

MATERNAL AND NEONATAL OUTCOMES IN PATIENTS WITH INSTRUMENTAL DELIVERY (FORCEPS/VENTOUSE)

Archana Pathak¹, Dilip Kumar Bhaumik², Amitabh Kumar³

¹Resident, Department of Obstetrics and Gynaecology, DMIMS, Meghe, Wardha, Maharashtra.

²Professor, Department of Obstetrics and Gynaecology, DMIMS, Meghe, Wardha, Maharashtra.

³Dean, Department of Ayurveda, Vinoba Bhave University, Hazaribag, Jharkhand.

ABSTRACT

BACKGROUND

The main objective of study was to study the maternal and foetal outcome in forceps delivery, to study the maternal and foetal outcome in vacuum extraction and to study the complications of instrumental delivery.

MATERIALS AND METHODS

This longitudinal observational (analytical) study was conducted in Department of Obstetrics and Gynaecology, Acharya Vinoba Bhave Rural Hospital (AVBRH) at Sawangi (Meghe), Wardha, Maharashtra, from August 1, 2014, to July 31, 2016. Eighty cases of instrumental delivery were studied for maternal complications and foetal outcomes.

RESULTS

Foetal distress was single most indication in forceps delivery 22 (55%) whereas prolonged second stage was important indication for vacuum delivery 23 (57.5%). Forceps group 5 (12.5%) required prolonged hospital stay than vacuum group 1 (2.5%). Mean in forceps group is 7.3 ± 1.18 and in vacuum 6.8 ± 1.07 .

CONCLUSION

Maternal and foetal outcome in instrumental vaginal deliveries suggests that encouraging instrumental vaginal deliveries may help to reduce the raised caesarean section rates. It is concluded here that both this application do not develop any complication in long run.

KEYWORDS

Forceps, Ventouse, Maternal Outcome, Neonatal Outcome.

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BACKGROUND

Instrumental delivery is the term used when obstetricians use forceps or vacuum device to assist vaginal delivery in the second stage of labour. All around the world, 10 to 20% of the deliveries receive assistance during their delivery.¹ Of the two, vacuum extractor is comparatively recent one. Despite being introduced more than half a century ago by Malmstrom (1954), the modern vacuum extractor took a lead over forceps for assisted vaginal delivery only recently owing largely to a number of trials conducted during the last three decades.² Vacuum extraction has recently gained in popularity because of new designs of vacuum cups, thereby minimising injury to infants.³ Studies around the world have shown that the vacuum extraction results in a decreased risk and severity

of trauma to both mother and foetus and reduced analgesic requirements during delivery with greater simplicity and safety compared to forceps.⁴ When compared with a caesarean section performed in the first stage of labour, a caesarean section performed in the second stage of labour is associated with significantly increased risk of maternal morbidity including tears in relation to the uterine incision, haemorrhage, blood transfusion, bladder trauma and requirement of intensive care.⁵⁻⁸ There is also potential for complications in future pregnancies relating to uterine scar rupture in labour and risks associated with repeat caesarean section, which increase with each caesarean section required.⁹

Further, a vaginal birth in a first pregnancy is associated with a high (78-91%) rate of spontaneous vaginal birth in the next pregnancy.^{10,11} There is a need for further longitudinal follow up to check abnormality if any develops later can be taken care of at the time of assisted vaginal delivery.

AIM OF THE STUDY

The aim of the study is to find out the maternal and neonatal outcome with the use of forceps and vacuum in instrumental vaginal deliveries.

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Corresponding Author:

Dr. Archana Pathak,
#FF (B)-04, Chirag Platinum Building,
Anmol Nagar, Nalwadi,
Wardha-442001, Maharashtra.
E-mail: drarchanapathak01@gmail.com
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OBJECTIVES OF STUDY

1. To study the maternal and foetal outcome in forceps delivery.
2. To study the maternal and foetal outcome in vacuum extraction.
3. To study the complications of instrumental delivery.

