

## Cesarean section in impacted fetal head at pelvis: Evaluation of Patwardhan's Technique.

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### Abstract:

**Objectives:** Our primary objectives is to evaluate the Patwardhan's method in 2<sup>nd</sup> stage cesarean section in the form of the extension of uterine incision and secondary aim is to evaluate of maternal and fetal outcome in the form of – total operative time, mean blood loss, blood transfusion, infection rate and birth asphyxia and NICU admission.

**Study design:** This is a prospective study conducted at the Department of obstetrics & Gynecology, BS Medical College, Bankura, India. One hundred ninety two women with single alive fetus with cephalic presentation at late stage of labour when head is deep in pelvis and needed emergency cesarean section were included in this study during February 2019 to January 2020. Ninety six women in the study group were delivered by **Patwardhan's technique** and 96 women in the control group were delivered by available **push / pull technique** according to surgeon's choice.

**Results and analysis:** Mean gestational age was 21.85±3.15 years and 22.13±3.3 years in **study group (Patwardhan's)** and **control group (Push / Pull)**. Delivery of fetal head was difficult in 68 cases (70.83%) in the study group as compared to control group it was 43 cases (44.79%),  $p < 0.05$ , OR 2.99, CI 1.58 -5. >40 mins time for cesarean section needed in. 38.54% vs 29.16% cases in control and study group respectively, Mean +/- SD 40.5 +/-7.33 vs 35.57+/-0.77  $p$  value <0.001 and was statistically significant. In study group, extension of uterine incision occurs only in 18(18.75%) cases as compared to 38(39.58%) cases in control group (Chi-square value 10.08, P-value <0.01, 95% CI 0.35). Uterine artery teared and needed for blood transfusion in 13(13.54%) and 4(4.17%) cases of Patwardhan's group as compared to 32(33.33%) and 11(11.46%) cases of push / pull group, respectively (P value <0.01 & >0.001). Instead of all measured, consultant help needed in 5 (5.20%) cases in study group, compared to 16 (16.67%) cases in control group (Chi-square value 6.47, P value<0.05, 95% CI 0.27). fetal outcome was similar in both group.

**Conclusion:** Patwardhan's method for delivery of a deeply impacted fetal head in second-stage cesarean section carries a significantly lower risk of extension of the uterine incision compared with the push or pull method. It is also associated with less operative time, less operative blood loss and blood transfusion rate and there is no difference in neonatal outcome.

**Key words:** Cesarean section / Deeply impacted fetal head / Patwardhan's method

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### I. Introduction

The global rate of caesarean section is now 15%<sup>1</sup>. There is wide variation between countries in the proportion of women who give birth by caesarean section. In developing country, the caesarean section rate comprises 2% of the overall birth rate. In the developed world, the caesarean section rate is now around 21%. Caesarean section rates have continued to rise in England and Wales, with average rates of 26.2% in 2013–14.<sup>2</sup> Individual countries with higher rates include Mexico (39%) and Brazil (31%).<sup>1</sup> Complete data on caesarean delivery is not available for all countries; however, a recent analysis has given a provisional estimate of 40.5% for China.<sup>1</sup> Our tertiary maternity care teaching hospital is draining mainly three districts-Bankura, Purulia, Paschim Medinipur with annual delivery more than 20000 and cesarean section incidence is around 36%. Although incidence of cesarean section is known, but true incidence of cesarean section in second stage of labour is not known. It is probably around 2-3% and accounts 25% of all cesarean section.<sup>3</sup>

The incidence of caesarean section has risen steadily in last two decades. There is an accompanying rise in the overall caesarean section rate in 2<sup>nd</sup> stage of labour / deeply impacted fetal head in pelvis. The

incidence of second stage caesarean sections is more in developing countries, where babies are delivered at home by traditional birth attendants and where the mothers report to hospital late in labour when the traditional birth attendants fail in their endeavours.<sup>4</sup> Temptation for vaginal delivery when condition is sub optimal or when mother is referred late from peripheral hospital may leads to both maternal and fetal complications. In this situation there is no way other than the baby has to deliver by abdominal rout. It is very difficult to do a cesarean section in this situation. Fetal head is deeply engaged, lower segment is stretched, oedematous and thinned out, liquor amni is drained out, fetus is in compromised state and mother is exhausted. As the duration for second stage increases, there would be more difficulties due to oedematous lower segment, overstretched and thinned out lower segment and more impaction of presenting part in pelvis.

