Reverse breech extraction versus head pushing in cesarean section for obstructed labor

A comparative study in Yemen

Kaima A. Frass, *ABOG, MD,* ***Abdulhakim Al Eryani,*** *MD,* ***Abdelrahman H. Al-Harazi,*** *ABOG, MD.*

ABSTRACT

الأهداف: معرفة معدل توسع الشق الجراحي في الرحم أثناء العملية القيصرية للولادة المتعسرة عند إخراج الجنين بالمجيء المقعدي مقارنةً مع إخراج الجنين بالرأس وذلك عندما يكون الجنين محشور الرأس في قاع الحوض.

الطريقة: أُجريت هذه الدراسة الاستطلاعية في مستشفى الثورة العام بصنعاء، اليمن وذلك خلال سنة واحدة من يناير إلى ديسمبر 2010م. تضمنت الدراسة 118 امرأة في حالة ولادة متعسرة وتم تقسيمهن عشوائياً إلى مجموعتين: مجموعة الدراسة (59 امرأة) اللاتي تم إخراج الجنين لديهن عن طريق المجيء المقعدي، ومجموعة الشاهد (59 امرأة) وتم إخراج الجنين لديهن بالرأس. لقد جُمعت المعلومات الأولية والسريرية لكل امرأة ومقارنة النتائج بين المجموعتين.

النتائج: أشارت نتائج الدراسة إلى أن نسبة توسع الشق الجراحي في الرحم لدى مجموعة الدراسة قد كانت 5% مقابل 40.6% عند مجموعة الشاهد (p=0.0001)، وكان متوسط وقت العمليات والنزيف عند مجموعة الدراسة أقل منها عند مجموعة الشاهد (52.9±5.1, 519±787 مقابل 471±1231، 4.7±67.2) (p<0.0001). ولم تكن هنالك اختلافات كبيرة في معدل المضاعفات ما بعد الحمل بين المجموعتين، كما كانت نسب مضاعفات الأجنة متساوية تقريباً بين المجموعتين.

خاتمة: أثبتت هذه الدراسة بأن إخراج الجنين محشور الرأس في قاع الحوض عند المرأة المتعسرة الولادة أثناء العملية القيصرية بالمجيء المقعدي يقلل إلى حد كبير من معدل توسع الشق الجراحي ومن معدل نزيف الأم.

Objectives: To compare the maternal and fetal outcome of 2 different methods of delivering the baby during cesarian section when the fetal head is deeply engaged.

Methods: A prospective case control study was carried out in the Obstetrics and Gynecology Department, Al-Thawra General Hospital, Sana'a, Yemen from January to December 2010. A total of 118 women who met our criteria were included in the study. They were divided randomly into 2 groups. A study group (n=59) was assigned to deliver the baby by reverse breech extraction, and control group (n=59) was assigned to deliver by the conventional method. The maternal and neonatal outcomes between the 2 groups were compared.

Results: Extension of the uterine incision occurred in significantly less women using reverse breech extraction compared to cephalic delivery (5% versus 40.6%; p=0.0001). It was observed that the mean operation time and blood loss in the study group were lower than that in the control group (52.9±5.1, 787±519 versus 67.2±4.7, 1231±471; p<0.0001). No significant difference between groups was noted in the maternal and neonatal outcomes.

Conclusion: Reverse breech extractions is an attractive and safe alternative to the standard method for intraoperative disengagement of a deeply impacted fetal head in order to reduce maternal and fetal morbidly.

Saudi Med J 2011; Vol. 32 (12): 1261-1266

From the Department of the Obstetrics and Gynecology (Frass, Al Eryani), Al-Thawra General Hospital, and the Department of Obstetrics and Gynecology (Al-Harazi), Thamar University, Sana'a, Yemen.

Received 18th May 2011. Accepted 17th October 2011.

Address correspondence and reprint request to: Dr. Abdelrahman H. Al-Harazi, Department of Obstetrics and Gynecology, PO Box 25244, Thamar University, Sana'a, Yemen. Tel.+967 (1) 541840. E-mail: Yem008@yahoo.com

Disclosure. The authors report no conflict of interest and declare that the study is not supported/funded by any Drug Company.