MATERIALS AND METHODS

Place of Study

This study was conducted in Department of Obstetrics and Gynaecology, Acharya Vinoba Bhave Rural Hospital (AVBRH) at Sawangi (Meghe), Wardha, Maharashtra.

Duration of Study

August 1, 2014, to July 31, 2016.

Study Design

Longitudinal observational (analytical) study.

Sample size- 80.

The cases were divided into 2- groups, each group consisting of 40 cases each.

Group A- Forceps (40 cases).

Group B- Ventouse (40 cases).

Inclusion Criteria

All pregnant women in second stage of labour who had following indications for instrumental vaginal delivery were taken after fulfilling prerequisites.

- Foetal distress.
- Non-progressive second stage of labour.
- To cut short second stage of labour.
- Poor maternal effects.

Exclusion Criteria

Malpresentation- Brow, face, breech.

True cephalopelvic disproportion/contracted pelvis.

High foetal station- above +1.

Presence of big caput.

Patients not given consent for the procedure.

METHODOLOGY OF RECRUITMENT

All primigravida and multigravida in second stage of labour were assessed and selected for instrumental delivery, written and informed consent was taken, prerequisites checked. After history, investigations, abdominal and vaginal examination was done, then the decision was taken for instrumental delivery. The patient was placed in lithotomy position and brought to the edge of the table. Parts were cleaned with antiseptic solution and draped. Local anaesthesia given with perineal infiltration given. Wrigley forceps was used when the cervix was fully dilated. Left blade is inserted first followed by right. Locking of the blades done. Episiotomy given. Direction of pull is as first straight horizontal and then upwards and forwards.

Technique of ventouse extraction- after case selection, written and informed consent taken, prerequisites checked with respect to history, clinical examination and investigations. Local perineal infiltration was done with 1% Xylocaine. Cup was lubricated and introduced in the vagina after retraction of perineum with left hand fingers with knob of cup pointing in the direction of occiput. Episiotomy given. Cup is connected to suction machine and an initial vacuum of 0.2 kg/cm² is created (about 250 mmHg) every 2 minutes until a total negative pressure of 0.8 kg/cm² is reached.

Direction of traction- the direction of pull is like forceps first downwards, then progressively extended upward as the head emerges.

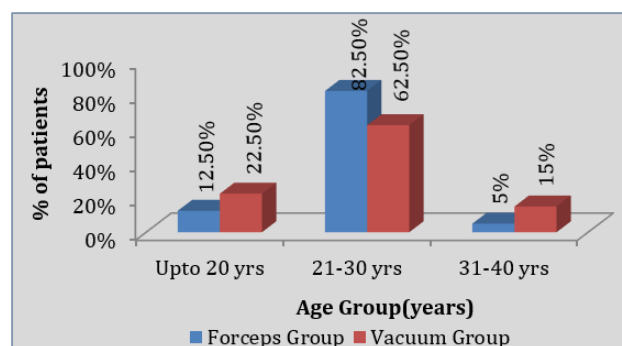
OBSERVATIONS AND RESULTS

This longitudinal observational (analytical) study was conducted in the Department of Acharya Vinoba Bhave Rural Hospital, Sawangi (M) and Wardha. Present study was carried out in 80 patients. After analysis, 40 pregnant women were enrolled in forceps and 40 pregnant women in vacuum group.

Age (Yrs.)	Forceps Group (n=40)		Vacuum Group (n=40)	
	No	%	No	%
Up to 20 yrs.	5	12.5	9	22.5
21-30 yrs.	33	82.5	25	62.5
31-40 yrs.	2	5	6	15
Total	40	100	40	100
Mean±SD	23.67±2.93 (19-32 years)		24.65±4.24 (19-34 years)	

Table 1. Distribution of Patients According to Age (Years)

In the above table, 33 (82.5%) patients were from 21-30 yrs. in forceps group and 25 (62.5%) in vacuum group. Maximum group of patients belong to the age group 21-30 yrs. Mean age in the forceps group was 23.67±2.93 and in vacuum, it was 24.65±4.24 years.

