

## REVIEW ARTICLE

## REVERSE BREECH EXTRACTION AT CESAREAN SECTION IN SECOND STAGE OF LABOR

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### ABSTRACT

**The aim:** Taking into consideration the increase in the frequency of urgent C-sections in the second stage of labor and significant technical difficulties in the extraction of deeply impacted fetal head during this operation, the aim of our work was to analyze the current published biomedical data to identify the optimal technical strategies for conducting this type of surgical interventions.

**Materials and methods:** The search and analysis of current clinical data available in PubMed was performed. We analyzed 9 retrospective and randomized prospective studies with collected data from a total of 974 women (2002-2019).

**Conclusions:** Analysis of nine prospective and retrospective studies, comparing reverse breech extraction with abdominovaginal technique, revealed a significant advantage and safety of reverse breech extraction. This procedure has been associated with the decrease of traumatic uncontrolled extension of uterine incisions in 2.3-10 times, the time of surgical intervention decreased by 6.5-33 minutes, and intraoperative blood loss was less by 149.5-444 ml as compared with abdominovaginal delivery. Moreover, less intra- and postoperative complications were observed. In conclusion, reverse breech extraction during cesarean section with impacted fetal head is a safe delivery technique that helps to significantly decrease the incidence of maternal complications.

**KEY WORDS:** cesarean section, labor stage second, reverse breech extraction

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### INTRODUCTION

Cesarean section surgery is known for several ages. It is described in the Myths of Ancient Greece. According to the legend, Asclepius, a god of Medicine, was extracted by Apollo from the womb of his dead mother [1,2]. Through the centuries cesarean section (C-section) was an operation of despair to save a child, and almost always meant the death sentence for the mother because the uterine wound was never sutured. In 1876 E. Porro introduced amputations of uterus after C-section. That helped to decrease postoperative mortality almost twice [3]. In 1881, F. Kerer performed C-section using low-segment transverse incision and emphasized the necessity of suturing the muscle layer of uterus (similarly to current surgical methodology) [1,2,4].

The discovery of antibiotics and improvement of surgical techniques made the surgery of C-section an integral part of modern obstetrics, and its frequency is constantly rising both in Ukraine and in the world [5]. However, even in the present time such operation might be accompanied by serious complications for mother and the child. Particularly, technically difficult is C-section surgery in second stage of labor with deeply impacted fetal head. The frequency of such surgeries is approximately 1.5% of all C-sections and approximately 25% of urgent C-sections [6,7]. The traditional approach to delivery out fetal head deeply inserted into pelvis and tightly attached to pelvic wall with over-stretched lower segment

can lead to significant complications [8,9]. Of note, carrying out the C-section at full cervical dilatation requires a higher transversal hysterotomy, which usually takes place at the level of the fetal shoulders. These factors further complicate the traditional delivery of the presenting head [10].

### THE AIM

Taking into consideration the increase in the frequency of urgent C-sections in the second stage of labor and significant technical difficulties in the extraction of deeply impacted fetal head during this operation, the aim of our work was to analyze the current published biomedical data to identify the optimal technical strategies for conducting this type of surgical interventions.

### MATERIALS AND METHODS

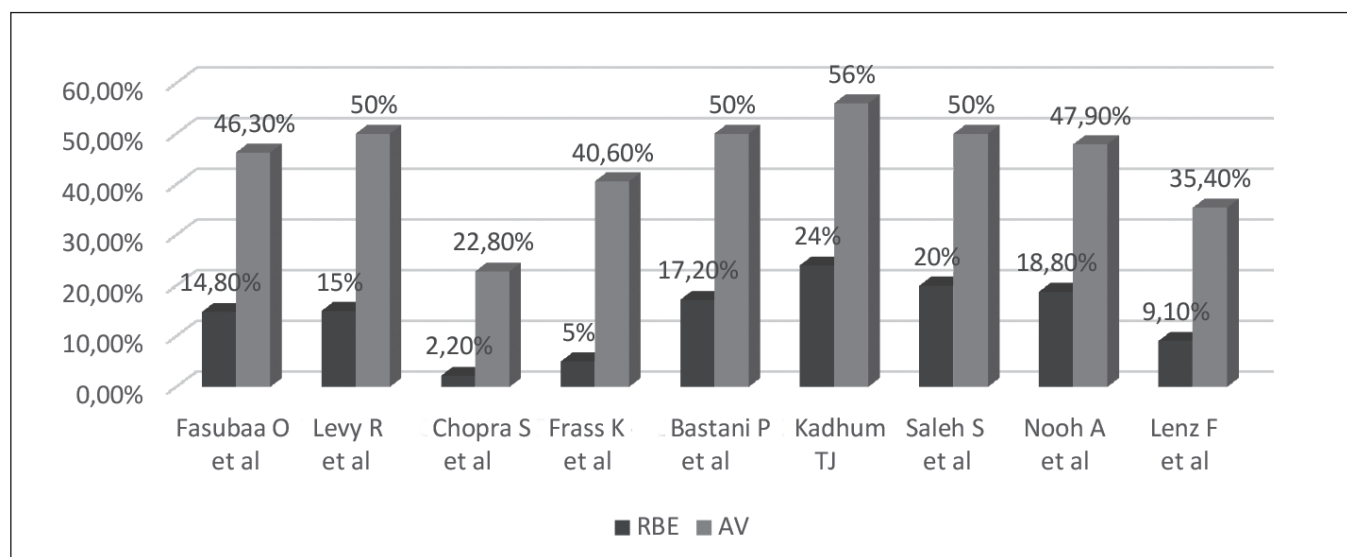
We performed the search and analysis of current clinical data available in PubMed. We analyzed 9 retrospective and randomized prospective studies with collected data from a total of 974 women (2002-2019).