Obstructed labor is defined as arresting of the progressive descent of the fetal presenting part despite strong uterine contractions due to mechanical obstruction.[1] It affects 3-6% of the women during labor globally, and is considered a major cause of both maternal and newborn morbidity and mortality.[2] The perinatal mortality rates reported are as high as 150-650 per 1000 births, and such a problem contributes to 8% of maternal mortality.[3-6] Obstructed labor is a common cause of uterine rupture and fistula formation.[7] Cesarean section is mostly performed to relieve the obstruction. However, cesarean section may be especially difficult when carried out late in labor with the head deeply wedged in the pelvis. In obstructed labor, the lower uterine segment is enormously thinned and expanded, which may result in a high rate of extension of the uterine incision, higher rates of major obstetric hemorrhage, injury to the uterine vessels, trauma to the urinary tract, and an increased hospital stay.[8] As obstructed labor is still fairly common in our country, the obstetricians often face such difficulty in the delivery of the deeply impacted fetal head in cesarean section. In practice, the surgeon has either to disengage the wedged head by pushing it upwards through the vagina (bimanual or by assistant), or alternatively to use the reverse breech extraction (delivery of the superior pole first). The purpose of this study was to examine the frequency of uterine incision extension in the reverse breech extraction method when cesarean section is performed for obstructed labor with deeply wedged fetal head.

Methods. We conducted a prospective case-control study in the Obstetrics and Gynecology Department, Al-Thawra General Hospital, Sana'a, Yemen from January to December 2010. The inclusion criteria comprised a singleton, term pregnant women (depending on the last menstrual period or early first trimester ultrasonography), cephalic presentation who had obstructed labor, and requiring abdominal delivery. We excluded from the study all women with multiple pregnancy, non-cephalic presentation, previous scar, and preterm labor. One hundred and eighteen (n=118) women who met our inclusion criteria were included in this study. These cases were divided into study (n=59) and control group (n=59). Distribution of women to either group was made randomly based on 1:1 ratio. Verbal consent was obtained from each participant, and the confidentiality was ensured. The demographic and clinical data included age, parity, gestational age, antenatal care visits, pregnancy complications, and the course and complications during previous delivery. Also, we observed the operation time and intraoperative complications such as uterine rupture, and extension of the incision tear. Blood loss, postpartum hemorrhage, fetal birth weight, gender, Apgar score and neonatal morbidity were noted. Blood hemoglobin, hematocrit, grouping and Rh factor were obtained from all patients. Preoperative preparations and anesthetic technique administered were similar to all patients. The standard cesarean section techniques were followed in both groups. The uterus was opened with a transverse incision in the lower segment. At this point, for the study group, the surgeon's right hand was inserted upwards into the upper segment to find and grasp a foot and deliver it along with leg through the incision. Traction on that foot brought the contra lateral lower limb into the operative field. The surgeon then grasped both feet and proceed in a manner similar to that practiced in breech extraction. For the control group, the surgeon inserted the right hand into the uterus down to dislodge the fetal head from pelvis and when difficulty was encountered, the assistant inserted the right hand through the vagina applying pressure to the fetal head upwards until it can be easily grasped by the surgeon's "push" method, the surgeon then delivers the fetus manually without using instruments. After spontaneous delivery of placenta, antibiotics (Augmentin 1.2 gm intravenous [IV], or equivalent) was started. The angles of the uterine incision were clamped, and any extension was noted. An extension was defined as inadvertent extension of uterine incision beyond normal limits. The rest of the procedure was completed by the standard method. Blood loss was estimated using Steri-Drape TM Loban TM 2 (3M Health Care, St. Paul, Minnesota, USA) for all cases. This allows the blood lost to be transmitted into the fluid collection pouch. The collected blood therefore was measured by calibrated jar. The pre-weighed surgical swabs were counted and measured in addition to the blood in the suction apparatus. Hemoglobin level was repeated 24 hours after operation.

The cesarean section is performed by 2 surgeons, one of whom has to be the attending senior and the second one can be a resident. The standard postoperative care protocol is mostly similar for each woman including antibiotics for the first 3 days, prophylactic anti coagulant, early ambulation, and analgesics, which are given depending on the "on need principle". Liquid are allowed 24 hours later and gradual solid diet is allowed 2-3 days postoperation. The indwelling Foley's catheter is kept in place for 7-10 days in some selected cases who were complicated by prolonged obstructed labor, or significant extension of the uterine incision. The institution ethical committee approved the study protocol. The study was carried out according to the Helsinki declaration.