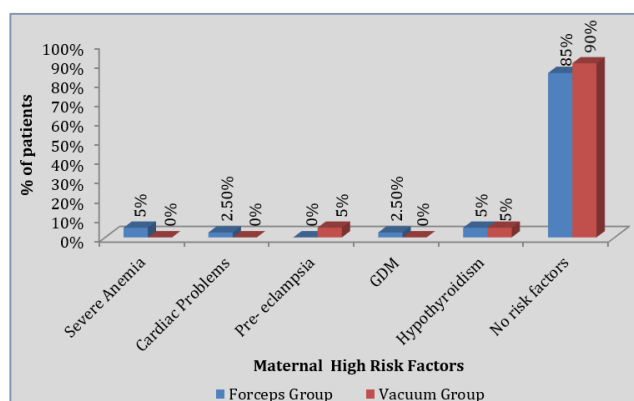


Graph 1. Distribution of Patients According to Age (Years)

Maternal High-Risk Factors	Forceps Group (n=40)		Vacuum Group (n=40)		χ^2 -Value
	No	%	No	%	
Severe anaemia	2	5	0	0	5.12, p=0.023, S, p<0.05
Cardiac problems	1	2.5	0	0	3.04, p=0.08, NS, p>0.05
Pre-eclampsia	0	0	02	5	5.12, p=0.023, S, p<0.05
Gestational diabetes mellitus	1	2.5	0	0	3.04, p=0.08, NS, p>0.05
Hypothyroidism	2	5	2	5	0.00, p=1.00, NS, p>0.05
No risk factors	34	85	36	90	0.45, p=0.67, NS, p>0.05
Total	40	100	40	100	1.14, p=0.28, NS, p>0.05

Table 2. Distribution of Patients According to Maternal High-Risk Factors

Forceps were applied for severe anaemia in 2 (5%), cardiac disease 1 (2.5%), GDM 1 (2.5%), while in pre-eclampsia, vacuum was applied in 2 (5%). Hypothyroidism was 2 (5%) in both the groups. P>0.05, NS.



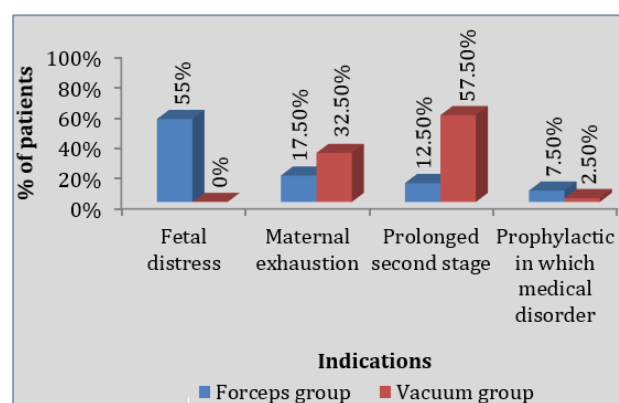
Graph 2. Distribution of Patients According to Maternal High-Risk Factors

Indications	Forceps Group (n=40)		Vacuum Group (n=40)		χ^2 -Value
	No	%	No	%	
Foetal distress	22	55	0	0	75.86, p=0.0001, S
Maternal exhaustion	7	17.5	13	32.5	5.22, p=0.022, S
Prolonged second stage	5	12.5	23	57.5	44.22, p=0.0001, S
Prophylactic in which medical disorder (anaemia)	6	7.5	4	2.5	2.40, p=0.12, NS
Total	40	100	40	100	

Table 3. Showing Indications for Instrumental Vaginal Delivery

Table 3 shows foetal distress was single most indication in forceps delivery 22 (55%), which is statistically significant whereas prolonged second stage

was important indication for vacuum delivery 23 (57.5%), which is also statistically significant.

