

Vacuum Assisted Caesarean Delivery Assessment of Maternal and Foetal Outcome in Tertiary Care Center.

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Received: 15-01-2024 / Revised: 20-02-2024 / Accepted: 15-03-2024

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Conflict of interest: Nil

Abstract:

Objectives: The present study was to evaluate the maternal and fetal outcome of pregnant women who were undergone to vacuum assisted caesarean delivery.

Methods: Vacuum deliveries were performed by application of silastic cups. The information related to cervical lacerations, vaginal laceration, perineal tear, episiotomy extensions or paraurethral tear and other maternal outcome were noted. New-born outcome in terms of Apgar score 1 and 5 min, NICU admissions, convulsions, instrumental injuries or complications (Cephalhematomas, Caput succedaneum, Jaundice, neonatal sepsis) were noted.

Results: A total of 200 pregnant women who undergone vacuum assisted caesarean delivery were enrolled. Most of the pregnant women 81(40.5%) were in age group of 21-25 years. Most of the cases 148(74%) were primi gravida. Majorities of the cases had 38- 40 weeks of gestation. Vaginal wall tear 9(4.5%), post-partum hemorrhage 2(1%), 2nd & 3rd degree perineal tear 2(1%) and cervical tear 2(1%) were the common maternal complications. Maternal complication rate was 16(8%). APGAR score of 4(2%) neonates at 1 minute had 0-3 and 3(1.5%) neonates at 5 minutes. 18(9%) neonates had 4-6 at 1 minute and 10(5%) neonates at 5 minutes. 32(16%) neonates had required NICU admission. The average NICU stay was 4.23±3.12 days. Most of the common neonatal complication was perinatal asphyxia 10(5%), neonatal depression 8(4%) and hyperbilirubinemia 4(2%).

Conclusions: Prolonged 2nd stage labour, poor maternal effort and fetal distress were the most indication for vacuum assisted caesarean delivery. Vacuum assisted caesarean delivery by a skilled person and a proper technique is found to be safer and associated with lesser maternal and neonatal morbidity and mortality. It should be used with great caution and the delivery be supervised by trained personnel. It is a reasonable option for the obstetrician but the patient must be counselled regarding the risks and benefits of vacuum assisted caesarean delivery.

Keywords: Vacuum assisted caesarean delivery, maternal outcome, Foetal outcome.

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Introduction

Vacuum-assisted methods have recently gained popularity for caesarean sections after being largely accepted as a safe and reliable way of surgical vaginal delivery [1,2]. It can be challenging to make an appropriate incision during an elective cesarean section since the lower uterine segment is frequently not effaced or lengthened by labor [2].

There are many indications for operative vaginal delivery, such as prolonged second stage of labor or concern about neonatal or maternal compromise [3]. Nowadays, institutions greatly rely on the use of a vacuum rather than forceps as an instrument of assisted delivery. This method is referred to as vacuum extraction (VE) where a soft or rigid

suction cup adheres to the baby's head and aids in the delivery process [4]. VE is highly dependent on the traction resulting from a difference between the atmospheric and suction cup pressure as well as the pressure arising from maternal contractions and bearing down. This cumulative pressure facilitates the baby's movement through the birth canal [5].

Approximately 10% of all deliveries in the western world are accomplished by one of the two methods of operative vaginal birth, vacuum extraction or forceps. Forceps extractions are preferred in the United States, Canada, South America and Eastern Europe while vacuum is the instrument of choice in Western Europe, Asia and middle east [6,7].

Use of caesarean delivery has grown considerably and is considered safe by many, but surgical vaginal delivery has a great advantage of reducing the complications associated with caesarean section, such as death, postpartum hemorrhage (PPH), wound disruption and injury to bladder, venous thromboembolism, infection, recovery time, rising costs, and subsequent repeat caesarean section [8,9].

Vacuum extraction has recently gained in popularity because of new designs of vacuum cups with reduced risk of injury to the neonate and increased instrumental success rate [6,10]. It avoids caesarean section and its associated morbidity and implications for future pregnancy.

An important cause of maternal and perinatal morbidity and mortality is prolonged second stage of labour and its complications such as haemorrhage, sepsis, uterine rupture, obstetric fistula and birth asphyxia [11,12]. Vacuum extraction is one of the evidence-based interventions that can prevent complications by shortening the second stage of labour [13,14]. Objectives of our study was to evaluate the maternal and fetal outcome associated with vacuum assisted caesarean delivery.

