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Original article

Single ceasarian section versus multiple ceasarian sections in magnitude of maternal and fetal complications: a case control study

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Abstract

There is a rise in repeated cesarean sections (CSs) with associated maternal & fetal complications. The study was to assess these risks at Beni- suef university hospital. 300 parturient women divided equally in 3 groups: control group, 2nd group with previous one CS, and the 3rd group with previous two or more cesarean deliveries. Pre-operative or intraoperative problems, estimated blood loss, longer Operation time, time to regaining bowel movement, hospital stay, intra and post-operative blood transfusion and doses of post CS analgesic were significantly increased among cases in the 3rd group. The number of neonates admitted to the NICU and neonatal deaths was higher while the mean Apgar score was significantly lower in the 3rd group. Strong correlation present between maternal & fetal complications with low Apgar score. Conclusion: Maternal and Neonatal outcomes were worse in mothers with previous two or more cesarean deliveries in comparison with other two groups.

1. Introduction:

Cesarean delivery is the most prevalent major surgical treatment for females globally, with a similar prevalence of 20–30% in both high- and low-income nations **[1]**.

The over use of CSs was prevalent in Egypt. This occurred due to financial incentives, physicians' desire for improved time management, ambiguous medical guidelines regarding CS indications, limited opportunities for junior doctors to perform vaginal deliveries, insufficient availability of analgesics in public hospitals, and a scarcity of anesthesiologists proficient in epidural anesthesia, which could alleviate pain during vaginal deliveries **[2]**.

The Nationwide Inpatient Sample indicated that at least one complication was associated with 76 out of 1000 cesarean deliveries (97 out of 1000 for first-time cesarean deliveries and 48 out of 1000 for repeat cesarean deliveries), including endometritis, hemorrhage, lower urinary tract injuries, thrombotic events, maternal mortality, anesthetic complications affecting the neonate, abnormal placentation, uterine rupture, scar complications, adhesions, infertility, and premature birth **[3-5]**.

The objective of this study was to examine the outcomes following multiple emergency cesarean deliveries at Beni-Suef University Hospital and to determine whether these outcomes, particularly maternal morbidity, vary with an increasing number of cesarean deliveries in comparison to a single cesarean delivery.

2. Patients and methods:

This study comprised 300 parturient women admitted to the casualties unit of department of obstetrics and gynecology at Beni- Suef university hospital and admitted for selective cesarean delivery during the period of research from August 2020 to August 2021. This study included 3 groups of pregnant women who had gestational age beyond 28 weeks: first group (control group) included 100 normal pregnant women with primary cesarean delivery, second group included 100 parturient women with previous one cesarean delivery, and the third group included 100 parturient women with previous two or more cesarean deliveries.

Ethical statement:

The study was approved by ethical committee, Beni-Suef University, faculty of medicine, Egypt. Written

consent was taken from all cases and controls.

Inclusion criteria includes all Pregnant women beyond 28 weeks of gestation presenting at the casualties unit of department of obstetrics and gynecology with (either one or higher) or without previous CS history. All elective CS, CS for prolonged labor and mothers with medical disorders, were excluded.

A detailed preoperative medical history, clinical examinations and investigations were done to all patients and controls. Intraoperative duration, blood loss and complications were measured. Post-operative recovery was recorded. Primary surgical outcomes with secondary maternal and neonatal outcomes were assessed.

Statistical Analysis

SPSS 23 analyzed the data. Shapiro-Wilks assessed variable normality. Numerical data were presented as mean ± SD, median, and range. Categorical data summarized as percentages. The two-tailed Student's t test and one-way ANOVA (analysis of variance) test, or quantitative data as appropriate, revealed a significant difference between groups. We utilized the chi-squared $\chi 2$ test to examine qualitative variables.

3. Results:

The present study indicated that pre-operative or intraoperative problems were significantly increased among cases in group three with history of more than one previous CS than other 2 groups (P<0.01). (Table 1)

Table (2) revealed that compared to control group, patients with previous history of repeated CS had significantly higher estimated blood loss, longer Operation time, time to regaining bowel movement, hospital stay and doses of post CS analgesic (P<0.001).

Table (3) showed that there were statistically significant increase in the incidence of intra and post-operative blood transfusion in group three than the other groups (P=0.001 and P=0.015; respectively).

