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Blunt incision vs. sharp incision of uterus in cesarean section in post-operative morbidity

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Abstract

Background: Several surgical procedures to minimise intraoperative blood loss in caesarean section births have been developed. One of these still disputed approaches is the extension of uterine incision using sharp or stubborn ways. Different surgeons have endorsed each strategy based on their personal experiences. The purpose of this research was to examine the effects of acute vs. blunt uterine expansion. Method: This is a randomised, 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; The results: 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). As regards unintentional extensions <2cm, there was substantial difference between the two groups. There was no significant difference in postoperative discomfort between both groups. The risk of intraoperative or postpartial haemorrhage did not change. Sharp uterine expansion technique may be healed quicker than the blunt uterine expansion technique and with a sharp uterine expansion technique, the demand for blood transfusion is lower. Conclusion: Based on this finding, future investigations with bigger patients and a longer follow-up time are required in order to highlight this conclusion.

Keywords: Blunt, sharp, incision, cesarean section**.**

1. Introduction

Cesarean surgery is the world's most frequent major operation and the rate is growing significantly. The world mean caesarean rate was calculated at 18.6% while in Europe the 2010 rate went from 14.8% to 52.2%. It is commonly acknowledged that higher blood loss is expected compared to vaginal delivery in a surgical procedure. Because obstetrical bleeding remains the major cause of maternal morbidity and mortality, procedures such as manual placental extraction, in situ uterine repair and blunt cerebrovascular traction have been recommended to decrease injection of intraoperative blood during cese [1].

In the past, proponents of the blunt or sharp approach used to support their choice of methodology should refer to training regimens, experience or theoretical considerations [2].

Hemorrhage is the most prevalent complication of the caesarean section. The following surgical measures were recognised as critical times to reduce blood loss during surgery: use of uterotonics, spontaneous placental elimination, and blunt uterine incision extension using the finger, rather than scissors[3].

Several operating procedures have been developed during the caesarean section for reducing intraoperative blood loss. An extension of the uterine incision, whether acute or blunt [4], remains controversial.

However, concerns exist about less control of uterine incision length and direction that may possibly cause injury to lateral uterine blood vessels and parametrial blood vessels, as well as increased chance of accidental extensions that might lead to hemorrhage[5].

The impact of blunt uterine wall division on the incidence of endometritis after caesarean birth is equally worrying [6].

The purpose of this research was to examine the effects of acute and blunt uterine incision expansion.

2. Patients and methods

The researcher introduced himself to all participants included in this study and asked them to participate after illustrating the goal of the study.

All selected participants received comprehensive information regarding objective and the expected benefit of the study. All ethical considerations were taken throughout the whole work.

An informed verbal consent from the participants was taken and confidentiality of information was assured.

An official written administrative permission letter was obtained from dean of faculty of medicine, at Benha University Hospitals and Benha Insurance Hospital, Head of the Obstetric and Gynecology department in the Benha. The title and objectives of the study were explained to them to ensure their cooperation.

Permission from the faculty of medicine ethical committee was also obtained. And approval from institutional review board was taken.

This study was carried out at Benha University Hospitals and Benha Insurance Hospital. during the period from November 2020 till April 2021.

400 female patients undergoing C- Section at Benha University Hospitals, 200 patients underwent blunt uterine incision, and 200 patients underwent sharp uterine incision, both groups were randomized by computer.

Group (1): underwent blunt uterine incision.

Group (2): underwent sharp uterine incision.

2.1. Inclusion criteria

- Singleton term pregnancy.

2.2. Exclusion criteria

- Maternal medical disorders as: hypertension, diabetes mellitus, hepatic, cardiac, renal, autoimmune diseases (antiphospholipid syndrome, Systemic lupus erythematosus) & anemia with pregnancy.

- Multiple pregnancies.
- Patients with BMI ≥ 40.
- Previous uterine scar other than cesarean section.
- All patients were subjected to full history taking, complete clinical examination, Assessment of fetal well-being, and abdominal Ultrasound

2.3. Intra-operative methodology:

The surgeon was only informed a short time prior to the operation which technique would be used. The patients were randomly allocated according to odds and evens numbers. Operations were performed under spinal anesthesia.

