

Research Article

Reverse Breech Extraction *versus* Vaginal Push before Uterine Incision during Cesarean Section with Fully Dilated Cervix and Impacted Fetal Head

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Keywords: Reverse breech extraction; Vaginal push; Impacted fetal head; Caesarean section; Second stage of labour



Abstract

Purpose: To compare between the two commonly used methods to deliver the fetus in emergency cesarean section with fully dilated cervix and impacted fetal head; vaginal push up of the fetal head and reverse breech extraction regarding safety and efficacy.

Methods: A retrospective observational study was conducted 152 women underwent emergency CS with fully dilated cervix and impacted fetal head were divided into two groups; Group 1, vaginal push ($n = 96$) and Group 2, reverse breech delivery ($n = 56$). Data variables were collected and analyzed to evaluate whether either method is more safe regarding maternal and fetal outcomes.

Results: There was a significant higher percentage of extension of uterine incision in group 1 ($p = 0.002$). Also, there were significant higher mean values of operative time and operative blood loss in group 1 ($p = 0.008$ and 0.015 ; respectively). On the other hand, there was a significantly shorter uterotomy to delivery time in group 1 ($p < 0.001$). There was a significantly higher mean value of APGAR score at one minute in group 1 ($p = 0.043$) but no significant difference between the two groups regarding APGAR score at five minutes, atonic PPH, postoperative blood transfusion and hospital stay.

Conclusion: Vaginal push technique was associated with significantly higher intraoperative maternal morbidity but postoperative maternal morbidity and fetal outcomes were comparable between both groups. Push method (after uterine incision) is still the preferable method and larger studies are required to assess the fetal safety with reverse breech extraction.

Introduction

The exact incidence of emergency Cesarean Section (CS) with fully dilated cervix and engaged fetal head is unknown and differs with different localities. It accounts for 20% to 25% of all emergency CS [1,2]. impacted fetal head results from fetal head malposition, prolongation of the second stage, regional analgesia and after failure of instrumental delivery [3,4]. It is a challenging obstetric emergency with potentially increased maternal and fetal morbidities mainly extension of the uterine incision, severe obstetric hemorrhage and fetal

injury and/or asphyxia [5]. several strategies have been reported to manage CS with fully dilated cervix and engaged fetal head and the two commonly used methods in such situation according to Obstetrician experience are vaginal push up of the fetal head and reverse breech extraction [6,7]. However, because it is an emergency situation with potentially serious complications, there is no consensus about the optimum technique regarding safety and efficacy [8].

Aim of the study

To compare Reverse breech extraction to vaginal push



during cesarean section with fully dilated cervix and impacted head regarding maternal and fetal outcomes and morbidities.

Materials and methods

A retrospective cohort study was conducted for all women who underwent an emergency CS in the department of Obstetrics and Gynecology at Menoufia University Hospital between March, 2018 and March, 2023. The study protocol was formerly approved by the study ethical committee and institutional review board of Menoufia University Hospital before starting data collection' *IRB No: 4/2023 OBG 21*'. During the study period, from 16934 deliveries, 5931 of them were cesarean deliveries, the data of those cesarean deliveries was reviewed to select the target population. Those with term singleton pregnancy with cephalic presentation underwent emergency CS during active labour were 754 women and finally 152 of them in whom data fulfilled the inclusion criteria were included in the analysis. The data of all women with a live, singleton pregnancy with 37 weeks and more gestation with cephalic presentation, in active labour and shifted for Emergency CS with full cervical dilatation and Impacted Fetal Head (IFH) was included in the analysis.

Multiple pregnancies, fetal anomalies, preterm delivery and non-cephalic presentation, the presence of uterine scar and those with missed files were excluded. Data variables were collected using information routinely documented as part of clinical care. The authors reviewed and reported information of the cases on customized data sheets. Included women were divided into two groups; Group 1, vaginal push ($n = 96$) in whom vaginal push of the fetal head was done by the assistant before uterine incision and Group 2, reverse breech delivery ($n = 56$) in whom the baby was delivered by reverse breech extraction.

The management and care plan was conducted by the consultant obstetrician in charge.

The incision-delivery time is defined as the time interval between skin incision and delivery of the baby and the uterotomy-delivery time is the interval between opening of the uterus and baby delivery. Both time intervals are usually measured and documented during caesarean section. The operative details for each woman were reviewed to identify cases of IFH at CS. The IFH is defined as engaged head where the station is below the ischial spine [9] and/or if documented as impacted fetal head", "deeply engaged fetal head" or "difficult delivery of head" by the surgeon in the operative notes. The management used for such condition, as practiced in the hospital was either vaginal push of the impacted head before uterine incision or inverse breech extraction and the choice was individual for each patient and depended on the surgeon preference and experience.

In push method, after opening of the anterior abdominal wall layers and before opening the uterus, the assistant pushes

the head vaginally until it's dislodged above the pelvic bone then the surgeon opens the uterus to deliver the fetal head the rest of the baby. In reverse breech delivery, if the baby is occipitoposterior, delivery of the fetal legs and/or feet then completing delivery of the baby as assisted breech delivery but if occipitoanterior, groin traction is applied then completing delivery as assisted breech delivery. After delivery of the baby the uterus was closed in two layers and closure of the anterior abdominal wall layers as per hospital protocol.