It is very difficult to deliver the fetal head as there is lack of space between bony pelvis, pelvic soft tissues and fetal head, associated with contracting uterus. When excessive manipulation is done to deliver the fetal head, there is high risk of uterine angle extension laterally tearing uterine artery or vertically down words into bladder and even in to vaginal vault can cause torrential haemorrhage which is difficult to control. **5, 6**

There are several techniques have been reported for delivery of deeply engaged head.

#### **The Patwardhan's method (shoulders first method)-**

This technique was first described by Dr.Patwardhan.<sup>7</sup> In cases of occipito-transverse or occipito-anterior positions with the head deeply impacted in the pelvis, an incision is made in the lower uterine segment, at the level of the anterior shoulder, which is then delivered out. With gentle traction on this shoulder, the posterior shoulder is also delivered. Next, the surgeon hooks the fingers through both the axillae and with gentle traction, aided by fundal pressure applied by an assistant, the body of the fetus is brought out of the uterus. The baby's head which is the only part still inside the uterus is then gently lifted out of the pelvis. When the back is posterior (occipito-posterior position) the hand is introduced into the uterus after delivering the anterior shoulder and a foot is grasped. By traction on this foot coupled with fundal pressure the breech is delivered followed by the trunk. The head is then delivered by traction on the legs.

#### **The push technique -**

Pushing from below is technically the same as the traditional cephalic delivery in a routine caesarean section, but it is assisted from below by another person. The head extraction follows pushing through the vagina, and is hence referred to as the push method.<sup>8</sup> Landesman et al<sup>9</sup> described abdominovaginal delivery using a modified lithotomy position, with the legs abducted in either the 'Whitmore' or the 'frog' position, and with the wedged vertex gently lifted with a cupped hand through the uterine incision. It is a modification of the push technique.

#### **Pull technique, also known as the Reverse breech extraction-**

In this method the fetus in cephalic presentation is first extracted by the breech.<sup>8, 10</sup> In the reverse breech extraction method, after opening the uterus, the surgeon introduces a hand through the uterine incision towards the upper segment, grasps both / one feet, and gently pulls the fetus up to extract it. In most of the circumstances, the fetal feet can be easily reached through a transverse uterine incision; therefore, an inverted T- or J-shaped incision is not a prerequisite of this method.

#### **The Fetal Disimpacting System<sup>®</sup> and 'fetal pillow'**

The Fetal Disimpacting System<sup>®</sup> is manufactured by Safe Obstetric Systems UK Ltd (Essex, UK). It has of a foldable base plate that is 11 cm long and 4.5 cm wide, with a balloon attached to it. It is inserted vaginally below the fetal head at the time of inserting a Foley catheter. An assistant uses up to 180 ml of saline solution to inflate the balloon using a syringe. The balloon inflates and gently elevates the fetal head 3–4 cm from its original position, making it easier to deliver.<sup>4</sup> This device is not widely available and the procedure is under trial.

All this techniques rely on extensive experience that is often not immediately available in labour ward. Different literature review showed, the sentinel audit report published by RCOG recommended constant presence of senior doctors when cesarean section is performed at full dilatation.<sup>11</sup> Trainees do not feel confident using techniques like reverse breech extraction, Patwardhan,s technique because of lack of experience. The fact is that in the UK's National Health Service it might be difficult to have round-the-clock supervision by an experienced obstetrician. Therefore, the training of junior doctors in these techniques must be a priority. It is important to develop essential skills among trainees to use different methods to deliver the impacted fetal head. Like any surgical technique, appropriate case selection, use of robust surgical techniques, operator's skills, and experience are keys for success.<sup>12</sup>

The head pushing method is associated with higher maternal morbidity than the reverse breech method for extraction of a deeply engaged fetus during intrapartum caesarean section in advanced stage of labour. Both

Pull and Push methods are associated with an increased rate of maternal morbidity in the form of uterine extensions, postpartum haemorrhage and fever.<sup>13,14</sup> Patwardhan's technique is a unique technique which is used for delivering babies in second stage caesarean sections with relatively less complication.<sup>15,16</sup>

