal delivery in terms of neonatal outcome.<sup>7</sup> The earlier work focused on the maternal side of problems, including the increased frequency of maternal tears, soft tissue damages and post-delivery scarring resulting in the development of procedures like vacuum extraction.<sup>4</sup> However, recent studies show that maternal soft tissue injury rates are similar in vacuum and forceps assisted deliveries.<sup>8</sup> Thus, there is considerable debate concerning the preferred instrument for assisted vaginal delivery. The objective of this study was to compare the short term neonatal and maternal outcomes after ventouse and forceps deliveries.

## MATERIAL AND METHODS

All patients who underwent instrumental vaginal delivery during the period Jun 2011 to May 2013, having singleton pregnancy at gestation of 37 weeks or more with cephalic presentation were included in the study. Patients having fetal anomalies and diagnosed IUD were excluded from the study. Main maternal outcomes were presence of 3<sup>rd</sup> or 4<sup>th</sup> degree perineal tears while the main neonatal outcomes were Apgar score at 1 minute and at 5 minutes after birth. Neonatal

outcome also included presence of cephalhematoma, shoulder dystocia and need for admission to NICU. In addition to the above, maternal age, parity and booking status were also recorded along with the indication for instrumental vaginal delivery for both ventouse and forceps delivery groups. Data was entered into SPSS-15. Percentages were calculated for all the above variables except maternal age for which mean  $\pm$  SD were calculated. Chi-square test was used for qualitative variables to assess any difference between the two groups. P-value of equal to or  $<0.05$  considered to be significant.

## RESULTS

A total of 80 patients who underwent ventouse delivery while 120 patients who underwent forceps delivery were included in the study. The mean ages in ventouse and forceps groups were  $25.7 \pm 4.33$  yrs, and  $25.05 \pm 3.47$  yrs respectively. Majority of patients belonged to the age groups  $\geq 25$  years in both groups. Age distribution is depicted in table 1. 67% of patients were primigravidas in ventouse group while this percentage was 79.16% in forceps group. Regarding the booking status of patients, they were predominantly unbooked in both the groups i.e.: 45(56.2%) in ventouse while 67(55.8%) in forceps group.

**Table-1 Maternal features in vacuum and forceps group**

Maternal features	Ventouse (n=80)	Forceps (n=120)	P-Value
Maternal age(yrs)	$25.7 \pm 4.33$	$25.05 \pm 3.47$	
< 25 years n(%)	31(37.5%)	42(35%)	0.89
$\geq 25$ years n(%)	49(61.25%)	78(65%)	0.99
Parity			
Primipara n(%)	54(67%)	95(79.16%)	0.10
Multipara n(%)	26(33%)	25(20.84%)	0.40
Booking status			
Booked cases n(%)	35(43.7%)	53(44.2%)	0.97
Unbooked cases n(%)	45(56.2%)	67(55.8%)	0.97

**Table 2 Indications of instrumental delivery**

Indication	Ventouse (n=80)	Forceps (n=120)
Fetal distress n(%)	60 (75%)	108 (90%)
Maternal exhaustion n(%)	14 (17.5%)	7 (5.8%)
Prolonged second stage of labor n(%)	6 (7.5%)	5 (4.16%)

The indications for ventouse application were fetal distress (75%), maternal exhaustion (17.5%) and prolonged second stage of labor (7.5%). Indications for forceps delivery were fetal distress (90%), maternal exhaustion (5.83%) and prolonged second stage of labor (4.16%). Apgar score of <7 at 1 minute after birth was observed in 16(20%) and 35(29.16 %) of cases in ventouse and forceps delivered neonates. Apgar score of <7 at 5 minutes after delivery was noted in 10(12.5 %) and 14(11.6%) in ventouse and forceps group respectively. Shoulder dystocia was observed in 2.5% (n=2) of ventouse deliveries while it was 1.66% (n=2) of forceps deliveries. Cephalhematoma was noted in 5 %(n=4) of ventouse delivered newborns while it is 1.5% (n=2) in forceps delivered newborns. 11% (n=9) of ventouse delivered neonates while 10% (n=12) of those delivered by forceps were admitted in NICU. 2 %(n=3) of mothers who underwent forceps delivery had 3<sup>rd</sup> degree perineal tears while no patient had 3<sup>rd</sup> degree perineal tear in ventouse group.