The time of surgery, duration of inpatient stay and blood loss were recorded for comparison. The operating time was measured from starting the skin incision at the start of the operation to completion of skin suturing at the end of the operation.

➢ **Blunt technique**

The skin incision was done as a horizontal Pfannenstiel incision 2 cm above the pubic symphysis; subcutaneous adipose tissue and the abdominal fascia were also sharply dissected using a scalpel and the aponeurosis of the transverse abdominal muscles was detached from the straight abdominal muscles. The rectus abdominis muscles bethened pushed apart. This was followed by cranio-caudal incision of the peritoneum. The peritoneum was severed from the ant uterine wall and pushed away caudally. In the blunt method the uterine wall was completely dissected using a scalpel, and the incision was then extended manually in a slight horizontal curve. The fetus was delivered manually after opening the amniotic sac. The placenta was removed by hand. Curettage of the uterus was done if there is any suspicion that remnants of the placenta have been retained. The uterus was closed using continuous or interrupted sutures. The peritoneum and the musculature were sutured with continuous or interrupted sutures. The fascia was closed as usual with a continuous suture. Finally the skin incision was closed with sub-cutecular continuous sutures.

➢ **Sharp technique**

The skin incision will be done as a horizontal Pfannenstiel incision 2 cm above the pubic symphysis; subcutaneous adipose tissue and the abdominal fascia will be also sharply dissected using a scalpel and the aponeurosis of the transverse abdominal muscles will be detached from the straight abdominal muscles. The rectus abdominis muscles bethened pushed apart. This was followed by cranio-caudal incision of the peritoneum. The peritoneum was severed from the ant uterine wall and pushed away caudally. In the sharp method the uterine wall was completely dissected using a scalpel, and the incision was then extended by scissor in a slight horizontal curve. The fetus was delivered manually after opening the amniotic sac. The placenta was removed by hand. Curettage of the uterus was done if there is any suspicion that remnants of the placenta have been retained. The uterus was closed using continuous or interrupted sutures. The peritoneum and the musculature was sutured with continuous or interrupted sutures. The fascia was closed as usual with a continuous suture. Finally the skin incision was closed with sub cutucalar continuous suture.

Outcome measures

➢ **Primary outcomes**

- To assess the maternal blood loss by pre & post-operative hematocrit.

➢ **Secondary outcomes**

- Unintended extension.
- Operative time & time to delivery.
- Injury to the neonate.
- Postoperative Pain.
- Incidence of post-operative endometritis.

2.3. Statistical analysis

Analysis of data was done using Statistical Program for Social Science version 20 (SPSS Inc., Chicago, IL, USA). Quantitative variables were described in the form of mean and standard deviation. Qualitative variables were described as number and percent. In order to compare parametric quantitative variables between two groups, Student t test was performed. Qualitative variables were compared using chi-square (X2) test or Fisher's exact test when frequencies were below five. Pearson correlation coefficients were used to assess the association between two normally distributed variables. When a variable was not normally distributed, A P value < 0.05 is considered significant.

3. Results

The mean age in group A was 28.91 (± 3.95 SD) with range (23-35), 41% were nulliparous, 19% had a parity, 19.5% had 2 parities, 6% had 3 parities, 7% had 4, 7.5% had 5, the mean BMI was 29.72 (± 2.86 SD). The mean age in group B was 28.72 (± 3.73 SD) with range (23-35), 39.5% were nulliparous, 19% had a parity, 23.5% had 2 parities, 5.5% had 3 parities, 7% had 4, 5.5% had 5, the mean BMI was 29.89 (± 2.95 SD). table (1).

In group A there were 62(31%) with Past cesarean section, 200(100%) with Elective LSCS, the mean Operating time was 27.60 (± 4.57 SD). In group B there were 54(27%) with Past cesarean section, 200(100%) with Elective LSCS, the mean Operating time was 27.07 (± 4.76 SD). table (2)

In group A there were 40% with Inadvertent extensions, 13% Inadvertent extension >2cm, 1% with Extension to broad ligament, 4% with Extension to uterine vessels, 1% with Extension to cervix, 43.5% with Tears during LSCS, 29% with Drop in hematocrit >10%, 20% with Drop of hemoglobin >2 g/dl.