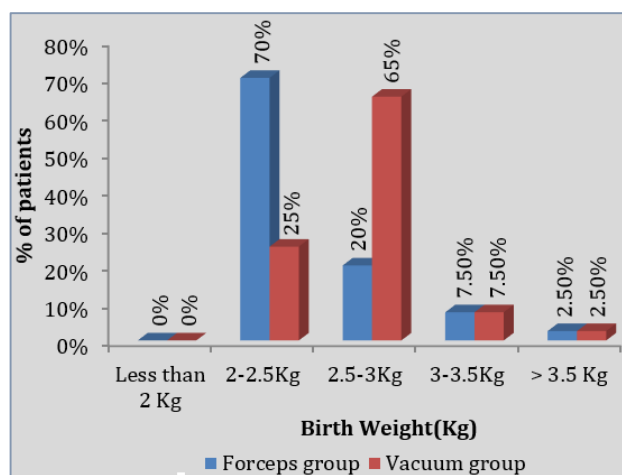


Graph 3. Showing Indications for Instrumental Delivery

Birth Weight	Forceps Group (n=40)		Vacuum Group (n=40)		χ^2 -Value
	No	%	No	%	
2-2.5 Kg	28	70	10	25	40.60, p=0.0001, S
2.6-3 Kg	8	20	26	65	41.43, p=0.0001, S
3.1-3.5 Kg	3	7.5	3	7.5	-
>3.5 Kg	1	2.5	1	2.5	-
Total	40	100	40	100	

Table 4. Distribution of Patients According to Birth Weight

In the present study, majority of the babies in forceps group is between 2-2.5 kg (70%) whereas majority of the baby of vacuum group were 2.6-3 kg (65%), which is statistically significant.

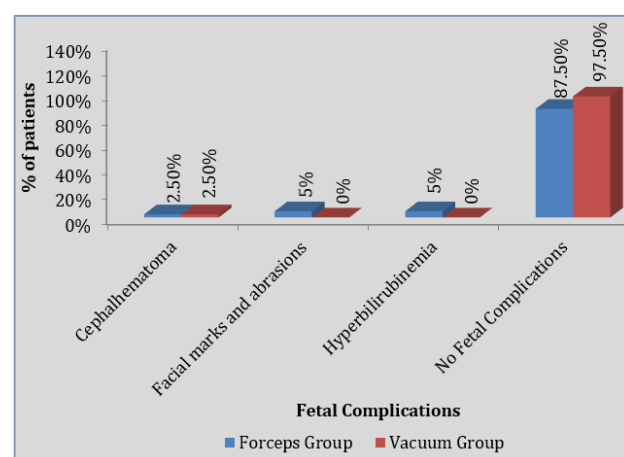


Graph 4. Showing Distribution of Patients According to Birth Weight

Foetal Complications	Forceps Group (n=40)		Vacuum Group (n=40)		χ^2 -Value
	No	%	No	%	
Cephalhematoma	1	2.5	1	2.5	0.00, p=1.00, NS, p>0.05
Facial marks and abrasions	2	5	0	0	5.12, p=0.0235, S, p<0.05
Hyperbilirubinaemia	2	5	0	0	-
No foetal complications	35	87.5	39	97.50	3.88, p=0.08, NS, p>0.05
Total	40	100	40	100	

Table 5. Table Showing Foetal Complications of Instrumental Vaginal Delivery

In above table, various foetal complications like cephalhematoma 1 (2.5%), facial marks and abrasions 2 (5%), hyperbilirubinaemia 2 (5%) are seen more in forceps groups than ventouse. $P < 0.05$.