Statistical analysis. The data were processed using the Statistical Package for Social Sciences version 11.0 (SPSS Inc, Chicago, IL, USA). Mean and standard deviation as well as proportion were used as appropriate

for describing data. Chi square test was used for qualitative variables and student-t test for quantitative variables. The 95% confidence intervals (CI) and odds ratio (OR) were calculated as appropriate. A $p<0.05$ was considered statistically significant.

Results. The overall admission to the delivery room during the study period was 11,450 women. There were no statistically significant differences between the 2 groups in the demographic data, and the initial hemoglobin level (**Table 1**). Most cases were primigravidas and accounted for 62% in each group. The most common cause of obstructed labor was cephalopelvic disproportion (CPD). Seventy-eight percent (46/59) of the study group versus 74% (44/59) in the control group were at advanced labor with severely reduced amniotic fluid when cesarean section were performed. Extension of the uterine incision was significantly lower in the study group compared to controls. In 2 women of the study group the extension of the incision was associated with severe bleeding and blood transfusion was needed. There was difficult extraction of the fetal legs due to severe firmly contracted uterine muscles over the fetus in 4 women (6.7%) of the study group, and the inverted T-incision was needed. In the control group, there were difficulties in the disengagement of the impacted fetal head in 21 cases (35.7%) and pushing up of the fetal head vaginally by assistants was needed. In these cases, the extension of the incision was recorded in 80.9% (17/21). It was noted that the extension occurred downward and mainly in the left side in the cephalic group, whereas it was upward in the reverse breech extraction group, and none of them reached the upper segment. No ureteral or bladder involvement was observed. The mean operation time was significantly lower in the study group compared with the control group. Although the rates of postoperative endometritis, wound infection, postpartum hemorrhage, and mean hospital stay were higher in the cephalic delivery group, the differences were insignificant. The mean blood loss in the cephalic delivery group was significantly higher than that of the study group ($p<0.0001$). We found no significant difference in the rate of ruptured uterus between the groups. The fetal and neonatal outcomes were similarly distributed between the 2 groups. **Table 2** summarizes the outcome findings.

Table 1 - The population characteristics of the study group, assigned to deliver to reverse breech extraction, and the control group assigned to the conventional method.

Variable	Study	Control	*P*-value
Mean maternal age, year	25.6±5.7	26.1±5.9	NS
Mean parity	1.93±1.2	1.89±1.1	NS
Mean gestational age, weeks	38.49±1	38.61±1.1	NS
ANC (n=59)			
Booked	37 (62.7)	34 (57.6)	NS
Unbooked	22 (37.3)	25 (42.4)	NS
Source of referral (n=59)			
Self	32 (54.2)	37 (62.7)	
Hospital	12 (20.3)	10 (16.9)	
Health center	15 (25.4)	12 (20.3)	
Mean initial Hb	12.67±3.6	12.08±3.1	NS

The data are presented as mean ± SD or n (%), ANC - antenatal care, Hb - hemoglobin, NS - not significant

Discussion. The incidence of obstructed labor in the hospital was 1.15%, similar to the incidence reported in Sudan,[9] but lower than 0.56% reported in India.[1] However, there are various estimations of the incidence of obstructed labor, probably due to a number of factors including variations in case definition and inadequate case ascertainment. Also, the hospital-based studies will not give valid estimates of the incidence as the study population includes only those who access health services.[1,10] Cesarean sections in the second stage of labor are often associated with higher complications rates and morbidity.[10] It is common practice in our country to receive prolonged obstructed labor when the fetal head is deeply impacted in the pelvis after unsuccessful attempts at home delivery, whether or not assisted by unskilled midwives. Performing cesarean section in this situation is often difficult because the lower uterine segment may be significantly overstretched, and the standard lower segment incision might be placed too low into the vagina,[11] with possible extension into the lower part of broad ligament, profuse bleeding from uterine vessels laceration, and potential injury of the ureter.[12] Moreover, the presence of molding and caput succedaneum could likely make the disengagement of the fetal head very difficult.[12] Our analysis shows that the extension of the uterine incision occurred significantly less in the "pull" method compared to the conventional method. This result is considered lower than that reported by Levy et al[13] in 2005 who found that the extension of uterine incision among the "push" method versus "pull" method was significantly higher (50% versus 15%, $p<0.05$). In addition, we found the "pull" method was associated with significantly lower amount of blood loss intraoperatively, as well as short operation time. These findings are comparable to other studies.[11,14,15] It is argued that reverse breech extraction can be achieved if a high transverse, or J-shaped incision is made in the lower segment. The location of such incision is considered a disadvantage of this technique.[16] In this study, there were only 4 cases (6.8%) in whom the inverted-T incision was needed, which