In group B there were 27.5% with Inadvertent extensions, 10.5% Inadvertent extension >2cm, 1% with Extension to broad ligament, 1% with Extension to uterine vessels, 0.5% with Extension to cervix, 35% with Tears during LSCS, 28.5% with Drop in hematocrit >10%, 17.5% with Drop of hemoglobin >2 g/dl. table (3)

Table (1) Comparison between the two studied groups according to demographic data.

Demographic data	Blunt incision (n = 200)		Sharp incision (n =200)		Test of Sig.	p
Age (Years)						
Min. – Max.	23.0 – 35.0		23.0 – 35.0		t=	
Mean ± SD.	28.91 ± 3.95		28.72 ± 3.73		0.469	0.639
Median (IQR)	29.0 (25.0 – 32.0)		28.0 (26.0 – 32.0)			
Parity	**No.**	**%**	**No.**	**%**		
Nulliparous	82	41.0	79	39.5		
1	38	19.0	38	19.0		
2	39	19.5	47	23.5	χ^2=	0.918
3	12	6.0	11	5.5	1.459	
4	14	7.0	14	7.0		
5	15	7.5	11	5.5		
BMI (Kg/m^2)						
Min. – Max.	25.0 – 34.50		25.0 – 34.60		t=	
Mean ± SD.	29.72 ± 2.86		29.89 ± 2.95		0.556	0.579
Median (IQR)	29.2 (27.35 – 32.4)		29.8 (27.35 – 32.5)			

χ^2: **Chi square test** **t: Student t-test**
IQR: Inter Quartile Range SD: **Standard deviation**
p: p value for comparing between the studied groups

Table (2) Comparison between the two studied groups according to history and operation data.

History and operation data	Blunt incision (n = 200)		Sharp incision (n =200)		Test of Sig.	p
	No.	**%**	**No.**	**%**		
Past cesarean section						
No	138	69.0	146	73.0	χ^2=	0.378
Yes	62	31.0	54	27.0	0.777	
Operating time						
Min. – Max.	20.0 – 35.0		20.0 – 35.0		t=	
Mean ± SD.	27.60 ± 4.57		27.07 ± 4.76		1.145	0.253
Median (IQR)	28.0 (24.0 – 31.50)		27.0 (23.0 – 31.0)			

χ^2: **Chi square test** **t: Student t-test**
IQR: Inter Quartile Range SD: **Standard deviation**
p: p value for comparing between the studied groups

Table (3) Comparison between the two studied groups according to complications.

Complications	Blunt incision (n = 200)		Sharp incision (n =200)		χ^2	p
	No.	**%**	**No.**	**%**		
Inadvertent extensions<2cm	80	40.0	55	27.5	6.988*	0.008*
Inadvertent extension >2cm	26	13.0	21	10.5	0.603	0.438
Extension to broad ligament	2	1.0	2	1.0	0	1.0
Extension to uterine vessels	8	4.0	2	1.0	3.692	0.055
Extension to cervix	2	1.0	1	0.5	0.336	FE p=1.000
Tears during LSCS	87	43.5	70	35.0	3.030	0.082
Drop in hematocrit >10%	58	29.0	57	28.5	0.012	0.912
Drop of hemoglobin >2 g/dl	40	20.0	35	17.5	0.410	0.522

χ^2: **Chi square test** FE**: Fisher Exact**
p: p value for comparing between the studied groups
*: Statistically significant at $p \leq 0.05$.
There was no significant difference between both groups as regard Post-operative pain. table 4

Table (4) Comparison between the two studied groups according to post-operative pain**.**

Post-operative pain	Blunt incision (n = 200)	Sharp incision (n =200)	t	p
Min. – Max.	4.0 – 7.0	4.0 – 7.0		
Mean ± SD.	5.41 ± 1.09	5.44 ± 1.06	0.232	0.817
Median (IQR)	5.0 (4.50 – 6.0)	5.0 (5.0 – 6.0)		

t: Student t-test **IQR: Inter Quartile Range** SD: **Standard deviation**
p: p value for comparing between the studied groups.