In our present prospective study we compare the Patwardhan's technique ( **Study group** ) with push and pull method ( **Control group** ) in term of maternal and fetal outcome. Our primary aim is to evaluate the extension of uterine incision and secondary aim is to evaluate of maternal and fetal outcome in the form of - the duration of time for the procedure, mean blood loss, blood transfusion, infection rate and birth asphyxia and NICU admission

## II. Materials & methods

This is a prospective study conducted at the Department of obstetrics & Gynecology, BS Medical College, Bankura, India. One hundred and ninety two women with single alive fetus with cephalic presentation at late stage of labour when head is deep in pelvis and needed emergency caesarean section were included in this study during February 2019 to January 2020. Women having local infective vulvovaginal lesion and severe vulval oedema were excluded from this study. Ninety six women in the study group were delivered by **Patwardhan's technique** and 96 women in the control group were delivered by available **push / pull technique** for delivery of deeply engaged head, according to surgeon's choice. Cases were randomly selected. In all the cases head was deep in pelvis with oedematous stretched and thinned out lower segment. All cases were done by properly trained junior surgeons, under guidance. Our primary objectives is to evaluate the extension of uterine incision and secondary aim is to evaluate of maternal and fetal outcome in the form of - the duration of time for the procedure, mean blood loss, blood transfusion, infection rate and birth asphyxia and NICU admission.

**Statistical Analysis** – Statistical calculations like descriptive statistics, Chi-square test was done with the help of Excel and Epi-Info version 3.5 software. A probability value  $p < 0.01$  was regarded as statistically significant.

## III. Result and analysis

Maternal profile of the **study group (Patwardhan's)** and **control group ( Push / Pull )** are summarized in **Table -1**. Obstetric features, like maternal age, parity and gestational age were comparable in both groups.

Indications of cesarean section were similar in both the groups (**Table-2**). Most common cause of emergency cesarean section was fetal distress in late stage of labour (31.25% vs. 26.04%). Next common cause of emergency cesarean section was fetal distress in 2<sup>nd</sup> stage of labour with unanticipated CPD (21.87% vs. 28.12%), followed by obstructed labour (19.79 vs. 26.04%).

Maternal outcome in the study and control group summarize in **Table-3**. Out of 96 cases in the study group, delivery of fetal head was difficult in 68 cases (70.83%) in the study group , as compared to control group it was 43 cases (44.79%),  $p < 0.05$ , OR 2.99, CI 1.58 -5. Time required to deliver the head was  $\leq 3$  mins in 62(64.58%) cases in the study group, as compared to 51(53.12%) cases in the control group and this was not statistically significant. ( $p > 0.05$ ). Skin to skin time required for cesarean section was more in control group than in study group, ( $>40$  mins time for cesarean section in. 38.54% vs 29.16% cases, Mean +/- SD 40.5 +/-7.33 vs 35.57+/-0.77  $p$  value  $< 0.001$  ) and was statistically significant.

In study group, extension of uterine incision occurs only in 18(18.75%) cases as compared to 38(39.58%) cases in control group (Chi-square value 10.08, P-value  $< 0.01$ , 95% CI 0.35). Uterine artery teared and needed for blood transfusion in 13(13.54%) and 4(4.17%) cases of Patwardhan,s group as compared to 32(33.33%) and 11(11.46%) cases of push / pull group, respectively ( $P$  value  $< 0.01$  &  $> 0.001$ ).

Instead of all measured, consultant help needed in 5 (5.20%) cases in study group, compared to 16 (16.67%) cases in control group (Chi-square value 6.47, P value  $< 0.05$ , 95% CI 0.27). There is more complication in control group, senior doctor's help was essential to manage it. Post operative recovery was uneventful, except for 1 case in study group and 3 cases in control group, required secondary suture.

**Table-4** Summarizes the fetal outcome. Fetal sex and body weight was comparable in both groups. So, more complications in control group were unrelated to birth weight and sex of the baby. NICU admission was 28(29.17%) vs 34(35.41%) similar in both groups and hence these were not dependent upon the technique of delivery.