Table 2 - Obstetric findings and outcomes of the study group assigned to reverse breech extraction, and the control group assigned to the conventional methods.

Variable	Study (n=59)	Control (n=59)	95% confidence interval	*P*-value
CPD	26 (44.0)	33 (55.9)		NS
Malposition	17 (28.8)	14 (23.7)		NS
Contracted pelvis	15 (25.4)	12 (20.3)		NS
Hydrocephalus	1 (1.7)	0		NS
Rupture of uterus	2 (3.3)	3 (5.0)		NS
Extension of incision	3 (5.0)	24 (40.6)	0.0218-0.2789	0.0001*
Blood transfusion	4 (6.7)	6 (10.1)		NS
Operative time, min	52.9±5.1	67.2±4.7	12.51-16.09	<0.0001*
Postpartum hemorrhage	5 (8.4)	10 (16.9)		NS
Endometritis	7 (11.8)	8 (13.5)		NS
Wound infection	3 (5.0)	4 (6.7)		NS
Mean hospital stay, days	6.1±1.7	6.6±1.2	-0.04-1.04	0.0675
Mean fall in Hb/dl	1.54±0.6	1.98±0.92	0.16-0.72	0.0004*
Mean blood loss	787±519	1231±471	263.28-624.72	<0.0001*
Mean birth weight, g	3038±503	3207±541		0.0815
Gender				
Male	31 (52.6)	34 (57.62)		NS
Female	28 (47.4)	25 (42.38)		NS
Apgar score <7				
1 min	23 (39.0)	27 (45.7)	0.0218-0.2789	NS
5 min	12 (20.3)	14 (23.7)		NS
Admission to nursery	11 (18.64)	13 (22.0)	12.51-16.09	NS
Stillbirth	2 (3.38)	2 (3.38)		NS

The data are presented as mean ± SD or n (%), *extremely significant,
CPD - cephalo pelvic disproportion, NS - not significant, Hb - hemoglobin

is significantly lower than that reported by previous study.[13] This suggests the easy accessibility of fetal legs by the standard low transverse incision. Nevertheless, even using this type of incision there is an evidence that the scar of inverted T incision poses the same risk of scar separation in the subsequent labor as the low-transverse type when confined to the lower segment.[16] However, from our experience in many cases, the extension tear related to the "push" method can be at least minimized when some preventive actions are taken at the time of cesarean section. Mobilization of the bladder off the cervix deeply downwards could likely protect the bladder from possible involvement when the extension tears do occur. Also, when the surgeon's fingers can get beneath the presenting part, it is advisable to sustain the elevation of the fetal head upwards until it brings the lower and flexed part of the vertex into the open incision. The delivery of the head before this point may result in laceration. Similarly, using excessive force to deliver the fetal head may result in extension of the uterine incision.

The significantly longer operation time noted in the present trial for the control group suggests difficult and potentially traumatic disengagement of the deeply wedged fetal head by the conventional way, particularly for women with prolonged obstructed labor for several hours or even days. The need for pushing of the fetal head through the vagina by the assistant was observed in 21 cases (35.5%) of our series. It has been suggested that such difficulties could result in a significant delay between the uterine incision to the delivery time,[17] and therefore may aggravate the already compromised fetal conditions.

The most frequent cause of obstructed labor reported is CPD,[10,18,19] in which case the fetal head fails to descend in the maternal pelvis,[20] and therefore the presence of obstructed labor by itself, is not sufficient to explain the impaction of fetal head deep in the pelvis. The major risk factor appears to be prolonged obstruction, a problem most frequently seen in the rural areas where most deliveries occur at home, and often mismanaged by a traditional birth attendant. The emergency cesarean section therefore, carries a higher risk of complications for both mothers and babies.[21,22] In this situation, the presence of a consultant surgeon is recommended, who can cope with the expected complex operative techniques. It is not uncommon for the surgeon to attempt one method first, and resort to the other when difficulty is encountered, and therefore

it is very important for the surgeon to be prepared and skilled for using various maneuvers promptly.