## DISCUSSION

Vacuum extraction and obstetric forceps are operative procedures used during complicated deliveries and it remains an important clinical procedure to be performed by obstetricians. The aim of instrumental vaginal delivery is to assist the vaginal birth ensuring minimum maternal and neonatal morbidity. So, an adequate clinical skill is required for use of both vacuum and forceps.<sup>9,10,11</sup>

**Table-3 Maternal and Neonatal morbidity**

Morbidity	Ventouse (n=80)	Forceps (n=120)	P value
Apgar score <7 at 1 minute n(%)	16(20%)	35(29.16%)	0.99
Apgar score <7 at 5 minute n(%)	10(12.5%)	14(11.66%)	0.76
NICU admission n(%)	9(11%)	12(10%)	0.70
S Shoulder dystocia n(%)	2(2.5%)	2(1.66%)	0.36
Cephalhematoma n(%)	4(5%)	2(1.5%)	0.13
Maternal 3 <sup>rd</sup> degree tear	0	3(2.5%)	0.00

This study was performed to focus especially on the short term maternal and neonatal morbidity associated with forceps and vacuum assisted vaginal deliveries. In the present study, mean ages of the patients undergoing for forceps and vacuum were 25.05±3.47yrs and 25.7±4.33yrs respectively which is comparable with the study performed by N Prapas et al.<sup>5</sup>

43.7% and 44.2% of patient were booked in vacuum and forceps group respectively. The higher frequency of un-booked cases depicts the type of patient coming to tertiary care hospital. It also indicates the attitude of society towards care of pregnant women.

Fetal distress was the commonest indication of forceps deliveries making 90% of all forceps deliveries followed by maternal exhaustion (5.8%) and prolonged second stage (4.16%) respectively. Among the vacuum delivery, 75% were due to fetal distress, 17.5% were due to maternal exhaustion and 7.5% were due to prolonged 2<sup>nd</sup> stage of labor. These finding were supported by local studies performed by Arshad A<sup>11</sup> and also by Akhtar S.<sup>4</sup>

Several studies documented differential maternal and neonatal outcomes and complication rates between the two methods of operative vaginal delivery. In this study, the Apgar scores were calculated at 1 minute and 5 minutes after birth. 20% and 29.16% of neonates had Apgar score of <7 at 1 min in vacuum and forceps group respectively which is comparable to the study performed by Akhter S.<sup>4</sup> The Apgar score at 5 minutes of <7 were 12.5% in vacuum while 11.66% in forceps group. These findings were consistent with a study conducted by Singh A and Rathore P.<sup>12</sup> 10% of neonates in forceps group while 11% of neonates in vacuum group had to be admitted in NICU. Supporting this, Singh has reported an equal incidence of neonatal unit admission among the two groups<sup>12</sup>

Shoulder dystocia is an obstetrical emergency and found to be high with vacuum use compared to forceps. The frequency of shoulder dystocia was 2.5% in vacuum and 1.66% in forceps group. This finding is consistent with the results of research done by Caughey AB et al.<sup>13</sup> Cephalhematoma occurred more frequently in vacuum i.e; 5% as compared to 1.5% in forceps deliveries. These results are supported by studies conducted by Singh A,<sup>12</sup> N Prapas et al<sup>5</sup> and Caughey AB et al.<sup>13</sup> Maternal third degree perineal tears are more common with the use of forceps.<sup>13,14,15,16</sup> The frequency of 3<sup>rd</sup> degree tears was 0% with vacuum while 2.5% with forceps in our study.

The present study was not without its shortcomings such as retrospective nature of the data and the absence of research on long term complications associated with instrumental vaginal delivery.

## CONCLUSION

Forceps deliveries are more associated with maternal morbidity while neonatal trauma is commoner among those delivered by vacuum extraction however there seems to be no difference in neonatal admission to NICU. In conclusion, our study shows that vacuum and forceps are safe alternatives to each other rather than rivals. The main factor determining the safety of instrument is the obstetrician rather than the instrument itself.

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