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Comparative study between Blunt Expansion Versus Sharp Expansion of the Uterine Incision in Primiparous Woman Undergoing Low-Segment Transverse Cesarean Section

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ABSTRACT

Background: Several surgical methods have been established to reduce intraoperative blood loss in caesarean section deliveries. One of these still-debated methods is the use of sharp or stubborn methods to extend the uterine incision. Depending on individual experiences, various surgeons have recommended each technique.

Aim of the work: To see if the maternal blood loss as a primary outcome is affected by the technique of uterine incision expansion (sharp versus blunt) for caesarean deliveries, with secondary outcomes including unintended extension of uterine incision, injury of uterine vessels, and postoperative pain.

Patients and methods: 500 women from Obstetrics and Gynecology Department at Military Production Specialized Hospital and Bab ALshaaria Maternal University Hospital participated in this randomized clinical trial. They were split into two groups: (250 for each group); (Group A): uterine incision expansion was done bluntly with fingers, (Group B): uterine incision expansion was done sharply with scissors.

Results: In comparison to the blunt extension group, the sharp extension group experienced a considerable increase in estimated blood loss ($p < 0.001$). Postoperative pain (VAS) was found to be substantially higher in the sharp extension group than in the blunt extension group ($p = 0.026$).

Conclusion: When compared to sharp dissection of the uterine incision during lower-segment caesarean delivery, blunt dissection of the uterine incision is associated with a significant reduction in blood loss. The use of blunt dissection resulted in significantly less blood loss when volume estimation was used.

Keywords: *Cesarean delivery; Hemorrhage; Blunt, sharp, incision.*

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INTRODUCTION

When medically required, a caesarean section (CS) is one of the most common and serious surgical procedures, sparing both the mother and the newborn's lives. [1]

Cesarean deliveries account for around 15% of all births worldwide, with rates as high as 1 in 3 in some developed nations. It is commonly known that a surgical birth will result in much more blood loss than a vaginal delivery. Removal of the placenta manually, repairing uterine incision in-situ instead of exteriorization, avoiding expansion of uterine incision transversely and expand it in the cephalon-caudad direction, and direction for uterine incision have all been proposed to help lower intraoperative blood loss during caesarean delivery, as obstetric bleeding is still a major cause of maternal morbidity and death.[2]

The exteriorization of the uterus vs suturing the uterine incision in-situ and the removal of the placenta, whether spontaneous or manual, are two procedures that have been advocated to decrease blood loss after operational abdominal delivery. Another strategy is uterine expansion (blunt versus sharp) of the uterine incision in low-segment transverse caesarean deliveries. The basic components have not changed considerably since Kehrer initially established the surgical procedure to low-transverse caesarean delivery. The uterine incision is commonly extended at CS in one of two ways: sharply by cutting laterally and then slightly upward with scissors, or bluntly by splitting the myometrium with the fingers.[3]

Apart from using scissors, you may also use your fingers to enlarge the initial incision. Previously, proponents of each technique may explain their methodological choice by citing learning approaches, past observations, or theoretical reasons. Only a few studies have looked at the impact of hysterotomy expansion on maternal blood loss following caesarean birth. The blunt approach has the benefit of creating less vascular stress, as well as less bleeding and oozing from the dissected myometrial edge.[4]

There is also a lesser risk of harm to the neonate and the cord, as well as a quicker delivery time. However, there are concerns about inappropriate prediction of the length and direction of the uterine incision, which might result in harm to the lateral uterine and parametrial blood vessels, as well as a higher risk of unintended extensions, which could worsen bleeding. The effect of blunt uterine wall division on endometritis after caesarean delivery is also a source of concern.[5]

The major goal of this study was to see if the technique of expanding the uterine incision (sharp vs. blunt) for caesarean section (CS) impacts intraoperative blood loss, with secondary objectives including: Unintended uterine incision extension, Injury to the uterine vessels, Need for additional sutures, Operation time & Postoperative pain.

PATIENTS AND METHODS

This randomized prospective clinical study on 500 women attending The Department of Obstetrics & Gynaecology at Military production specialized Hospital & at Bab Al-Shaaria Maternal University Hospital.

