

## ORIGINAL ARTICLE

# Second Stage Intervention (Vacuum Versus Forceps) and Maternal Outcome

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The procedures for facilitating the delivery of the foetus in the 2nd stage intervention instrumental delivery or by vaginal delivery.<sup>1</sup> Approximately 10- 20% of deliveries worldwide require some type of intervention, with instrumental vaginal deliveries (vacuum extraction and forceps) accounting for 7–11% of deliveries.<sup>1,2</sup> The use of obstetric forceps or a suction device to effect vaginal birth of the foetus is known as instrumental vaginal delivery. Instrument-assisted births are performed when a maternal or fetal problem is detected, as well as any incident that poses harm to the mother or foetus but can be alleviated by 2nd stage intervention.<sup>3</sup> Though it has been practiced for millennia, the technique of instrumental delivery (the use of forceps and suction) has a bad reputation due to the risk of poor mother and fetal outcomes.<sup>4</sup> In any situation affecting the mother or the foetus, surgical vaginal delivery to end the second stage of labor is recommended.<sup>5</sup> Both vacuum and forceps get the possibility to injure the foetus and newborn; nevertheless, the vacuum has a lower rate of maternal harm than forceps.<sup>4</sup> The operator must be conversant with the recommendations, restrictions, administration, and use of the specific device in order to reduce both maternal and fetal hazards. It is suggested that operative vaginal delivery be done from either a low or an outlet station.<sup>4,6</sup> However, contemporary research reveals that instrumental births are on the decline, which is a major problem in health-care systems around the world. It also reduced the movement of the lady during labour. Adopting a lithotomy position, which provides better perineal access even when an instrumental birth is required, is one of the reasons for this decline.<sup>7</sup> The increasing use of epidural analgesia is another cause.<sup>7</sup> Soft tissue damage is the most common cause of maternal problems, which are recorded more commonly with forceps in contrast to the vacuum.<sup>5</sup> The use of the vacuum and forceps has

changed over time and between regions.<sup>8</sup> It is determined by clinical experience, instrument availability and anesthesia service, as well as awareness of the risks and advantages connected with each instrument.<sup>8</sup> The surgical delivery rate dropped from 1.6 to 0.3 percent in a large prospective study of low- and middle-income nations, but the caesarean rate doubled to 14.4%.<sup>8</sup> Its unclear if the significant benefits and hazards of squatting during the 2nd stage of labour transfer into clinically meaningful mother and foetal outcomes.<sup>7</sup> This study has been conducted to investigate the incidence of second-stage interventions at Liaquat University Hospital in Hyderabad, as well as maternal outcomes among those who underwent second-stage intervention (forceps vs. vacuum).

**MATERIAL AND METHODS**

This was a cross-sectional comparative study, which was done at the gynecology and obstetrics department of Liaquat University Hospital Hyderabad during one year from October 2014 to September 2015. All the study subjects having singleton pregnancy with cephalic presentation as per fresh fetal well-being ultrasound, gestational age 36 weeks or more, undergoing instrumental vaginal deliveries (vacuum or forceps) of either age or parity were included. All the cases having antepartum hemorrhage, transverse lie, cephalopelvic disproportion, previous C-section history and compound presentation were excluded. Detailed medical history, including demographic information and clinical examination was done. The position of the head and pelvis and the status of the cervical dilatation were assessed. All women underwent baseline investigations to assess their general fitness and health for the pre-operative workup. Informed consent was taken from the patients and their attendants and study subjects were taken trusted regarding the purpose of the study. Following that, all subjects were given a standard pre-load for labor, which

