

## Fetomaternal Outcome in Instrumental Vaginal Delivery

Ranjit Kumar Sahoo<sup>1</sup>, Sanghamitra Mohapatra<sup>2</sup>

<sup>1</sup>Senior Resident, Department of Obstetrics and Gynaecology, MKCG Medical College and Hospital, Berhampur

<sup>2</sup>Associate Professor, Department of Obstetrics and Gynaecology, MKCG Medical College and Hospital, Berhampur

Received: 15-04-2022 / Revised: 20-05-2022 / Accepted: 05-06-2022

Corresponding author: Dr Ranjit Kumar Sahoo

Conflict of interest: Nil

### Abstract

**Objective:** Instrumental vaginal delivery is an along obstetric practice used to expedite vaginal delivery and avoid caesarean delivery. This study is to compare maternal and neonatal outcomes of vacuum versus forceps application in assisted vaginal delivery.

**Material and Method:** Women in labor with vertex presentation were delivered by vacuum and forceps. A total of 110 cases were included in this prospective study. Maternal and neonatal morbidity were compared in terms of perineal lacerations, episiotomy extension, post-partum hemorrhage, Apgar score, instrumental injuries of the baby, NICU admissions PNM etc. Prospective observational study was used to analyze the data.

**Observations:** Maternal morbidity viz. episiotomy extension as well as first and second-degree perineal tear were significant in the forceps group compared to ventouse. ( $P = 0.0001$  and  $P = 0.02$ , respectively). With regards to neonatal morbidity, no statistically significant difference was noted.

**Conclusion:** Vacuum and forceps should remain appropriate tools in the armamentarium of the modern obstetrician. However, ventouse may be chosen first (if there is no fetal distress) as it is significantly less likely to injure the mother.

**Keywords:** Vacuum extraction, Forceps, Maternal morbidity, Neonatal outcome

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Vacuum extraction and forceps are the two options when an instrument is needed to facilitate a vaginal birth. The choice between these two options has usually been based on tradition and training [1]. In North America, forceps has been used more frequently than vacuum extraction whereas reverse is true in Europe and Asia [2-4]. Vacuum extraction has recently gained in popularity because of new designs of vacuum cups with reduced risk of injury to the neonate [5]. James Young Simpson was

the first to use traction to deliver a baby in 1849. It was later modified by Malmstrom in 1953. The obstetric forceps had its history from the time of Chamberlain family in the seventh century. Modern obstetrics practice has witnessed an increase in the caesarean section rates everywhere. Assisted vaginal delivery, with the use of forceps and vacuum extraction, offers the option to accomplish safe delivery for the mother and the clinician. A successful assisted vaginal delivery avoids caesarean section, its attendant uterine scar and its implications

for future pregnancy. Reintroduction of this art will definitely find a place in emergency obstetric care. The present study was designed to assess the fetomaternal outcome by comparing vacuum with forceps.

### Materials and Methods

A total of 110 cases were included in this prospective study carried out from June 2018 to July 2020. The various indications for instrumental delivery were fetal distress, non-progressive 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 randomly assigned for either vacuum or forceps application.

A detailed history was taken, and obstetric examination done. Data on women giving birth by vacuum and forceps deliveries were analyzed and compared in terms of parity, gestational age, station of fetal head at the commencement of extraction, presentation, indications.

Silastic cup was used in vacuum extraction. Forceps deliveries were performed using short, curved outlet Wrigley's forceps.

Maternal morbidity was analysed in terms of perineal, vaginal, cervical lacerations, episiotomy extension, urinary incontinence, traumatic postpartum haemorrhage.

Neonatal complications in both groups including low Apgar score, unexplained convulsions, jaundice, scalp and facial injuries, cephalhematoma, birth asphyxia, neonatal sepsis, were investigated and compared. Condition of mother and baby at the time of discharge was noted. Prospective observational study was used to analyze the data.

### Observations

This study was carried out in the department of obstetrics and gynaecology, MKCG Medical College, Berhampur from June 2018 to July 2020. Total no of instrumental vaginal delivery was 110 out of which delivery by ventouse was 55 and that of forcep was 55 and they were followed up.

Table 1 shows that the total no of deliveries during the study period was 3540, out of which instrumental delivery were 110. Thus, the incidence of instrumental delivery was 3.12%.