They divided into two groups: A Pfannenstiel incision was done followed by transverse lower uterine segment incison about 2 cm was done using the scalpel then the patients were split into two groups: Group (A): Uterine incision expansion was done blunt by fingers, and Group (B): Uterine incision expansion was done sharply by scissors.

Inclusion criteria: Age (25–35 years), BMI (19 – 34 Kg/m^2), no history of previous cesarean deliveries, no previous history of abdominal or pelvic operation, normal placental insertion (no placenta previa), no history of medical disorders (e.g. No DM, No HTN), normal coagulation profile, term pregnancy (>37 weeks), and estimated fetal weight (2750 – 3500 gm).

Exclusion criteria: Elderly primigravida (> 35 years old), Morbid obesity, history of intra-abdominal or pelvic operation, abnormal placental insertion (placenta previa or accreta), history of medical condition (Hypertension – diabetes – severe anemia – bleeding tendency), and preterm labor.

The following was done to all of the patients in this study:

Written informed consent regarding inclusion in the study was obtained.

History taking: Including the personal history, medical history, previous operations.

All cesarean sections were performed under spinal anesthesia.

Patients took part in this study were divided into two groups: Blunt expansion group and Sharp expansion group.

All cesarean sections took 2 ampules of syntocinon 10 IU/ml (oxytocin) and 1 ampule of methergin (methyl ergometrine).

Closure of uterus in 2 layers.Closure of abdominal layers.

Statistical analysis:

The results were tabulated and statistically evaluated using the SPSS (Statistical Package for Social Sciences) programme version 26.0, Microsoft Excel 2016, and the MedCalC programme version 19.1. Descriptive statistics were generated for numerical parametric data as mean + SD (standard deviation) and minimum and maximum of the range, and for numerical non parametric data as median and first and third interquartile range, and for categorical data as number and percentage. When there were two independent groups with parametric data, inferential analyses were done using the independent t-test, and when there were two independent groups with non-parametric data, the Mann Whitney U. Inferential analysis for qualitative data were conducted using the Chi square test for independent groups.

RESULTS

		Group A (Blunt extension group) (No.= 250)	Group B (Sharp extension group) (No.= 250)	P-value
Age (years)	Mean± SD	30.32± 2.65	30.80± 2.28	0.075
	Median	31.0	31.0	
	Range	25.0- 35.0	25.0- 35.0	
BMI (Kg/m^2)	Mean± SD	28.12± 4.43	28.85± 3.70	0.173
	Median	29.0	29.5	
	Range	19.0 – 34.0	19.0 – 34.0	
Gestational age (weeks)	Mean± SD	39.28± 0.66	39.43± 0.63	0.065
	Median	39.30	39.60	
	Range	38.0 – 40.30	38.0 – 40.30	

Table 1: Comparison between the two groups as regarding clinical & demographic data

The age in blunt extension group ranged from 25 to 35 years with mean ±SD was 30.32± 2.65 years while the in sharp extension group the age ranged from 25 to 35 years with mean ±SD was 30.80± 2.28 years with no statistical significant difference (p=0.075) among the two groups. Regarding BMI, there was no statistical significant difference between blunt and sharp extension groups (p=0.173). The gestational age in blunt extension group had mean ±SD= 39.28± 0.66 weeks while the in sharp extension group the mean gestational age was 39.43± 0.63 weeks with no statistical marked difference between the two groups (p=0.065) (Table 1).

		Pre-operative Hb (g/dl)	Post-operative Hb (g/dl)	P-value
Group A (Blunt extension group) (No.= 250)	Mean± SD	11.21± 0.57	10.32± 0.50	<0.001
	Median	11.20	10.30	
	Range	10.0- 12.70	9.20 – 11.80	
Group B (Sharp extension group) (No.= 250)	Mean± SD	11.80± 0.55	10.41± 0.41	<0.001
	Median	12.0	10.30	
	Range	10.0- 12.70	9.20 – 11.80	

Table 2: Comparison between pre and postoperative Hb in the two groups

There was significant decrease in postoperative Hb. compared to preoperative Hb. in blunt extension group (p<0.001). Likewise, there was marked decrease in postoperative Hb. compared to preoperative Hb. in sharp extension group (p<0.001) (Table 2).