included 5 percent dextrose water and a plain clean enema. Analgesia was administered when needed, and the choice of forceps or vacuum delivery was made depending on the indication of obstetrics. In the Labor Room, all instrumental forceps and vacuum-assisted deliveries were performed following verbal and written agreement. A silastic cup vacuum extractor or a suction pump operation performed by a skilled and senior obstetrician or by the senior resident under the guidance of a consultant, provided the vacuum. Analgesia was provided to all of the mothers in the form of epidural or local infiltration with xylocaine. At zero or below zero station, the vacuum was applied to the vertex. The pressure was raised to 0.6–0.8 kg/cm<sup>2</sup> immediately. The uterine contraction was always in sync with the traction. The cup could be detached twice in a row. After three failed tries, the technique was abandoned. Das variety of long curved forceps and Wrigley's outlet forceps were used. The time of instrument application, the time of delivery, the type of instrument used, the number of pulls, the number of detachments in the case of ventouse, and the analgesia/anaesthetic provided were all recorded. The consultants who delivered the patient assessed the level of maternal trauma right away. The individuals were inspected once again at discharge. Perineal tears, extension of episiotomy, ulceration of the vagina, cervical tears, and other maternal outcomes were measured. The data were entered and analyzed in the statistical program SPSS version 26.0.

**RESULTS**

During the study period, a total of 2135 pregnant women were identified, with 265 receiving second-stage intervention (14.70%). These women were 27.84+5.13 years old on average, with a median of 28 years and a range of 16 to 38 years. In the second stage of labour, 52.83% women received ventouse/vacuum extraction and 47.16% received forceps assistance. Primigravida patients accounted for 39.62%, 15.84% instances of para 1, 12.45% cases of para 2 to 4, and 32.07% cases of para 5 and above. A majority of females 73.58% were not booked, while only 75 (28.30 percent) were booked. Table.1

Table.1: Descriptive statistics of demographic characteristics of the study subjects n=265

Variables		Statistics
Age		27.84+5.13 years
Second stage intervention	Forceps	125(47.16%)
	Ventouse / Vacuum	140(52.83%)
Parity	Primigravida	105(39.62%)
	Para-1	42(15.84%)
	Para-2 to 4	33(12.45%)
	Para 5 and above	85(32.07%)
Booking status	Booked	195(73.58%)
	Un-booked	32(25.6%)

Table.2: Descriptive statistics of types of analgesia, duration of interval and complications n=265

Maternal outcome		Second stage intervention		p-value	
		Vacuum	Forceps		
Type of analgesia	No	10 (7.1%)	00	0.002	
	Perineal alone	120 (88.5%)	55 (44%)		
	Perineal and Pudendal	10 (7.1%)	70 (56%)		
Decision to delivery interval (minutes)		13.8 ± 6.2	8.6±5.4	0.0001	
Maternal complications	Te ars	Vaginal	10 (7.14%)	23 (18.4%)	0.000
		cervical	5 (3.57%)	5 (4%)	0.716
		3rd degree perineal	5 (3.57%)	10 (8%)	0.008
	Injury to anal sphincter	5 (3.57%)	8 (6.4%)	0.107	
	PPH	4 (2.85%)	3 (2.4%)	0.645	
	LSCS	4 (2.85%)	5 (4%)	0.697	
	Others	2 (1.42%)	2 (1.6%)	0.820	

Vacuum extractions with local perineal infiltration were much more common, and pudendal block with local infiltration was significantly more common to aid delivery with forceps (p<0.002). The interval decision-to-delivery was substantially shorter in patients in the forceps group (8.65.4 minutes) than in the vacuum patient's group (13.86.2 minutes) (p<0.0001). Out of all 34.33 percent patients had developed maternal complications as a result of intervention in the second stage of labour. Maternal trauma of soft tissues was the most common complication among 58 cases and out of them vaginal tears were significantly higher 18.4% in the Forcep group compared to vacuum group 7.14%, while cervical tear 4% in the Forcep group and 3.57% in the vacuum group and 3rd degree perineal in 8% of the Forcep group and 3.57% in the vacuum group. The findings-regarding cervical tears and 3rd degree perineal were statistically insignificant according to the both groups (p>0.05). Although injury to the anal sphincter, PPH, LSCS and other maternal complications were also statistically insignificant according to both procedures (p>0.05). Table.2

**DISCUSSION**

Vacuum and forceps are commonly used in obstetrics to help with fetal distress or a long 2nd stage of labour, but they also carry a high risk of maternal problems such anal sphincter damage. In this study, the average age of the patients was 27.84+5.13 years and on the comparing these findings with other studies, such as one conducted of Shekhar S et al<sup>9</sup>, reported that the ventouse category patient's average age was 25.2+5.8 years, the forceps delivery group's average was 24.4+5.6 years. On the other had Huma Naz et al<sup>10</sup> demonstrated that the average age of the study subjects was 24.17 + 3.86 years in group one and 29.04+5.62 years in group two. In this study primipara cases were (39.62%) and most of the women 73.58% were un-booked. These findings were almost similar to the studies of Baloch S et al<sup>1</sup> and Aliyu LD et al<sup>11</sup>.