## IV. Discussion

Obstetric features and indications of cesarean section in the current study were similar to the study by Ziyauddin F et al,<sup>5</sup> Mukhopadhyay P et al,<sup>6</sup> Khosla AH et al,<sup>16</sup> and Singh M et al,<sup>17</sup>

Cesarean section is commonly perceived as a simple and safe alternative to difficult vaginal birth. Sometimes cesarean section has to be done when head is deep in pelvis and lower segment is stretched and thinned out. Surgeons try to deliver this head by any one of the available technique, according to surgeons experience. Sethuram R et al<sup>12</sup> 2010 reported that 80% junior doctor (registrars) agreed that they faced

difficulties during delivery of deeply engaged head and agreed for supervised session. RCOG also recommended this supervised training.<sup>11</sup> Hager RME et al<sup>18</sup> 2003 reported that increasing cervical dilatation, in particular, at 9 or 10 cm at the time of operation was an independent risk factor. The fact is that in the UK's National Health Service it might be difficult to have round-the-clock supervision by an experienced obstetrician.<sup>12</sup> Therefore; the training of junior doctors in these techniques must be a priority. It is important to develop essential skills among trainees to use different methods to deliver the impacted fetal head. Like any surgical technique, appropriate case selection, use of robust surgical techniques, operator's skills, and experience are keys for success.<sup>12</sup>

Our study showed, Out of 96 cases in the study group, delivery of fetal head was difficult in 68 (70.83%) cases in the study group, as compared to control group it was 43 (44.79%) cases,  $p < 0.05$ , OR 2.99, CI 1.58 -5. The study also showed that need for consultant doctors help was 5(5.20%) cases in study group, in comparison to 16(16.67%) cases in control group. P value was  $<0.05$ . It means that whatever the technique applied for delivery of fetus, it is difficult to do a cesarean section when fetal head is deeply engaged, lower segment is stretched, oedematous and thinned out, liquor amnii is drained out, fetus is in compromised state and mother is exhausted. Our present study corroborated with the study of Sethuram R et al,<sup>12</sup> RCOG,<sup>11</sup> Hager RME et al.<sup>18</sup> UK's National Health Service and support for proper training of junior doctors.

In the present study the incidence of uterine incision extension was much less in study group than control group, 18(18.75%) vs 38(39.58%),  $p < 0.1$ , OR 0.35 with 95 % confidence interval 0.17 – 0.71. Study by Chopra S et al,<sup>10</sup> Levy R et al,<sup>8</sup> and Frass KA et al,<sup>19</sup> showed the uterine incision extension was 40 to 50 % by head pushing method. The incidence of extension of incision or intraoperative trauma in second stage caesarean sections seen in “Push” and “Pull” method used for extraction of fetus, has been found to be about 15% to 50% in various studies.<sup>8,20,13</sup> Study by Saha PK et al<sup>4</sup> 2014, extension rate was 22% in “Push”/ “Pull” mode of extraction of fetus. However, no extension was noted while Patwardhan,s technique used as method of extraction of fetus, thus demonstrating the safety and efficacy of this technique. Study by Barbe et al<sup>21</sup> 2017 showed 3.3 % patient had extension of uterine incision. A total of three studies compared the Patwardhan's method with the push or pull technique.<sup>4,6,16</sup> The meta-analysis showed a significantly lower risk of extension of the uterine incision with the Patwardhan,s method compared with the push or reverse breech extraction. Our study also showed statically significant lower rate of uterine incision extension in Patwardhan's technique than push or pull technique.