4. Discussion

This research is intended to examine the influence of sharp vs. mild uterine incision enlargement on post-operative outcomes.

This research showed the average age of Group A was 28,91 (± 3,95 SD), the range of 41% was nulliparous, 19% had parity, 19,5% were 2 parities, 6% were 3 parities, 7% had 4, 7,5% had 5, and the average BMI was 29,72 (± 2,86 SD). While in group B average age was 28.72 (± 3.73 SD). The range (23-35) was nulliparous, 39.5% had parity, 19% had parity, 23.5% had two parities, 5.5% had three parities, 7% had 4, and 5.5% had 5, while the mean BMI was 29.89. There is no significant variation in age, parity and BMI across groups.

Jayasundara et al. [7] discovered an age ranging from 21 to 40 years with a mean of 29.8 years +/- 4.8 years. The age of the rapid growth group was 18-44 years, with an average of 30+/- 5 years. In a blunt expansion group 60 (42.1%) Nulliparous, 73 (54.9%) multiparous, 81 (57.4%) multiparous in a sharp expansion group 60 (42.6%) Nulliparous, the two investigated groups had minor differences in age, parity, and BMI.

Hameed et al [8] discovered Sharp group, mean age 28.4 ± 5.13, 32 Nulliparous and 66 Multiparous, BMI average 26.64±1.61, Mean age 27.1±5.35, mean age 27.1±5.36, mean age 27.16 ± 1.43. There was no significant difference between the two groups.

Ozcan et al. [9] showed that the demographic and baseline obstetric features of the groups were comparable to each other (p>0.05). in Blunt group, average age 30.4 ± 4.6, average of 1.3 ± 1.4, average 28.13 ± 2.31 in sharp group, average age 29.7 ± 5.6, mean 1.2 ± 1 in parity, average of 28.7 ± 1.83 in Blunt group.

In the thesis, 62(31%) with Past Cesarean section, 200(100%) with Elective LSCS and average operating time of 27.60 (± 4.57 SD) was proven. Group B had 54(27%) of the previous C-section, 200(100%) of the elective LSCS and the average duration of operations was 27.07 (± 4.76 SD). The two groups differed significantly from the past caesarean section, Elective LSCS or Operating Time.

Jayasundara et al. [7] showed that 51 (38.3%) with past caesarean section and 91 (68.4%) in the blunt expansion group with Elective LSCS, the mean operating time was 14.9 (± 4.7%). There were 58 (41.1 percent) in sharp expansion groups in Past Caesarean Section, 112 (79.4 percent) with Elective LSCS and 13.7 (± 4.4 SD) was average operating time. There was no substantial difference between the two groups as compared with the Elective LSCS segment, but there was a considerable variation in operating time between the two groups.

In terms of operational time and delivery time, Xu et al.[10] could not detect any time differences between sharp (mean, 11.7 min) and blunt (mean, 11.5 min) groups (P=.72) from the beginning of the surgery to the birth of neonate.

Ozcan et al. [9] discovered no significant operational differences in blunt group 42.3 ± 11.6 and sharp group 42 ± 12.1.

The study has shown that in group A 40% with Inadvertent extensions, 13% Inadvertent extension >2cm, 6.5 percent with extension to wide ligament, 4% with extension to uterine vessels, 1% with extension to cervix, 43.5% with tears during LSCS, 29% with a drop of hematocrit >10 percent, 20% with a drop of haemoglobin >2 g/d In this study we have found a 40 percent increase. Group B consisted of 26,5% with inadvertent extensions, 10,5% with inadvertent extension >2 cm, 4,5% with extension to broad ligament, 1% with extension to uterine vessels, 0.5% with extension to uterine vessels, 35% with LSCS tears, 28,5% with hematocrit drop >10%, 17,5% with haemoglobin drop > 2 g/dl. The difference between the two groups was substantial in terms of unintentional extensions, but the difference between both groups was minor in relation to other difficulties.