As the occurrence of prolonged obstructed labor in the developing countries is unlikely to be eliminated at least in the foreseeable future, teaching the resident doctors the basic concept of the maneuvers required when faced with a real situation should be addressed. In the present study, there were no significant differences in the postoperative complications such as endometritis, wound infection, and hospital stay between the 2 groups. The higher rate of postpartum hemorrhage among the cephalic delivery group was observed, but still not statistically significant. It was interesting to notice that the frequency of both wound infection and postpartum hemorrhage was lower in our study in contrary to what had been reported by Fasubaa et al.[14] A higher postoperative infection rate in term of endometritis has been reported in the "push" method compared to reverse breech extraction.[11,15] However, the debate still exists, whether such a high rate is attributable to inadequate surgical asepsis, or to the method itself.[23] Our result of low frequent postoperative endometritis could be explained by using all the intraoperative preventive measures and timely antibiotics administration. Nevertheless, it seems logical that passage of the assistant's hand (who mostly is not part of the operating team) into the vagina can never be under sterile conditions, and therefore contamination of the operating field should be anticipated.[12] We believe thus, more studies are needed to clarify this area using all the intraoperative meticulous precautions along with controlling the possible confounding factors. For example, the duration of the second stage, latency of prelabor rupture of membranes, and type and dose of antibiotics given among others.

Despite a good study design, still there were some limitations. We could not control the rate of ruptured uterus in our study population, as women who had this complication were usually diagnosed as a case of ruptured uterus rather than obstructed labor. Thus, the rate of ruptured uterus reported in our investigation could be lower than the actual rate. Likewise, as some women with prolonged obstructed labor should have a Foley's catheter in place for 7-10 days postoperatively as a prophylactic against genital fistula, and they preferred to stay during the duration within the hospital, so the mean hospital stay calculated in this study could not reflect the necessary needed time to care for complications and therefore, should be interpreted with caution. A further limitation is that, we have considered the maternal and neonatal morbidity and mortality only up to the time limit of hospital discharge. Long-term follow-up was not possible because most women had been referred from different rural areas.

In conclusion, cesarean section for women with prolonged obstructed labor when the fetal head is deeply wedged in the pelvis is associated with difficult disengagement and potential risks for maternal trauma, and excessive blood loss. Delivery of the superior fetal pole first (reverse breech extraction) in such circumstances is an attractive, and safe alternative to the conventional method with, or without pushing.