In the present study uterine artery tear was 13(13.54%) in study group and 32(33.33%) in control group. Ziyauddin F et al,<sup>5</sup> Mukhopadhyay P et al,<sup>6</sup> showed incidence of uterine artery tear was 37.14%, and 28% respectively by head pushing method. In the present study blood loss and need for blood transfusion 4 (4.17 %) vs 11(11.46%), Chi-square for linear trend; 8.97 and  $p < 0.01$  were much less in study group than control group. Ziyauddin F et al<sup>5</sup> reported that the blood loss (11.43% vs. 67.14%) and need for blood transfusion (17.14% vs. 40%) were more in head pushing method than breech extraction method. Khosla AH et al<sup>16</sup> 2003 reported the haemorrhage due to extension of uterine incision and requirement of blood transfusion up to 24% by push / pull technique. Mukhopadhyay P et al<sup>5</sup> 2005 reported increased blood loss and need for blood transfusion in 34% cases by conventional push / pull method. Study by Saha PK et al<sup>4</sup> 2014 showed statistically significant lower rate of blood transfusion needed in patwardhan's technique (8.6%) than in push or pull Technique (27.3%). Study by Barbe VM et al<sup>21</sup> 2017 showed Patwardhan,s method was used in 61 ( 23%) cases for delivery deeply engaged head, atonic PPH was seen in 11.5% of patients, 3.3% of patients had extension of uterine incision. A meta-analysis of two studies by YB Jeve<sup>2</sup>( $n = 179$ ) showed that the blood transfusion rate was significantly lower with the Patwardhan's method than with the push or pull method (OR 5.00, 95% CI 2.06–12.16,  $P = 0.0004$ , <sup>4,6</sup> Result of our present study also coincide with these studies.

In the present study, time required to deliver the fetal head was  $\leq 3$  mins in 62(64.58%) cases in study group, as compared to 51(53.12%) cases in control group, with odd Ratio 1.61 and CI 0.87-3. Skin to skin time required for cesarean section was more in control group than in study group, ( $>40$  mins time for cesarean section in. 38.54% vs 29.16% cases, Mean +/- SD 40.5 +/-7.33 vs 35.57+/-0.77  $p$  value  $<0.001$  ). Results were comparable with other study by Khosla AH et al,<sup>16</sup> and Fasubaa OB et al,<sup>20</sup> 2002 (Longer operative time, more blood loss, extension of uterine incision, longer hospital stay, higher hospital bills by push method than the pull method).

Berhan and Berhan summarized available evidence comparing the push and pull methods for delivery of impacted fetal head in a systematic review and meta-analysis; they included 11 studies and 1028 total deliveries. Rates of wound infection were not statistically different.<sup>22</sup> Delivery of an impacted fetal head during cesarean: A literature review and proposed management algorithm by Jennifer B. Manning et al,<sup>23</sup> 2015 shows no statistical significant wound infection in different delivery technique. Our study also coincides with these studies.

In the present study fetal outcome was comparable in both groups. More complications in mother of control group were unrelated to birth weight and sex of the baby. NICU admission was higher and was similar

in both groups 28(29.17%) vs 34(35.41%). Babre VM et al,<sup>21</sup> 2017 shows 54% babies needs NICU admission after delivery of impacted fetus. A meta-analysis of four studies by YB Jeve et al,<sup>2</sup> 2015 ( $n = 289$ ) showed no significant difference in Apgar scores at 5 minutes between pull and push groups. Saha PK et al<sup>4</sup> 2014 showed 5 mins apgar score, NICU admission comparable in Patwardhan,s vs pull and push group. Delivery of an impacted fetal head during cesarean: a literature review and proposed management algorithm by Jennifer B. Manning et al<sup>23</sup> 2015 showed, pooled data revealed no significant difference in 5-minute apgar scores between different delivery technique. All study showed there was more neonatal complication when cesarean section done in late stage and was almost similar outcome in all available technique of impacted fetal head delivery.

## V. Conclusion

Impacted fetal head at the time of cesarean delivery is a challenging clinical scenario that may become more common secondary to a decrease in the performance of operative vaginal deliveries. . The first-line approach for an impacted fetal head at the time of cesarean delivery should be based on individual familiarity with each technique. Ideally, surgeons would be properly trained in several different techniques for best possible outcome. Patwardhan,s method for delivery of a deeply impacted fetal head in second-stage cesarean section carries a significantly lower risk of extension of the uterine incision compared with the push or pull method. It is also associated with less operative time, less operative blood loss and blood transfusion rate and there is no difference in neonatal outcome. Further study of fetal extraction techniques is warranted to develop evidence-based recommendations.