**Table 1: Incidence of instrumental delivery**

Total no of delivery	Instumental delivery	
	No of cases	Percentage
3540	1	3.12%
	1	
	0	

**Table 2: Maternal and neonatal charecterstic**

Sl No	Parameters	Forceps(55)	Ventouse (55)
		No(%)	No(%)
1	Age in years		
	<20	4(7.2)	5(9.0)
	20-25	38(69.1)	41(74.6)
	>25	13(23.7)	9(16.4)
2	Gravida		
	Primi(G1)	39(70.9)	30(54.6)
	G2	10(18.2)	12(21.8)

	G3 and above	6(10.9)	13(23.6)
3	Socioeconomic status		
	Lower	40(72.7)	38(69.0)
	Middle	13(23.7)	14(25.5)
	High	2(3.6)	3(5.4)
4	Gestational age (weeks)		
	<37	01(1.8)	03(5.4)
	37-40	46(83.6)	45(81.8)
	>40	08(14.5)	07(12.7)
5	Birth weight (kg)		
	<2	01(1.8)	02(3.6)
	2-2.5	15(27.2)	12(21.8)
	2.5-3	21(38.1)	18(32.7)
	3-3.5	12(21.8)	13(23.6)
	3.5-4	05(9.0)	08(14.5)
	>4	01(1.8)	02(3.6)
6	Apgar score (at 5 mins)		
	0-3	-	01(1.8)
	4-6	04(7.2)	05(9.0)
	7-10	51(92.7)	49(89)

The mean age of women in our study was 23yr in both forcep and ventouse. In our study 54.6% of ventouse delivery and 70.9% of forcep delivery were carried out in primigravida. Mean birth weight in our study was 2.8kg. We found no difference in APGAR score at 1 and 5 minutes between the two study group.

**Table 3: Indications of forceps and ventouse in primi and multigravidae**

Indications	Forceps	Ventouse
	NO(%)	NO(%)
Fetal distress in 2 <sup>nd</sup> stage of labour	20(36.3)	08(14.5)
Prolonged 2 <sup>nd</sup> stage of labour	12(21.8)	25(45.4)
Maternal exhaustion/ineffective uterine contraction	6(10.9)	5(9.0)
Eclampsia	5(9.0)	3(5.4)
PIH	8(14.5)	10(18.1)
Heart disease	1(1.8)	1(1.8)
Prev cs	1(1.8)	1(1.8)
Severe anaemia	1(1.8)	1(1.8)
Second baby twin	1(1.8)	1(1.8)

Table 3 shows most common indication was fetal distress (51% of cases) and forcep was the instrument of choice in 36.3% of cases as compared to ventouse (14.5%).

**Table 4: Total time taken for delivery of the baby by forceps and ventouse**

Time taken in mins	Forceps delivery (n=55)	Ventouse delivery (n=55)
	No(%)	No(%)
1-5 mins	9(16.3)	3(5.4)
6-10 mins	35(63.6)	12(21.8)
11-15 mins	11(20)	36(65.4)
16-20 mins	0(0)	4(7.2)
>20 mins	0(0)	0(0)

Table 4 shows the decision to delivery interval was average of 8 mins for forceps and 13 mins in ventouse assisted deliveries. It shows that it is quicker to delivery by forceps than ventouse, which tells forceps a preferred device in fetal distress cases.

**Table 5: Failure rates of instrumental delivery**

NO OF CASES	SUCCESSFUL	UNSUCCESSFUL
VENTOUSE (55)	50 (90.9)	5 (9.1)
FORCEPS (55)	53 (96.3)	2 (3.7)

Table 5 shows failure of 5 cases in ventouse (9%) as compared to forceps(3.6%).

**Table 6: Maternal morbidity in instrymental vaginal delivery**

MORBIDITY	FORCEPS(55)	VENTOUSE(55)
Epsiotomy	55(100)	47(85.4)
Episiotomy extension	7(12.7)	5(9)
Vaginal wall tear	2(3.6)	0
Periurethral tear	1(1.8)	0
Extension to fornices	1(1.8)	0
Cervical tear	1(1.8)	0
1st and 2 <sup>nd</sup> degree perineal tear	2(3.6)	2(3.6)
3rd and 4 <sup>th</sup> degree perineal tear	0	0
Post partum haemorrhage	3(5.4)	0
Length of hospital stay	36hr	24hr
Blood transfusion needed	3(5.4)	0

**Table 7: Neonatal mortality and morbidity**

VARIABLES	FORCEPS(55)	VENTOUSE(55)
Cephalohematoma	-	3(5.4)
Instrumental marks and bruising	14(25.4)	2(3.6)
Subconjunctival haemorrhage	2(3.6)	1(1.8)
Brachial plexus injury	-	-
Convulsion	1(1.8)	1(1.8)
Neonatal hyperbilirubinemia	1(1.8)	5(9.0)
Scalp and facial injury	2(3.6)	-
Birth asphyxia	1(1.8)	3(5.4)
Neonatal ICU admission	3(5.4)	1(1.8)

Table 6 shows maternal morbidity was significantly less in vacuum as compared to forceps. episiotomy was given to all patients before forcep application and 72% of vacuum

applications. It also shows episiotomy extension, vaginal wall tear and perineal tear were more frequent with forcep application.