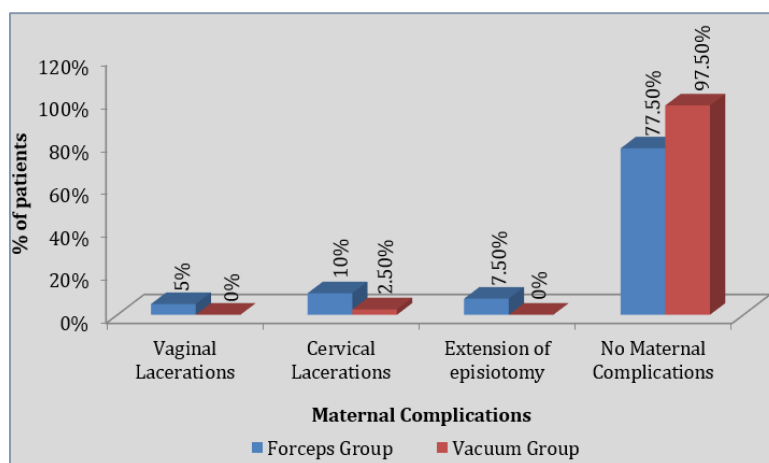


Graph 5: Graph Showing Foetal Complications of Instrumental Vaginal Delivery

Maternal Complications	Forceps Group (n=40)		Vacuum Group (n=40)		χ^2 -Value
	No	%	No	%	
Vaginal lacerations	02	5	00	0	5.12, p=0.023, S, p<0.05
Cervical lacerations	04	10	01	2.5	4.03, p=0.044, S, p<0.05
Extension of episiotomy	03	7.5	00	0	8.33, p=0.003, S, p<0.05
No maternal complications	31	77.5	39	97.5	7.31, p=0.006, S, p<0.05
Total	40	100	40	100	

Table 6. Table Showing Maternal Complications of Instrumental Vaginal Delivery

In the present study, complications like vaginal lacerations 5%, cervical lacerations 10%, extension of episiotomy 7.5% is more in forceps than vacuum group. $P < 0.05$.



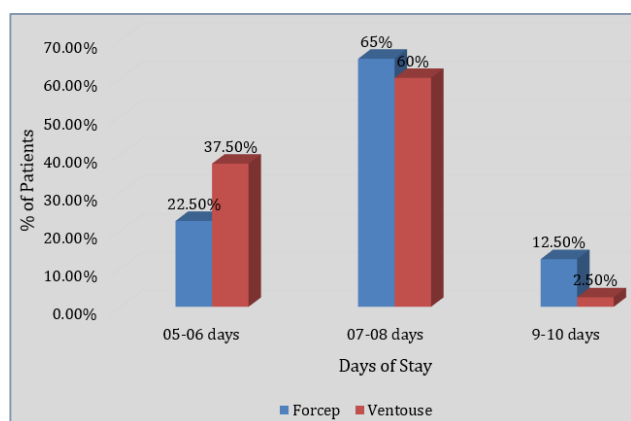
Graph 6. Showing Maternal Complications of Instrumental Vaginal Delivery

Days of Stay	Forceps (n=40)		Ventouse (n=40)	
	Frequency	Percentage	Frequency	Percentage
5-6	9	22.5	15	37.5
7-8	26	65	24	60
9-10	05	12.5	01	2.5
Total	40	100	40	100
Mean of stay	7.3±1.18 S.D.		6.8±1.07 S.D.	

Table 7. Frequency of Patients for Hospital Stay

Chi-square = 7.58 DF = 2, P < 0.05.

Table 7 shows that forceps group 5 (12.5%) required prolonged hospital stay than vacuum group 1 (2.5%). Mean in forceps group is 7.3±1.18 and in vacuum 6.8±1.07.



Graph 7. Graph showing frequency of Patient for Hospital Stay

Longitudinal Periodical Checkup

The attendance of patients for four subsequent monthly checkup in forceps and ventouse group was 23, 19; 11, 13; 6, 5; 0, 0, respectively. All the individual were found normal throughout the follow up with respect to various vital parameters. Other individuals who did not turn up for follow up were expected to be normal.

DISCUSSION

In the present study, mean age is 23.67±2.93 in forceps group and 24.67±4.24 in vacuum group and is comparable with studies of Shekhar Shashank et al¹² and R.C. Pramela et al.¹³ Foetal distress was most common indication for forceps delivery 55%, which is statistically significant whereas prolonged second stage was important indication for vacuum delivery 57.5%, which is also statistically significant. In a study of Shihadeh et al,¹⁴ prolonged second stage was a common indication for vacuum extraction while foetal distress was the most common reason for forceps (p<0.05). In a study by Achanna et al,¹⁵ vacuum was used more often for prolonged second stage of labour (66% v/s. 58%, p=<0.234) and poor maternal effort.