Neonatal outcomes were worse in the third group in comparison with other two groups as: Table 4 showed a statistical significant decrease of neonatal birth weight in group 3 (2255±476.7 g) when compared with newborns of control group (P<0.001).

The number of neonates admitted to the NICU was higher in group 3 than that in other two groups but without significant difference (P=0.057). (Table 5)

There was increase in rate of neonatal death in third group (4%) than that in group 2 (1%) and control group (0%), but without significant difference (P=0.071) (Table 6).

The mean Apgar score was significantly lower for women with more than one prior CS compared with others (P<0.001). (Table 7)

Table 8 showed that gestational age at delivery, time of operation, estimated blood loss, neonatal birth weight, presence of either placental previa or placental accretia, and NICU admission were strongly correlated with a low Apgar score (P<0.05).

4. Discussion:

In developed countries, the steadily increasing rates of cesarean sections (CS) pose a threat to public health. According to **Mohamed et al. [6],** there is a notable variation in the prevalence of CS between these countries.

Recurrent complications and a rise in the number of CSs are noticeable trends. Few studies have examined the risks to mothers and their unborn children from having caesarean procedures several times, and the results have been mixed **[7]**.

The researchers at Egypt's Beni-Suef University Hospital set out the current research to compare the results of primary CSs to those of repeated selective CSs, as well as to identify any correlations between the two. They were especially interested in maternal morbidity and the frequency of CSs.

Women who have had a previous CS had a significantly higher risk of placenta previa and accreta, according to the present study (P≤0.001). Only 9% of cases involving many previous cesarean procedures result in adhesions to the peritoneum, which make reaching the abdominal cavity difficult. The incidence of intraperitoneal adhesions increased in correlation with the number of CSs performed, according to research by **Magne et al. [8]**.

Among patients who had four or more CSs, 45.7% had significant adhesions, compared to 13.9% in those who had three or less CSs.

Group three had much higher rates of bowel, omental, and bladder adhesions as a result of having had more than one CS **[9]**. Among women who had their third CS, the rate of placenta previa and accreta was much higher. As compared to the other groups, group 3 with repeated CSs had a higher prevalence of surgical complications, including injury to the bladder and intestines. Our results suggest that the incidence of adhesion increases with the number of CSs, which is in line with those of previous studies. It seems that the fourth CS is the pivotal barrier. Based on the number of CSs conducted, the prevalent agreement is that the frequency of adhesions lies between 46% and 65%. **[10]**.

The incidence of placenta previa increased with the frequency of cesarean procedures, according to **Kaplanoglu et al. [11]**. But even after the fourth C-section, the danger was still rather high.

Having a previous CS delivery is known to increase the likelihood of placenta previa. Following a single CS, the incidence rises to 2%, 4.1%, and 22%, respectively. The exact reason is yet unknown, however it could have something to do with the uterine vascular system being older. This increases the risk of placental intrusion into the lower segment by causing the placenta to enlarge and grow. More frequent caesarean procedures are associated with an increased risk of placental invasion abnormalities **[12]**.

In a study on intraoperative and postoperative complications, **Alshehri and colleagues [13]** found that 80 percent (316 cases) of women who had four or more CSs developed adhesions of different degrees. They hypothesised that a genetic propensity to adhesion development greatly affects the process, and that the likelihood of adhesions worsens with the frequency of cesarean deliveries and previous surgery on the pelvis or the intestines. In addition, the numbers of placenta accreta (15 cases, or 3.8% of the total) and cesarean hysterectomy (13 cases, or 3.3% of the total) were significantly higher in the group that had repeated CSs.

Improvements in obstetrician training and cesarean delivery techniques may explain why these complications are less common now.

The incidence of severe adhesions did not differ significantly among the three groups (one, two, and three or more previous cesarean deliveries), according to **Qublan and Tahat [14]**. This suggests that certain patients may be more prone to developing dense intraperitoneal adhesions, but the exact mechanisms by which this occurs are still unknown. Consistent with these results, **Stivanello et al. [15]** concluded that the incidence of severe intraperitoneal adhesions increases with the frequency of caesarean sections, which in turn complicates abdominal access and may cause organ damage, especially to the bladder.