Material & Methods

The present study was conducted in the Department of Obstetrics & Gynecology, Netaji Subhas Medical College & Hospital, Bihta, Patna during a peri-

od from August 2023 to December 2023. Entire subjects/ attendants signed an informed consent approved by institutional ethical was sought.

A total of 200 women who had undergone vacuum assisted caesarean delivery were enrolled in the present study.

Inclusion Criteria:

- All women who had vacuum assisted deliveries and records of their new-born children.

Methods:

- Vacuum deliveries were performed by application of silastic cups.
- The information related to cervical lacerations, vaginal laceration, perineal tear, episiotomy extensions or paraurethral tear and other maternal outcome were noted.
- New-born outcome in terms of Apgar score 1 and 5 min, NICU admissions, convulsions, instrumental injuries or complications (Cephalhematomas, Caput succedaneum, Jaundice, neonatal sepsis) were noted.

Results

A total of 200 pregnant women who undergone vacuum assisted caesarean delivery were enrolled in the present study. Most of the pregnant women 81(40.5%) were in age group of 21-25 years. 54(27%) women were in age group of 18-20 years. 52(26%) were in age group of 26-30 years.

Table 1: Age wise distributions.

Age group (Years)	No. of cases (N=200)	Percentage
18-20	54	27%
21-25	81	40.5%
26-30	52	26%
31-35	9	4.5%
36-40	4	2%

Most of the cases 148(74%) were primi gravida. Majorities of the cases had 38- 40 weeks of gestation.

Table 2: Gravida status and period of gestation (POG) categories among the subjects.

Gravida	No. of cases (N=200)	Percentage
Primi	148	74%
Multi	52	26%
Period of Gestation		
36-38	26	13%
38-40	138	69%
>40	36	18%

In the present study, vacuum assisted caesarean delivery was indicated in most of the cases of 110(55%) prolonged 2nd stage labour, 41(20.5%) poor maternal effort and 35(17.5%) fetal distress.

Table 3: Indications for vacuum applications among the subjects.

Indications	No. of cases (N=200)	Percentage
Poor maternal efforts	41	20.5%
Cut short 2nd stage of labour	14	7%
Fetal distress	35	17.5%
Prolonged 2nd stage of labour	110	55%

Vaginal wall tear 9(4.5%), post-partum hemorrhage 2(1%), 2nd & 3rd degree perineal tear 2(1%) and cervical tear 2(1%) were the common maternal complications. Over all maternal complication rate was 16(8%).

Table 4: Maternal complication rate among the subjects.

Maternal complications	No. of cases (N=200)	Percentage
Vaginal wall tear	9	4.5%
Postpartum hemorrhage	2	1%
Perineal tear (2nd and 3rd degree)	2	1%
Cervical tear	2	1%
Retained placenta	1	0.5%

In the present study, APGAR score of 4(2%) neonates at 1 minute had 0-3 and 3(1.5%) neonates at 5 minutes. 18(9%) neonates had 4-6 at 1 minute and 10(5%) neonates at 5 minutes.

Table 5: Apgar score.

APGAR Score	0 – 3	4 – 6
At 1 minute	4(2%)	18(9%)
At 5 minute	3(1.5%)	10(5%)

32(16%) neonates had required NICU admission. The average NICU stay was 4.23±3.12 days.

Table 6: Neonates by NICU admission requirement.

NICU admission	No. of cases (N=200)	Percentage
Yes	32	16%
No	168	84%

In the present study, most of the common neonatal complication was perinatal asphyxia 10(5%), neonatal depression 8(4%) and hyperbilirubinemia 4(2%).

Table 7: Perinatal complications rate.

Neonatal complications	No. of cases (N=200)	Percentage
Perinatal asphyxia	10	5%
Neonatal depression	8	4%
ERBS palsy	1	0.5%
Perinatal asphyxia+ ERBS palsy	2	1%
MAS	2	1%
TTNP	1	0.5%
Hypernatremia	3	1.5%
Convulsions	1	0.5%
Hyperbilirubinemia	4	2%
Total	32	16%

Discussions

Over the past few decades, there has been a sharp rise in the cesarean delivery rate, which now surpasses 55% in many nations [15]. According to the National Family Health Survey (NFHS-5), India has a C-section rate that is 21.5% greater than the WHO criteria of 15% [15]. Despite public health initiatives to maximize and reduce the use of cesarean sections, [16] the frequency of these deliveries keeps steadily increasing [17].