Table 7 shows cephalohematoma and neonatal hyperbilirubinemia were significantly more common in vacuum but

instrumental marks and bruising were more common with forceps.

### Result and Discussion

The incidence of instrumental vaginal delivery in our study was 3.1%.it is still within the worldwide incidence of 2-15%. Decrease incidence could be attributed to variation in practice protocol, litigations, obstetrician resort to cs, whenever there is any problem with concern for the neonate.

In our study 70.9% of forcep delivery and 59.6% of ventouse delivery were carried out which is in accordance with prior study done by Akhtar.S.

For vacuum delivery the most common indication was prolong 2nd stage of labour followed by to cut short the 2nd stage of labour and fetal distress (14.5%).for forcep main indication was fetal distress(36%) followed by to cut short the 2nd stage of labour. these results are similar to that obtained by Asha and Vaisnav and Mariyams Ahmed et al. Our study result showed that forceps are the instrument of choice in fetal distress.

In the present study 5 cases in ventouse and 2 cases in forcep group were failed. unexpected failure of instrumental vaginal delivery is not rare. CPD is the main cause. RCOG guideline state that sequeatral use of instruments should be avoided.

Episiotomy was routinely done in all cases of forcep delivery. Study done by Achanna S et al also supported that association. Epsiotomy extension were more with forcep delivery.

Table 6 shows maternal morbidity was significantly lower in ventouse as compared to forcep delivery which is in accordance with Cochrake database result. In a randomized control trial Eason E showed a decrease in anal sphincter injury when vacuum was used over forcep. Our study reported no anal sphincter injury after vacuum as compared to forcep group.

Neonatal morbidity differs substantially among various published report. In present study birth asphyxia were not significantly higher after forcep application. cephalohematoma and neonatal hyperbilirubinemia were more marked after ventouse and instrumental bruising was more after forcep application. there is no significant difference in the neonatal morbidity in both groups.

## Conclusion

Instrumental vaginal delivery by experienced hand is associated with good obstetric outcome with minimum failure rate. The present study analysed maternal and fetal outcome in instrumental vaginal delivery with concluding that ventouse application is associated with less maternal trauma than forcep and seems to be no difference in neonatal outcome. The major factor which determines the safety of the instrument is the operator. Encouraging operative vaginal delivery may help to reduce the unwanted and raised cs rate.

## References

1. Anonymous. Vacuum versus forceps. (Editorial). Lancet. 1984;1:144.
2. Meniru GI. An analysis of recent trends in vacuum extraction and forceps delivery in the United Kingdom. BJOG: An Intern J Obstetr Gynaecol. 1996;103(2):168-70.
3. Learman LA. Regional differences in operative obstetrics: a look to the South. Obstetrics & Gynecology. 1998;92(4 Part 1):514-9.
4. Hillier CE, Johanson RB. Worldwide survey of assisted vaginal delivery. Intern J Gynecol Obstetr. 1994;47(2):109-14.
5. Johanson RB, Rice C, Doyle M, Arthur J, Anyanwu L, Ibrahim J, et al. A randomised prospective study comparing the new vacuum extractor policy with forceps delivery. Intern J Obstetr Gynaecol. 1993; 100(6): 524-30.
6. Lurie S, Glezerman M, Sadan O. Maternal and neonatal effects of forceps versus vacuum operative vaginadelivery. Intern J Gynecol Obstetr. 2005;89(3):293-4.
7. Akhtar S. Comparison of maternal and infant outcome between vacuum extraction and forceps deliveries. Pakistan Armed Force Med J. 2006; 2(1):25-31.
8. Nkwabong E, Nana PN, Mbu R, Takang W, Ekono MR, Kouam L. Indications and maternofetal outcome of

- instrumental deliveries at the University Teaching Hospital of Yaounde, Cameroon. *Tropical doctor*. 2011;41(1):5-7.
9. Singh A, Rathore P. A comparative study of fetomaternal outcome in instrumental vaginal delivery. *The Journal of Obstetrics and Gynecology of India*. 2011;61(6):663-6.
10. Achanna S, Monga D. Outcome of forceps delivery versus vacuum extraction-a review of 200 cases. *Parity*. 1994;3(1.4):3-4.