		Pre-operative HCT (%)	Post-operative HCT (%)	P-value
Group A (Blunt extension group) (No.= 250)	Mean± SD	33.64± 1.71	30.97± 1.50	<0.001
	Median	33.60	30.90	
	Range	30.0- 38.10	27.60 – 35.40	
Group B (Sharp extension group) (No.= 250)	Mean± SD	35.41± 1.66	31.23± 1.23	<0.001
	Median	36.0	30.90	
	Range	30.0- 38.10	27.60 – 35.40	

Table 3: Comparison between pre and postoperative hematocrit in the two groups

This table shows comparison between studied groups regarding preoperative and postoperative hematocrit. There was significant decrease in postoperative hematocrit compared to preoperative hematocrit in blunt extension group (p<0.001). Also, there was marked decrease in postoperative hematocrit compared to preoperative Hb. in sharp extension group (p<0.001) (Table 3).

		Group A (Blunt extension group) (No.= 250)		Group B (Sharp extension group) (No.= 250)		P-value
		No.	%	No.	%	
Estimated blood loss (ml) (suction + Towels)	Mean±SD	672.68± 88.73		849.40± 98.89		<0.001
	Median	690.0		820.0		
	Range	480.0 - 810.0		680.0 - 1040.0		
Unintended extension of the uterine incision	No	210	84.0%	190	76.0%	0.034
	Yes	40	16.0%	60	24.0%	
Injury to the uterine vessels	No	237	94.8%	225	90.0%	0.063
	Yes	13	5.2%	25	10.0%	
Need for additional sutures	No	140	56.0%	100	40.0%	<0.001
	Yes	110	44.0%	150	60.0%	

Table 4: Comparison between the two groups regardng estimated blood loss, injury to the uterine vessels, unintended extension of the uterine incision, and need for additional sutures

The sharp extension group had significantly more unintended uterine incision extension than

the blunt extension group (p = 0.034). In comparison to the blunt extension group, the estimated blood loss in the sharp extension group was significantly higher (p < 0.001). There was no statistically significant difference in uterine vessel injury between the blunt and sharp extension groups (p > 0.05). Additional sutures were required considerably more frequently in the sharp extension group than in the blunt extension group (p < 0.001) (Table 4).

		Group A (Blunt extension group) (No.= 250)	Group B (Sharp extension group) (No.= 250)	P-value
EFW (Kg)	Mean± SD	3.26 + 0.2	3.33 + 0.18	0.01
	Median	3.3	3.4	
	Range	2.8 – 4.1	2.8 – 4.1	

Table 5: Comparison between the two groups regarding estimated fetal weight (EFW).

The Estimated fetal weight in blunt extension group had mean ±SD= 3.24 + 0.2 Kg while

the in sharp extension group the mean estimated fetal weight was 3.31 + 0.18 Kg with no statistical significant difference between the two groups (p=0.01). (Table 5).

	Group A (Blunt extension group) (No.= 250)	Group B (Sharp extension group) (No.= 250)	P-value
Number of cases (EFW > 3.5 Kg)	12	14	P < 0.01
Injury of uterine vessels	8	7	
Unintended extension	11	10	
Average estimated blood loss	745.83 ml + 32.78	933.57 ml + 29.91	

Table 6: Comparison between the outliers of estimated fetal weight of the two groups regarding the injury of the uterine vessels, unintended extension and average estimated blood loss.

The outliers in each group (Estimated fetal weight > 3.5 Kg) were 12 cases in the blunt

expansion group and 14 cases in the sharp expansion group, we compared between the outliers of the two groups regarding the injury of the uterine vessels, unintended extension and average estimated blood loss. (Table 6).

	Group A (Blunt extension group) (No.= 250)	Group B (Sharp extension group) (No.= 250)
Incidence of atonic uterus	16	21
	Management	
Pabal amp IV (Carbetocin 100 mcg)	16	21
Uterine artery ligation	9	13
B-Lynch suture	3	5

Table 7: Comparison between the two groups regarding incidence of atonic uterus.