Jayasundara et al. [7] found the blunt and sharp approach based on problems. Of 133 women (42,1 percent) in the mild uterine expansion group, 56 were tears, compared to 40 in the sharp uterine expansion group out of 141 women (28.4 percent). This was a statistically significant difference. (p=0.02) Most of these rips had been smaller than 2cm (67.9 percent in blunt expansion and 60.0 percent in sharp expansion method). Extension into wide ligament occurred in blunt 9 (6.8 per cent) and sharp groups 7 (5.0 per cent), and expansion into uterine arteries occurred in blunt 6 (4.5 per cent) and in sharp group 2 (1.4 per cent), each with tears extending to cervix 1 in either procedure (0.8 percent Vs 0.7 percent). In subgroup analysis, it was discovered that 35 (38.5%) tears occurred during the Lower Segment of Elected Cesarean Section (LSCS) with blunt technique and 27 (24.1%) with a sharp method. Statistically significant was this result (p=0.03). In the emergency LSCS there were 21 tears (50 percent) in the blunt group, compared to 13 tears (44.8 percent). It was not statistically significant (p=0.67). while considering cervical dilatation of the LSCS The blunt group had 42

tears (36.5%) compared with 30 tears (24%) in the sharp group when the cervical dilation was less than 4 cm. Statistically, this difference was significant (p=0.03). Inadvertently, extensions in either group were not statistically significant when LSCS was conducted between 4cm-9cm and when completely dilated. The percentage decrease from preoperative value to 48 hours post-operative value in hemoglobin>2g/dl has not been noteworthy in any of the expansion methods. In comparison with sharp expansion groups, the requirement for blood transfusions was more pronounced (5). (2). The mean time required to repair a uterine incision was 14.9min in the blunt expansion group, compared to 13.7min in the sharp expansion group.

Xu et al.[10] observed a downward trend in haemoglobin levels that benefited the blunt dissection group, but was not statistically significant.

Ozcan et al. [9] have discovered no significant changes in the number of compresses intra-operated and other haemostatic uterine sutures across groups, pre-operative and post-operative hematocrit concentrations. Statistically significant differences between the two groups were seen between haemoglobin changes ($p<0.01$) and hematocrit changes ($p<0.01$) from pre-operational to post-operative values, blood loss estimations ($p<0.01$), and postoperative hematocrit levels ($p = 0.02$).

In this research, the mean postoperative pain of group A was 5.41 (± 1.09 SD) with range (4-7). The mean postoperative pain for Group B was 5,44 (± 1,06 SD) (4-7). There was no difference between the two groups for postoperative discomfort

In the blunt post-surgery average group of pain was 4.6 (±1.8 SD), while in the sharp post-surgery average group of pain was 5.1 (±1.8 SD). There was little difference between two groups investigated.

On the other hand, the current research has several limitations:

The sample was quite small and showed short term benefits, not long-term consequences such as healing of uterine incision, dehiscence, or uterine rupture. In addition, the surgical method was blinded and hence those who were responsible could not have been prejudiced with regard to the anticipated blood loss or incidents. The findings would be strengthened by the huge number of patients, additional investigation required.

Results have revealed that sharp uterine expansion when LSCS has a decreased probability of unintentional extension as well as extensions into wide ligaments and uterine arteries compared to the blunt expansion approach is related with this. Sharp uterine expansion technique may also be healed quicker than blunt uterine expansion technique, and with sharp uterine expansion the demand for blood transfusion is lower.

However, the findings of this research also revealed that no difference in the likelihood of intratum or postpartum haemorrhage was made during the low segment caesarean section between sharp uterine expansion and sharp uterine expansion approaches.

5. Conclusion

Sharp expansion of the uterine incision with LSCS is linked to a decreased risk, compared with the blunt expansion approach, of unintended extensions as well as extensions into wide ligament and uterine arteries. The findings of this research also found that the risk of intra-operative or post-partial haemorrhage does not vary between sharp uterine expansion and bland uterine expansion procedures in the lower caesarean segment. Sharp uterine expansion procedure may be healed quicker than blunt uterine expansion and with a sharp uterine expansion technique the demand for blood transfusion is lower.

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