In contrast to our results, study by **Qublan and Tahat [14]** showed that all three patient groups (those who had one, two, or three cesarean deliveries in the past) had similar issues.

Contrast this with the findings of Turkish studies, which found a rate of 5 (4.09%) cases of cesarean hysterectomy **[16]**. United States-based researchers

found that placenta accreta was nine to thirty times more common in women who had four or more caesarean procedures **[17]**. The second most common cause for an emergency peripartum hysterectomy is placenta accreta. Any woman who has had a previous cesarean surgery and has placenta previa is likely to have placenta accreta **[18]**. Whether or whether placenta previa is present, the presence of any uterine scar increases the likelihood of a hysterectomy. Inadequate decidualization and an increased incidence of placenta accreta are common causes of this **[11]**.

Our study found that patients who had had previous CSs were more likely to experience placenta previa and accreta, which was associated with an increased risk of intraoperative complications such as hemorrhage, longer operation duration, blood transfusions, hysterectomy, and postoperative analgesic needs (p value <0.001). Group 3 had a larger estimated blood loss than groups 1 and 2, which is in line with our results. This is because group 3 had a higher incidence of placenta previa and placenta accreta, which are important complications (p value = 0.001, statistically significant). Women who had more than two caesarean sections were more likely to need blood transfusions during surgery (17%) and thereafter (14%). Blood transfusions were more often requested, which is consistent with the increasing number of CSs performed due to placenta previa **[11]**.

Our results are in line with those of **Cook et al. [19]**, who found that placenta previa and placenta accreta are more common in women who have had more than three caesarean sections, which increases the risk of hemorrhage and blood transfusions compared to women who have had fewer caesarean sections.

There was a significant increase in the number of patients in the research group who had high blood loss during surgery (> 1000 mL) and required blood transfusions. Specifically, 24 patients (6.1%) and 22 patients (5.6%) met these criteria, according to **Alshehri and colleagues [13]**. This is considered small when put next to a Saudi study done in Riyadh, where 24 patients (8%) needed blood transfusions and 24 patients (8%) had blood loss during surgery (>1000 mL) [**16, 20]**.

Factors such as hemoglobin levels, blood volume, amount of blood loss, any accompanying disorders, and problems may influence a pregnant woman's ability to withstand blood loss after giving birth, which might explain

these variations. Additionally, transfusion methods rely on accurate evaluation of blood loss after CS delivery.

Patients with several recurrent CSs had significantly longer operation durations, longer hospital stays, and longer times to regain bowel function ($P < 0.001$). In addition, those who had many repeat SC had significantly longer durations ($P < 0.001$). Our results are in line with those of **Kandil et al. [9]**, who found that patients in group 3 had a considerably longer operating time compared to those in groups 1 and 2 who had one or two prior caesarean sections ($p < 0.001$). Group 3's hospital stay lasted 2.90, 1.29, and 1.27 days, respectively, which is significantly longer than groups 1 and 2 ($p < 0.001$).

There was no statistically significant difference in the duration of operation or postoperative hospital stay between women with a previous single cesarean delivery and those with three or more cesarean deliveries, according to **Althabe et al. [21]**. Similarly, **Sabourin et al. [22]** discovered that patients undergoing repeated caesarean births had operations that lasted longer. However, there was no discernible difference in the length of time that women spent in the hospital; both groups stayed for more than seven days. In addition, a study by **Alshehri and colleagues [13]** found that the total operating time for the group that had repeated CSs was 75.195±25.99 minutes, which was longer than the 21.2±6.1 minutes recorded in a study by **Ben-Ami et al., [23]**. Significant adhesions from many CSs made dissecting the abdominal wall and separating the bladder from the lower uterine region very difficult, which in turn increased the time of the surgery.

Our study also found that, thirteen women, or 13% of the higher CS group, required admission to the intensive care unit. In the groups that were subject to the study, no mothers died. The results were similar to those of **Kandil et al. [9]** (10%) and **Alshehri et al. [13]** (2.5%).