		Group A (Blunt extension group) (No.= 250)		Group B (Sharp extension group) (No.= 250)		P-value
		No.	%	No.	%	
Operation time (min)	Mean± SD	40.71± 6.02		43.38± 4.80		<0.001
	Median	40.0		43.0		
	Range	29.0 - 50.0		29.0 -50.0		

Table 8: Comparison between the two groups regarding operation time

This table shows comparison between the two groups in terms of operation time. Operation time was markedly higher in sharp extension group than blunt extension group (p<0.001) (Table 8).

		Group A (Blunt extension group) (No.= 250)	Group B (Sharp extension group) (No.= 250)	P-value
Postoperative pain (VAS)	Mean± SD	4.82± 1.67	5.16± 1.57	0.026
	Median	5.0	5.0	
	Range	2.0 - 8.0	3.0 -8.0	

Table 9: Comparison between the two groups regarding postoperative pain (VAS)

This table shows comparison between the two groups in terms of postoperative pain (VAS). It was noticed that postoperative pain (VAS) was markedly higher in sharp extension group than blunt extension group (p=0.026) (Table 9).

DISCUSSION

The mean age in the studied cases was 30.56± 2.49 years and ranged from 25 to 35 years. The BMI ranged from 19 to 34.0 Kg/m2 with mean was 28.68± 3.93 Kg/m2. The mean gestational age was 39.42 ± 0.63 weeks. As regard demographic & clinical characteristics among the two studied groups. The age in blunt extension group ranged from 25 to 35 years with mean ±SD was 30.32 ± 2.65 years while the in sharp extension group the age ranged from 25 to 35 years with mean ±SD was 30.80± 2.28 years with no statistically significant difference (p=0.075) among the two groups. In relation to BMI, there was no statistically considerable difference among blunt and sharp extension groups (p=0.173). The gestational age in blunt extension group had mean ±SD= 39.28± 0.66 weeks while the in sharp extension group the mean gestational age was 39.43 ± 0.63 weeks with no statistically considerable difference among the two groups (p=0.065).

Our results were consistent with those of Faiza et al. [5] who included total 80 women who were randomly allocated to 40 women in each group either blunt or sharp uterine incision groups while performing lower segment cesarean section through Pfannenstiel incision. According to demographic characteristics such as age, parity, and gestational age, both groups were indistinguishable.

Similarly, El-Berry et al. [6] revealed that randomized, controlled trial of 400 C-sector patients split into two groups at Benha University Hospitals and Benha Insurance Hospital. (Group 1); 200 of them have had blunt uterus incisions (Group 2); 200 of them have been sharply uterine incised; they found that average age in Group A was 28.91 (± 3.95 SD) with a range (23-35); 41% were nulliparous; 19% had parity; 19.5% had two parities; 6% had three parities; 7.0% had four; 7.5% had five; and average BMI was 29,72 (± 2,86 SD) with no statistically considerable difference among both groups.

The present study showed that as regard comparison between studied groups regarding preoperative and postoperative Hb. There was significant decrease in postoperative Hb. compared to preoperative Hb. in both sharp group ($p < 0.001$) and blunt group ($p < 0.001$).

Our results were supported by study of Faiza et al. [5] as they found that individuals in Group-A had a substantially lower reduction in mean Hb concentration than those in Group-B (1.47 ± 1.08 and 1.95 ± 0.85 respectively, P value 0.031).

While, the combined results of meta-analysis of Xu et al.[2] revealed a tendency toward a lower decline in hemoglobin value preferring the blunt expansion technique group, although this was not valuable statistically (95% CI, - 20.53 to 5.72; 3 trials; 786 patients). A lot of variation across trials was noticed.

The current study showed that as regard comparison between studied groups regarding preoperative and postoperative hematocrit. There was significant decrease in postoperative hematocrit compared to preoperative hematocrit in both sharp group ($p < 0.001$) and blunt group ($p < 0.001$).

In accordance with our results, study of Xu et al.[2] as they reported that obtained data demonstrated a tendency towards blunt expansion technique among the three trials, a lower decline in hematocrit value following the surgery; however, this haven't achieved statistical significance (mean difference [MD], - 0.86%;95% CI, - 2.04 to 0.32; 3 trials; 1445 patients). A lot of variation across trials was noticed.