In this study overall, 14.70% women underwent the second stage intervention. On other hand, Baloch S et al<sup>1</sup> performed a local analysis in Jamshoro and found a 22 percent 2nd stage frequency, which is slightly higher than our findings. On other hand Aliyu LD et al<sup>11</sup> reported that the instrumental vaginal delivery accounted for 2.8 percent of all deliveries and these findings were lower compared to this study. The difference may be because of study sample size, sample selection criteria and big difference in conducting years of the studies. The incidence of instrumental deliveries in underdeveloped nations is usually low, but the incidence in industrialized countries is higher.<sup>12</sup> In Africa, 1–4% of the population is affected, 4.5 percent in the United States, in the UK 10–13 percent and in Canada and Australia 15%.<sup>12,13</sup>

In this study the interval decision-to-delivery was substantially shorter in patients of the forceps group (8.65.4 minutes) than the vacuum patient's group (13.86.2 minutes) (p<0.0001) and overall, 34.33% patients had developed maternal complication as a result of intervention in the second stage of labour. In this study the maternal trauma of soft tissues was the most common complication among 58 cases and out of them vaginal tears were significantly higher 18.4% in the Forcep group compared to vacuum group 7.14%, while cervical tear 4% in the Forcep group and 3.57% in the vacuum group and 3rd degree perineal in 8% of the Forcep group and 3.57% in the vacuum group. The findings-regarding cervical tears and 3rd degree perineal were statistically insignificant according to procedures (p>0.05). Although injury to the anal sphincter, PPH, LSCS and other maternal complications were also statistically insignificant according to both procedures (p>0.05). However, Cetin BA et al<sup>15</sup> reported that the forceps group had more episiotomies, postpartum hemorrhage, vaginal ulcerations and cervical rips, while the difference was statistically insignificant. Postpartum hysterectomy, postpartum transfusion and sphincter injury were all more common in the vacuum group than in the forceps group, despite the fact that these were not significant statistically. Consistently in the study of Naz H et al<sup>10</sup> reported that the 2<sup>nd</sup> degree, 3<sup>rd</sup> degree and 4<sup>th</sup> degree perineal tears were significantly higher in the Forcep group

( $p < 0.05$ ), while the cervical tears were statistically insignificant as per both procedures ( $p > 0.05$ ). Biru S et al<sup>3</sup> reported that the perineal tear of 2nd degree was 7.4%, 3rd-degree tear was in 1.5% cases, and episiotomy extension were all common complications of forceps assisted delivery 1%. The only complications associated with vacuum-assisted vaginal birth were the episiotomy extension 0.5% and cervical tear also 0.5% and further they observed that the primiparity was a substantial risk factor linked with maternal morbidity due to instrumental birth, as was forceps assisted vaginal delivery. Inconsistently Egbodo CO et al<sup>16</sup> also discovered that material issues differed significantly between females underwent vacuum and forceps deliveries. Vacuum-assisted deliveries had 25% fewer complications than forceps-assisted deliveries (which had 100%). Our findings were also comparable to what other researchers have reported.<sup>17,18</sup> Because of the small number of people who received forceps delivery versus vacuum extraction in their study, no conclusions can be reached.<sup>16</sup> The vacuum may be preferred for IVD in Africa due to its convenience of use and the ease with which the expertise to operate it may be learned.<sup>16</sup> These are possibly the same causes that have led to vacuum being the most regularly used device in our facility.

## CONCLUSION

In the study conclusion, the frequency of the second stage interventions was observed to be 14.70%. No adverse maternal outcomes have been observed. Vaginal, cervical and perineal tear rates were higher in forceps groups, while these complications were statistically insignificant. Although decision to delivery interval was significantly high in vacuum procedure cases. Primigravida, unbooked status and mismanaged labor by unskilled persons were observed to be the commonest factors.

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