### REVIEW AND DISCUSSION

The most frequent complication of C-section in second stage of labor with difficult delivery of anterior fetal head

**Table I.** Analysis of published data to compare reverse breech extraction method (RBE) with abdominovaginal method (AV).

Author, year	Number of women	Type of study	Traumatic elongation of uterine incision		Time of surgery, min		Intraoperative blood loss, ml		Incidence of hemotransfusions		Incidence of postpartum hyperthermia	
			RBE	AV	RBE	AV	RBE	AV	RBE	AV	RBE	AV
Fasubaa O et al 2002 [18]	108	Prospective randomized	14.8%	46.3%	56	89	899	1257				
Levy R et al 2005 [10]	48	Retrospective	15%	50%							5%	46%
Chopra S et al 2009 [22]	182	Retrospective	2.2%	22.8%								
Frass K et al 2011[19]	118	Prospective randomized	5%	40,6%	52.9	67.2	787	1231				
Bastani P et al. 2012 [24]	59	Retrospective	17.2%	50%					3.4%	10%	10.3%	53.3%
Kadhun TJ 2009 [23]	50	Prospective	24%	56%					16%	40%		
Saleh S et al. 2014 [20]	80	Prospective randomized	20%	50%	59.7	75.2	878	1321	5%	25%		
Nooh A et al 2017 [21]	192	Prospective randomized	18,8%	47,9%					2.1%	11.5%	3.1%	19.8%
Lenz F et al 2019 [25]	137	Retrospective	9.1%	35.4%	38.3	44.8	562.7	712.2				


**Figure 1.** Analysis of published data demonstrating the incidence of unintended extension of uterine incision following application of reverse breech extraction (RBE) vs. abdominovaginal (AV) method. [10,18,19,20,21,22,23,24,25].

is traumatic uncontrolled extension of uterine incision leading to increase of intraoperative blood loss, time of surgical intervention, potential blood transfusion, and likelihood of infection [11]. Furthermore, difficulties during child delivery might cause damage of urinary bladder and

neonatal birth injuries. [6,7,9,12,13]. Several approaches have been proposed to solve such problems:

1. Method of intraoperative tocolysis. Ritodrine, terbutaline, nitroglycerine and other tocolytics have been used to facilitate child delivery during C-section. However,

in the current literature of evidence-based medicine, we were not able to find the data supporting the positive effect of intraoperative tocolysis on maternal and perinatal outcomes during C-section in second stage of labor with deeply impacted fetal head [13,14,15].

2. Vacuum extraction or forceps head delivery appeared to be poorly efficient because application of forceps in the prolonged second stage of labor and deeply impacted fetal head could be also traumatic for the lower segment of the uterus [12]
3. Patwardhan Manoeuvre. This method was proposed by Indian doctor Patwardhan in 1957. With the head deeply impacted in the pelvis, incision is usually made in the lower uterine segment on the level of the anterior shoulder, which is delivered out first. Next, with gentle traction on this shoulder, the posterior shoulder, body and head of the child are subsequently delivered out [16]. Patwardhan method can prevent traumatic injury of the lower uterine segment with deeply impacted foetal head, but technically it is not a simple procedure. Few published data demonstrate safety of this technique for mother and child [13,17].
4. Abdominovaginal method (AV) (push-method). With this method, the assistant is pushing the head of the fetus up by four fingers from the vagina and the surgeon is delivering it by regular procedure through the uterine incision. Most of the Authors emphasize that from the point of view on potential fetal head injury, pushing it with four fingers is safer than with one or two. [7,12,13]. This technique is currently most common because of its technical simplicity and efficiency.
5. Reverse breech extraction (RBE) (pull method) involves the delivery of the fetus in cephalic presentation by pelvic end. After making a uterine incision, the surgeon inserts his/her hand into uterus to the direction of fundus, reaches for the fetal foot, and through the wound consequently delivers legs, body and, lastly, the head [7,12,13]. Although this technique is widely used in different countries of the World, it is less known in Ukraine, and unfortunately almost not mentioned in Ukrainian studies and clinical protocols. All randomized clinical investigations performed in different countries demonstrated significant advantages and safety of reverse breech extraction technique (pull method) as compared with abdominovaginal (push method) [18,19,20,21] (Table I).

Since the main complication of C-section in second stage of labor with the delivery of deeply impacted fetal head is an uncontrolled traumatic extension of uterine incision, which entails a majority of further complications, such as the increase in intraoperative blood loss, time of operation, increase in the frequency of needs in hemotransfusion, etc., in Figure 1 we demonstrated a significant reduction of this problem by using reverse breech extraction in comparison to abdominovaginal method.

According to the available data from the studies performed in different countries (Table I), pull method was associated with the decrease of traumatic elongation of uterine incision

in 2.3-10.4 times less than using push method. Time of surgical intervention was decreased to 6.5-33 min, intraoperative blood loss was decreased on 149.5-444 ml, need in blood transfusion and rate of postsurgical infections were also reduced accordingly. Concerning fetal state, we found only one study analyzing the neonatal complications [23], which reveals that reverse breech extraction was associated with less frequent cases of Apgar score under 7, (specifically 8.3% vs. 21.9%) as compared with abdominovaginal method [12]. The meta-analysis, performed by Berhan Y et al [26] find that abdominovaginal method was associated with more perinatal deaths and admissions to the neonatal intensive care unit comparing to reverse breech extraction. Other published studies did not reveal any significant differences in the health of a newborn in relation to the methods of extraction.

## CONCLUSIONS

Current evidence-based medical researches reveals that reverse breech extraction during cesarean section with deeply impacted fetal head is a safe delivery technique that helps to significantly decrease the incidence of maternal complications.

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#### Conflict of interest:

*The Authors declare no conflict of interest*

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