However, Tahir et al. [7] demonstrated that there was a marked drop in post-operative hematocrit in the patients in whom expansion of uterine incision was made bluntly (p= 0.00).

Similarly, Faiza et al. [5] found that the drop in mean HCT in Group-A was substantially less than in Group-B (3.21 ± 1.3 and 4.21 ± 2.17 respectively, P-value 0.015).

The present study showed that as regard comparison between the two groups as regards estimated blood loss. Sharp extension group showed significant increase in estimated blood loss in comparison with blunt extension group ($p < 0.001$).

According to our findings, as reported by Xu et al. [2] the data gathered from combined results demonstrated a lesser estimated amount of blood loss preferring the group using blunt expansion technique that was statistically relevant (95% CI, - 79.48 to - 30.52; 2 trials; 1145 patients) with strong variability across trials.

Also, in the study of Sekhavat et al.[8], they also estimated volume by comparing the weight of lap towels and sponges prior and after the surgery, as well as blood in the suction device. They discovered that the volume of blood loss within the sharp cases was considerably more than in the blunt cases ($P < 0.05$).

However, in the study of El-Berry et al. [6], the requirement for blood transfusion is decreased with a sharp uterine expansion method.

Our results showed that as regard comparison among the two groups in terms of operative data. The sharp extension group had a considerably greater rate of unintended uterine incision extension than the blunt extension group ($p = 0.034$). Similarly, the requirement for additional sutures was considerably greater in the sharp extension group ($p < 0.001$) than in the blunt extension group. In comparison to the blunt extension group, the sharp extension group witnessed a considerable increase in estimated blood loss ($p < 0.001$). The sharp extension group had a considerably longer operation time than the blunt extension group ($p < 0.001$). There was no statistically considerable difference between blunt and sharp extension groups regarding injury to the uterine vessels ($p > 0.05$). As regard comparison between the two groups as regards of postoperative

pain (VAS). It was discovered that the sharp extension group's postoperative pain (VAS) was much higher than the blunt extension group's. (p = 0.026).

Our results were supported by study of Magann et al. [9] described extension as every other lesion identified further than the primary incision, which backed up our findings. The blunt group had a much lower probability of any extension than the sharp group (P = 0.0001). The number of broad ligament and cervical lacerations, however, did not differ (P = 0.06 and P = 0.14, respectively).

Whereas, Xu et al. [2] found that gathered information from three studies revealed a strong tendency of a lower risk of unintended uterine incision extension among the blunt, in relation to sharp group, that have not been considerable (relative risk, 0.57; 95% CI, 0.28 –1.17; 3 trials; 1431 patients), however marked variability between trials was found.

While, Sekhavat et al.[8] on the other hand, found no statistically marked variations regarding the frequency of uterine incision extensions for each group (P >.05). Expansions further into cervix or the broad ligament were not found. No variation was observed in total operating time after evaluation of both blunt and sharp groups (mean 27.9 min, 30.7 min respectively) (P >.05).

In the study of El-Berry et al. [6], found that the sharp uterine expansion approach cured faster than the blunt uterine expansion approach.

Also, Song et al. [10] also found that using the finger-assisted stretching technique (FAST) for CS led to less blood loss (601 vs. 928 ml; P < 0.05) and quicker recovery. Every completely pointless surgical step was evaluated, they noted raised tissue injury and inflammatory reaction, liability to infection and bleeding. When compared to the old approach, FAST shortened the period of operational field exposure by around 3–4 minutes. Less blood loss is attributed to FAST's rapid control of bleeding spots.

CONCLUSION

The results of this study demonstrated that a remarkable blood loss reduction when blunt

method is used to expand the uterine incision during lower-segment caesarean delivery. The use of blunt dissection resulted in much less blood loss when volume estimate was used. This finding was supported by laboratory-based results showing a decline in hemoglobin/hematocrit level and need for blood transfusion, however it had not achieved significant statistics. Results from a recent, unreported study with higher sample size might help to elucidate the clinical difference between these two approaches.

Conflict of interest : none

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