Outcomes

Outcome measures were documented; maternal morbidity as extended uterine incision, excessive bleeding, broad ligament hematoma, blood transfusion, postpartum hemorrhage and postoperative surgical site infection and maternal mortality. Also operative time and any reported operative complications. Fetal outcomes included any fetal birth injury, Apgar score, NICU admission, asphyxia intrapartum or neonatal mortality.

Statistical analysis

Results were collected, tabulated and statistically analyzed by an IBM compatible personal computer with SPSS statistical package version 23 (SPSS Inc. Released 2015. IBM SPSS statistics for windows, version 23.0, Armonk, NY: IBM Corp.).

Two types of statistical analysis were done:

- a) Descriptive statistics e.g. was expressed in: Number (No), percentage (%) mean (\bar{x}) and Standard Deviation (SD) for quantitative data While qualitative data were reported as numbers and percentages.
- b) Analytic statistics e.g.
 - Student's t-test was used to compare the two groups of quantitative variables between two groups of normally distributed data.
 - Comparing quantitative variables between two non-normally distributed data groups using the Mann Whitney test.
 - The Chi-square test was used to compare categorical results.
 - Odds ratio at 95 percent Confidence Interval (CI) was computed for outcome measures in the two groups.
 - p - value of < 0.05 was considered statistically significant.

Results

Table 1 shows that Patients' characteristics were comparable between the two groups without significant differences regarding women age, gestational age, weight and height, parity, fetal malposition and birthweight.

Table 2: There was a significant higher percentage of extension of uterine incision in group 1 than in group 2 [32



(33.3%) and 6 (10.7%)] respectively ($p = 0.002$). Also, there were significantly higher mean values of operative time and operative blood loss in group 1 than in group 2 ($p = 0.008$ and 0.015 ; respectively). On the other hand, there was significantly lower mean values of uterotomy to delivery time in group 1 than in group 2 (2.5 ± 1.4 and 3.0 ± 1.6 minutes) respectively ($p < 0.046$) while operative time, incision to delivery time, broad ligament hematoma and need for T- shaped incision were not significantly different between the two groups.

In Table 3, there was a significantly higher mean value of APGAR score at 1 min in group 1 than in group 2 (7.1 ± 0.5 and 6.9 ± 0.7) respectively. ($p = 0.043$). On the other hand, the two groups were comparable regarding atonic postpartum hemorrhage, need for blood transfusion, surgical site infection, APGAR score at five minutes and NICU admission.

No reported neonatal deaths in the studied groups.

Discussion

CS with full cervical dilatation and IFH constitutes an emergency high risk situation and requires skillful and safe management. CS in such situations carries potential maternal risks such as obstetric hemorrhage, uterine incision extension,

delayed delivery of the baby and prolonged operative time and fetal risks like birth injuries, fetal asphyxia and increased NICU admission [7,9] so optimal and standardized management should be adopted for such situation and revised periodically.

The traditional and most used maneuver is vaginal head pushing in most centers [10].

Reverse breech extraction in obstructed labour was first prescribed in 1957 [11]. Since then, it is gradually increasing to be practiced and to be the favorite technique by some obstetricians in different localities [12,13].

The current study found that there was no difference between both groups regarding patient characteristics in terms of age, parity, gestational weight and height at delivery, malposition of the fetal head and fetal birthweight (Table 1). Duration of surgery, operative blood loss and extension of uterine incision was significantly higher in push group, on the other hand, Uterotomy to delivery time was significantly shorter in the same group denoting more rapid delivery of the baby since uterine incision. Regarding outcomes, There was a significantly higher mean value of APGAR score at 1 min in group 1 (vaginal push) without any significant differences between both groups regarding morbidities in terms of atonic

Table 1: Patients' characteristics of the studied groups.

Baseline criteria	Group 1, vaginal push (n = 96) no (%)	Group 2, reverse breech (n = 56) no (%)	Test of significance	p value
Age (years) mean \pm SD	30.6 \pm 5.2	30.7 \pm 5.1	$t = 1.20$	0.908
Gestational age (weeks)	39.5 \pm 1.3	39.6 \pm 1.2	$t = 0.47$	0.639
Parity: Primi multi	51 (53.1) 45 (46.9)	29 (51.8) 27 (48.2)	$\chi^2 = 0.03$	0.873
weight (kg) mean \pm SD	65.2 \pm 9.8	66.1 \pm 10.0	$t = 0.54$	0.589
Height (cm) mean \pm SD	158.5 \pm 7.4	159.1 \pm 6.8	$t = 0.50$	0.620
Occipitoposterior position	51 (53.1)	32 (57.1)	$\chi^2 = 0.23$	0.631
Fetal birthweight (kg): mean \pm SD	3.5 \pm 0.4	3.4 \pm 0.6	$t = 1.23$	0.220

t Student's t- test χ^2 : Qui-Square test.