Regarding station of the head, majority patients 75% were in +3 station in forceps, whereas majority patients 47.5% in vacuum group were in +2, which is statistically significant. Coherent findings were observed in study conducted by Shihadeh et al¹⁴ outlet forceps application was 95.3% and vacuum application at +2 station was 92.8%.

In the present study, majority of the babies in forceps groups is between 2-2.5 kg (70%) whereas majority of the baby of vacuum group were 2.6-3 kg (65%), which is statistically significant. The present study correlates with the study conducted by Shihadeh et al,¹⁴ weight of babies between 2.5-4 kg were 66.67% in forceps and 76.18% in vacuum.

In the present study, complications like vaginal lacerations 5% (2 out of 40), cervical lacerations 10% (4 out of 40), extension of episiotomy 7.5% (3 out of 40) was found in forceps group where as in vacuum only 2.5%

(1 out of 40) had cervical laceration, which was statistically significant ($p=0.04$). In a study by Achanna et al,¹⁵ vaginal and cervical lacerations were more in forceps than in vacuum group. There was one case of vulval haematoma and one case of rectovaginal fistula following forceps delivery. In a study by Shihadeh et al,¹⁴ 3rd and 4th degree perineal injuries, extension to fornix and vaginal lacerations were all significantly more common in forceps group ($p<0.01$) than in vacuum group as were cervical tear ($p<0.05$). During the procedure, blood loss was significantly more in forceps group. Periurethral tears more common in forceps delivery. Our analysis of maternal and neonatal outcome in instrumental vaginal delivery using forceps and vacuum suggests maternal birth canal injuries more with forceps as compared to vacuum.

Only 2.5% babies in forceps group and 2.5% babies in vacuum group had cephalhematoma, which is statistically not significant $P>0.05$. Facial marks and abrasions are found in 5% in forceps group, but none in vacuum, which is statistically significant $p < 0.05$. Study done by Johnson et al¹⁶ had cephalhematoma, 3% in forceps group and 9% in vacuum, which is comparable with present study. In a study by Shihadeh et al,¹⁴ cephalhematoma was seen in 1.67% of forceps group and 4.76% of vacuum group. Study by Shihadeh et al¹⁴ shows facial cuts and abrasions were more in forceps group. Cerebral haemorrhage was diagnosed in 2 infants born by vacuum extraction, but none in forceps group.

SUMMARY

Instrumental vaginal delivery using forceps or vacuum has been an important part of obstetric practice. In our study, 75% cases were primigravida in the forceps group compared to 70% in the vacuum group.

Maternal complications like cervical lacerations 10%, vaginal lacerations 5% and extension of episiotomy 7.5% is more significant in forceps than vacuum.

Seventy five percent of forceps deliveries were outlet deliveries whereas vacuum was applied at a higher station.

Perineal analgesia was used maximum in both the groups, 82.5% in forceps and 95% in vacuum.

More foetal complications in forceps like facial marks and abrasions 5%, hyperbilirubinaemia 5%, which is statistically significant and cephalhematoma 2.5% equal in both the groups.

CONCLUSION

Maternal and foetal outcome in instrumental vaginal deliveries suggests that vacuum application is associated with significantly less maternal and neonatal trauma than the forceps. Encouraging instrumental vaginal deliveries may help to reduce the raised caesarean section rates. It is also concluded here that both this application do not develop any complication in long run.

LIMITATIONS

The limitations of our study is the difficulty of long-term followup. Followup of each and every patient could not be done. Hence, the long-term study remain limited only with few patients in their successive followup. Because of complexity and technique of its application, one should be sufficiently trained before independent use.

RECOMMENDATION

Hands on training in simulation skill lab for achieving expertise in application of forceps and vacuum. To avoid caesarean section related operative and anaesthetic morbidity practice of instrumental vaginal delivery should be promoted. There should be training program/workshops to update the skill.

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