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**Table -1 Obstetric feature/Maternal Profile.**

	Patwardhan's Technique (Study group) (n=96)	Pull /Push Technique (Control group) (n=96)	Chi Square	P- Value
<b>Age (Years)-</b> <20 20-30 >30 Mean Age ± SD	24 (25%) 69(71.87%) 3(3.12%) 21.85±3.15	25 (26.04%) 67(69.8%) 4(4.16%) 22.13±3.35	0.19	0.908
<b>Parity-</b> Prime Para Multi Para	86(89.58%) 11(11.46%)	83(86.56%) 13(13.54%)		
<b>Gestational age-</b> <37 Weeks 37-40 Weeks >40 Weeks Mean GA ±SD	8(8.33%) 66(68.75%) 22(22.92%) 272.86±10.51	5(5.20%) 74(77.08%) 17(17.70%) 2.73.14±9.25	1.79	0.408

**Table -2 Distribution of Indication of Caesarean Section.**

		Patwardhan's Technique (Study group) (n=96)	Pull /Push Technique (Control group) (n=96)
1	Fetal distress in late 1 <sup>st</sup> stage of labour	30(31.25%)	25(26.04%)
2	Unanticipated CPD with or without fetal distress in late stage of labour.	21(21.87%)	27(28.12%)
3	DTA(Deep Transverse Arrest)	14(14.54%)	11(11.46%)
4	Obstructed labour	19(19.79%)	25(26.04%)
5	Persistent occipito posterior Position.	8(8.33%)	5(5.20%)
6	Fail forceps	4(4.16%)	3(3.12%)

**Table - 3 Labour event and maternal outcome.**

		Patwardhan's Technique (Study group) (n=96)	Pull/Push Technique (Control group) (n=96)	Chi- square	p- value	Odd Ratio(OR) with confidence interval (CI)
1.	Delivery of Fetal head					
	a)Easy	19(19.79%)	32(33.33%)	13.35	<0.001	2.99(1.58-5).
	b)Difficult	68(70.83%)	43(44.79%)	4.51	<0.05	0.49(0.24-1)
	c)Very Difficult	9(9.38%)	21(21.87%)	5.69	<0.05	0.37(0.15-0.91)
	Chi-square for linear trend : 12.74 and p <0.001					
2.	Time -					
	a)Baby delivery time≤3 min	62(64.58%)	51(53.12%)	2.6	>0.05	1.61(0.87-3)
	b)Skin to skin time >40 min	28(29.16%)	37(38.54%)	1.8	>0.05	0.66(0.34-1.25)
3.	Extension of uterine incision.	18(18.75%)	38(39.58%)	10.08	<0.01	0.35(0.17-0.71)
4.	Uterine artery tear	13(13.54%)	32(33.33%)	10.48	<0.01	0.31(0.14-0.68)
5.	Blood loss					
	Average	83(86.46%)	66(68.75%)	12.63	>0.001	3.9(1.68-9.26)
	>average	9(9.37%)	21(21.87%)	5.69	>0.05	0.37(0.15-0.91)
	Need for Blood Transfusion	4(4.17%)	11(11.46%)	11.77	>0.001	0.16(0.04-0.51)
	Chi-square for linear trend : 8.97 and p <0.01					
6.	Need for Senior	5(5.21%)	16(16.67%)	6.47	<0.05	0.27(0.08-0.85)

	Doctor's help					
7.	Skin Infection	4(4.17%)(Secondary Suture-1)	6(6.25%)(Secondary Suture-3)	0.11	>0.05	0.65(0.15-2.72)

**Table-4 Fetal profile and fetal outcome.**

		Patwardhan's Technique (Study group) (n=96)	Pull/Push Technique (Control group) (n=96)	Chi Squire	P- Value
1	Sex- Male baby Female baby	56(58.33%) 40(41.67%)	54(56.25%) 42(43.75%)		
2	Body weight- <2.5 kg 2.5 - 3 kg >3 kg Mean Body Wt. ± SD	11(11.46%) 54(56.25%) 31(32.29%) 2.9 ± 0.39	14(14.58%) 59(61.46%) 23(23.96%) 2.82 ± 0.35	1.77	0.413
3	Admission in NICU	28(29.17%) Still born-1	34(35.41%) Still born-3		

Dr. Sannyasi Charan Barman, et. al. "Cesarean section in impacted fetal head at pelvis: Evaluation of Patwardhan,s Technique." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(8), 2020, pp. 24-30.