Table 2: Operative data of the studied groups.

Operative data	Group 1, vaginal push (n = 96) no (%)	Group 2, reverse breech (n = 56) no (%)	Test of significance	p value
Operative time (min): mean \pm SD	41.2 \pm 14.3	35.2 \pm 11.3	$U = 2.69$	0.008*
Incision to delivery time (min): mean \pm SD	6.3 \pm 3.2	6.6 \pm 2.6	$U = 0.60$	0.552
Uterotomy to delivery time (min): mean \pm SD	2.5 \pm 1.4	3.0 \pm 1.6	$U = 2.01$	0.046*
Extension of uterine incision	32 (33.3)	6 (10.7)	$\chi^2 = 9.65$	0.002*
Broad liga hematoma	5 (5.2)	1 (1.8)	$\chi^2 = 1.09$	0.296
Operative blood loss (ml) mean \pm SD	712.2 \pm 345.0	581.7 \pm 232.0	$U = 2.47$	0.015*
Need for inverted T incision	3 (3.1)	4 (7.1)	$\chi^2 = 1.30$	0.254

*Significant U: Mann-Whitney test.

Table 3: Maternal and neonatal outcomes for the studied groups.

Maternal and neonatal outcomes	Group 1, vaginal push (n = 96) no (%)	Group 2, reverse breech (n = 56) no (%)	Test of significance	p value	OR (95% CI)
Atonic PPH	15 (15.6)	4 (7.1)	$\chi^2 = 2.33$	0.127	2.41 (0.76 - 7.65)
Blood transfusion	10 (10.4)	2 (3.6)	$\chi^2 = 2.28$	0.131	3.14 (0.66 - 14.88)
Hospital stay(days) mean \pm SD	2.9 \pm 0.8	2.8 \pm 0.6	$t = 0.81$	0.418	-----
Wound infection	6 (6.3)	2 (3.6)	$\chi^2 = 0.51$	0.476	1.80 (0.35 - 9.24)
APGAR score at 1 min mean \pm SD	7.1 \pm 0.5	6.9 \pm 0.7	$t = 2.05$	0.043*	-----
APGAR score at 5 min mean \pm SD	7.9 \pm 0.5	7.8 \pm 0.7	$t = 1.02$	0.308	-----
Admission to NICU	2 (2.1)	2 (3.6)	$\chi^2 = 0.31$	0.580	0.57 (0.08 - 4.20)
Neonatal death	0	0	NA	--	--

OR: Odd's Ratio; CI: Confidence Interval; NA: Not Applicable



PPH, need for blood transfusion and wound infection in spite of more uterine extensions in vaginal push group and this can be attributed to the standard vaginal push technique practiced in our hospital is not to open the uterus unless the head is disimpacted vaginally by the assistant according to past publications [14], so, surgical complications was not serious. The higher rate of uterine incision extension and increased operative time and blood loss with vaginal push method revealed in the current study correlates with previous reports [12,15,16]. Regarding birth trauma, the current analysis didn't find significant difference between the two techniques to extract the baby correlating with Fasubaa, et al. [7] who conducted a randomized comparative study, Bastani, et al. [16] and Veisi, et al. [17] and the differences between those reports and the present study that they reported increased rates of postpartum fever and endometritis in push method contrary to no significant difference between the two methods reported in the present study and this may be attributed to standard antibiotic prophylaxis given before skin incision applied in the hospital.

No serious birth injuries were encountered with either maneuver and no reported fetal mortality.

Pull method can cause femoral fracture to the baby as reported [12,17], even not significantly different from push method but it was taken in consideration when performing reverse breech delivery techniques, so that the push method is still the most commonly used technique with precaution (disimpaction of the fetal head before uterine incision), also, the team who prefers reverse breech extraction stuck to certain precautions; to be done by senior obstetrician, higher uterine incision and gentle extraction.

It is should be noted that reverse breech extraction developed originally to reduce fetal injury [7,10] depending on the effect of tensile forces of fetal parts making no harmful traction or compression on fetal head and/or neck in addition to significant reduction in maternal operative and postoperative morbidities.

The standardized technique of reverse breech extraction and being done by senior obstetrician and the unified technique for vaginal push (push and disimpact the head before uterine incision) and the analysis being conducted in a tertiary hospital considered the final relay of complicated cases in the Government constitute points of strength to the present study.

The little big difference between the two group samples, missing some files and databases and relatively small numbers to detect significant differences between the two methods specially for neonatal outcomes constitute unintended limitations of the present study.

Future research should focus on conducting randomized controlled studies comparing vaginal push technique to

reverse breech delivery in emergency CS with fully dilated cervix and IFH regarding maternal and fetal outcomes.

Conclusion

Vaginal push technique is associated more intraoperative maternal morbidity but not reaching the serious level when disimpaction of the fetal head is done before uterine incision as postoperative maternal morbidities are comparable in both groups.

Push method (after uterine incision) is still the preferable method and larger studies are required to assess the fetal safety with reverse breech extraction.

Availability of data and material

Data are available with the corresponding author upon relevant request.

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