Vacuum extraction (VE) is one of the key signal functions in both basic and comprehensive emergency obstetric care worldwide. It is acknowledged as safe and relatively easy to perform and is less often complicated by anal sphincter injuries compared with forceps extraction [26]. Therefore, in many countries VE is preferred over forceps-assisted birth [27,28]. Despite the guidelines, VE is rarely used in many countries

around the globe and instead, second-stage caesarean section is performed. The global rate of assisted vaginal birth in hospitals is 2.6% and continues to decrease [29,30]. In sub-Saharan Africa, the proportion of institutional births by VE or forceps extraction is even below 1% of all births. Although several explanations for this low proportion have been suggested, fear of neonatal complications is identified as the most important reason. Other reasons for low rates of assisted vaginal birth include a lack of equipment, a lack of trained personnel and a fear of mother-to-child transmission of HIV or other infectious diseases [31].

Chaudari P et al, in Uttarakhand found that in vacuum assisted deliveries 68% women needed episiotomy, 9% had perineal tear, 3% had vaginal / periurethral tear, 1% had post partum hemorrhage and 1% needed blood transfusion. Morbidities of the newborns were 13% had NICU admissions,

18% neonates had cephalhematoma, 13% had hyperbilirubinemia, 11% had bruising, 5% had convulsions, 5% had feeding difficulties and 1% had irritability [10].

In the present study, 200 pregnant women were undergone vacuum assisted caesarean delivery. Most of the women 81(40.5%) were in age group of 21-25 years. Most of the cases 148(74%) were primi gravida. Majorities of the cases had 38- 40 weeks of gestation. Vacuum assisted caesarean delivery was indicated in most of the cases of prolonged 2nd stage labour 110(55%), poor maternal effort 41(20.5%) and fetal distress 35(17.5%).

Shresta et al in Nepal found that, the most common (62.5%) indication for vacuum application was prolonged second stage of labor followed by fetal distress (19.2%), poor maternal effort (9.6%), and to shorten the second stage (8.6%). The overall rate of maternal morbidity with vacuum assisted vaginal delivery was 17.3% with no mortality. Neonatal morbidities were present in 25.0% neonates and the most common was birth asphyxia (19.2%) followed by cephalohematoma (4.8%), and brachial plexus injury (0.96%). There was one (0.96%) early neonatal death due to meconium aspiration syndrome [18].

In the present study, APGAR score of 4(2%) neonates at 1 minute had 0-3 and 3(1.5%) neonates at 5 minutes. 18(9%) neonates had 4-6 at 1 minute and 10(5%) neonates at 5 minutes. 32(16%) neonates had required NICU admission. The average NICU stay was 4.23±3.12 days. Most of the common neonatal complication was perinatal asphyxia 10(5%), neonatal depression 8(4%) and hyperbilirubinemia 4(2%).

Jason B et al in USA found that maternal morbidity among nulliparous women who underwent vacuum assisted delivery was 31%, third- and fourth-degree perineal tear was 16%, infections were 10%, lacerations were 5%, hemorrhage was 5% and < 1% had to stay in the hospital for more than 5 days [19]. Neonatal morbidity for vacuum assisted vaginal births in California between 2008 to 2012 was 13.3%. 5.7% had respiratory problems, 3.4% had to stay in the hospital for more than 5 days, 1.3% had Apgar <7, 2.7% had shoulder dystocia, 2.3% had infections, 0.8% had neurological injury and 0.7% had skeletal injury [19].

Second-stage caesarean section (SSCS) is associated with adverse outcomes such as postpartum haemorrhage (PPH), infection and sepsis, a need for hysterectomy or admission to an intensive care unit [20,21]. Risks of caesarean section extend into every subsequent pregnancy and include uterine rupture, placenta accreta spectrum, PPH and preterm birth [22,23]. Notwithstanding these risks, the caesarean section

rate is rising rapidly worldwide and has even doubled in two decades [23,24].

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 [25].

Conclusions

The present study concluded that the prolonged 2nd stage labour, poor maternal effort and fetal distress were the most indication for vacuum assisted caesarean delivery. Vacuum assisted caesarean delivery by a skilled person and a proper technique is found to be safer and associated with lesser maternal and neonatal morbidity and mortality. It should be used with great caution and the delivery be supervised by trained personnel. It is a reasonable option for the obstetrician but the patient must be counselled regarding the risks and benefits of vacuum assisted caesarean delivery.

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