References

1. Adhikari S, Dasgupta M, Sanghamita M. Management of obstructed labor: a retrospective study. ***Journal of Obstetrics and Gynaecology of India*** 2005; 55: 48-51.
2. Kongnyuy EJ, Mlava G, Vanden BN. Establishing standards for obstructed labor in a low-income country. Rural and Remote Health 8: 1022 (on line) 2008. [Accessed 2010 November 12; Updated 2011 June 8]. Available from URL: http://www.rrh.org.au
3. van Beekhuizen HJ, Unkels R, Mmuni NS, Kaiser M. Complications of obstructed labour: pressure necrosis of neonatal scalp and vesicovaginal fistula. ***Lancet*** 2006; 368: 1210.
4. Chhabra S, Gandhi D, Jaiswal M. Obstructed labour - a preventable entity. ***J Obstet Gynaecol*** 2000; 20: 151-153.
5. Weiner R, Ronsmans C, Dorman E, Jilo H, Muhoro A, Shulman C. Labour complications remain the most important risk factors for perinatal mortality in rural Kenya. ***Bull World Health Organ*** 2003; 81: 561-566.
6. Melah GS, El-Nafaty AU, Massa AA, Audu BM. Obstructed labour: a public health problem in Gombe, Gombe State, Nigeria. ***J Obstet Gynaecol*** 2003; 23: 369-373.
7. Neilson JP, Lavender T, Quenby S, Wray S. Obstructed labour. ***Br Med Bull*** 2003; 67: 191-204.
8. Allen VM, O'Connell CM, Baskett TF. Maternal and perinatal morbidity of caesarean delivery at full cervical dilatation compared with caesarean delivery in the first stage of labour. ***BJOG*** 2005; 112: 986-990.
9. Dafallah SE, Ambago J, El-Agib F. Obstructed labor in a teaching hospital in Sudan. ***Saudi Med J*** 2003; 24: 1102-1104.
10. Dolea C, Abouzahr C. Global burden of obstructed labour in the year 2000. Geneva: Evidence and Information for Policy, World Health Organization; 2003.
11. Chopra S, Bagga R, Keepanasseril A, Jain V, Kalra J, Suri V. Disengagement of the deeply engaged fetal head during cesarean section in advanced labor: conventional method versus reverse breech extraction. ***Acta Obstet Gynecol Scand*** 2009; 88: 1163-1166.
12. Blickstein I. Difficult delivery of the impacted fetal head during cesarean section: intraoperative disengagement dystocia. ***J Perinat Med*** 2004; 32: 465-469.
13. Levy R, Chernomoretz T, Appelman Z, Levin D, Or Y, Hagay ZJ. Head pushing versus reverse breech extraction in cases of impacted fetal head during Cesarean section. ***Eur J Obstet Gynecol Reprod Biol*** 2005; 121: 24-26.
14. Fasubaa OB, Ezechi OC, Orji EO, Ogunniyi SO, Akindele ST, Loto OM, et al. Delivery of the impacted head of the fetus at caesarean section after prolonged obstructed labour: a randomised comparative study of two methods. ***J Obstet Gynaecol*** 2002; 22: 375-378.
15. Baloch S, Khaskheli M, Khushk IA, Sheeba A. Frequency of second stage intervention and its outcome in relation with instrumental vaginal delivery versus caesarean section. ***J Ayub Med Coll Abbottabad*** 2008; 20: 87-90.

16. Kafali H. Cesarean breech extraction for impacted fetal head in deep pelvis after a prolonged obstructed labour: a cesarean technique variation. ***The Internet Journal of Gynecology and Obstetrics*** 2003; 2: 2-5.
17. Khosla AH, Dahiya K, Sangwan K. Cesarean section in a wedged head. ***Indian J Med Sci*** 2003; 57: 187-191.
18. Ohonsi AO, Ashimi O. Obstructed labor – A six year Review in Aminu Kano Teaching Hospital, Kano, Nigeria. ***Nigeria Med Pract*** 2007; 51: 59-63.
19. Bhosale A, Fonseca M, Nandanwar YS. Obstructed labor due to contracted pelvis in a grand multiparous women. ***Bombay Hosp J*** 2010; 52: 138-140.
20. Surapanthapisit P, Thitadilok W. Risk factors of caesarean section due to cephalopelvic disproportion. ***J Med Assoc Thai*** 2006; 89 Suppl 4: S105-S111.
21. Häger RM, Daltveit AK, Hofoss D, Nilsen ST, Kolaas T, Øian P, et al. Complications of cesarean deliveries: rates and risk factors. ***Am J Obstet Gynecol*** 2004; 190: 428-434.
22. Murphy DJ, Liebling RE, Verity L, Swingler R, Patel R. Early maternal and neonatal morbidity associated with operative delivery in second stage of labour: a cohort study. ***Lancet*** 2001; 358: 1203-1207.
23. Iffy L, Apuzzio JJ. Reverse breech extraction for cesarean section. ***Eur J Obstet Gynecol Reprod Biol*** 2006; 126-127.

Related topics

Frass KA, Shuaib AA, Al-Harazi AH. Misoprostol for induction of labor in women with severe preeclampsia at or near term. ***Saudi Med J*** 2011; 32: 679-684.

Aldudak B, Kervancioglu M. Effect of mode of delivery on postnatal decline in pulmonary artery pressure. ***Saudi Med J*** 2011; 32: 579-583.

Bondok WM, El-Shehry SH, Fadllallah SM. Trend in cesarean section rate. ***Saudi Med J*** 2011; 32: 41-45.

Manan AZ, Raja MH, Namukangula R, Benayan AA. Appendiceal pseudomyxoma peritonei in a pregnant woman. ***Saudi Med J*** 2010; 31: 572-574.