When comparing the neonates from different groups to those from group 3, there were substantial decrease in both neonatal birth weight and Apgar score ($P<0.001$). Although the differences were not statistically significant ($P=0.057$ for the number of neonates admitted to the NICU and 0.071 for the number of neonatal fatalities), group 3 had higher rates than the other two groups. There was a strong link between a low Apgar score and gestational age at delivery, operation time, estimated

blood loss, neonatal birth weight, presence of placental previa or accretia, and NICU stay (P<0.05). In line with our results, **Kandil et al. [9]** showed that the group who had numerous CSs had a considerably lower Apgar score. Increasing rates of caesarean sections were related with higher rates of maternal intensive care unit and neonatal intensive care unit admissions, according to **Alshehri et al. [13]**, demonstrating the dangers to mother and child health from having too many caesarean procedures. Findings from previous publications **[17]** are consistent with this.

As a result, complications such as scar dehiscence, adhesion formation, bladder injury, placental problems, and the risk of morbidity from CSs tend to increase in correlation with the frequency of CSs. There is no statistically significant difference in severe morbidity associated with multiple repeat CSs; however, there is a correlation between these procedures and increased risks of adhesions, increased need for blood transfusions, longer surgical duration, and longer hospital stays.

5. Conclusion:

Although there is no statistically significant difference in severe morbidity associated with numerous repeat CSs, there is a correlation between these procedures and higher risks of adhesion development, blood transfusion frequency, surgical time, and length of hospital admissions. It is important for the doctor and patient to be aware that multiple CSs increase the risk of maternal morbidity.

Conflict of interest:

None

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dilatation and evacuation in patients with previous multiple cesarean sections. American journal of obstetrics and gynecology. 2009;201(2):154-e1.

Tables:

Table (1): Comparison between the three groups regarding the preoperative and intraoperative problems:

Type of preoperative problem		Control group (Noprevious cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
Placenta previa	N	2	4	16	<0.001
	%	2%	4%	16%	
Placenta accreta	N	0	1	9	0.001
	%	0%	1%	9%	
Scar dehesience	N	0	0	9	<0.001
	%	0%	0%	9%	
Omental adhesion	N	1	3	29	<0.001
	%	1%	3%	29%	
Bowel adhesion		1	4	10	0.012
		1%	4%	10%	
Bladder adhesiion		0	4	28	<0.001
		0%	4%	28%	

Table (2): Comparison between the three groups regarding the estimated blood loss, and time of operation, time to regain bowel movement, and duration of hospital stay and dose of analgesic used after CS:

	Control group (No previous cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
Estimated blood loss	496.59±82.09	567.4±114.7	780±166.3	<0.001**
Time of operation (min)	40.36±4.87	45.1±6.38	59.35 ± 7.12	<0.001**.
Time to regain bowel movement (hours)	6.42±1.1	6.57±1.1	7.05 ± 1.5	0.001**
Duration of hospital stay (days)	1.18±0.39	1.23±0.4	1.72 ± 1.17	<0.001**
Dose of analgesic used after CS	2.67±0.71	3.5±0.81	4.33±2.6	<0.001**.

Table (3): Maternal Complications of cesarean delivery in different studied groups:

		Control group (No previous cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
Intraoperative blood transfusion	N	3	6	22	<0.001***
	%	3%	6%	22%	
Post-operative blood transfusion	N	2	4	11	0.015**
	%	2%	4%	11%	
Uterine laceration	N	0	2	0	0.134
	%	0%	2%	0%	
Uterine hematoma	N	7	6	8	0.858
	%	7%	6%	8%	
Uterine atony	N	2	2	5	0.357
	%	2%	2%	5%	
Hysterectomy	N	0	0	10	<0.001***
	%	0%	0%	10%	
Bowel injury	N	0	0	3	0.048*
	%	0%	0%	3%	
Bladder injury	N	0	0	1	0.367
	%	0%	0%	1%	
Vascular injury	N	0	0	2	0.134
	%	0%	0%	2%	
ICU admission	N	0	0	13	<0.001***
	%	0%	0%	13%	

Table 4 : Distribution of birth weight among both studied groups.

Birth Weight (gm)	Control group (No previous cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
1000-1499	0(0%)	0(0%)	7(7%)	
1500-2499	4(4%)	21(21%)	58(58%)	<0.001***
≥2500	96(96%)	79(79%)	35(35%)	
Mean ± SD	3231.7±389	2962.55±550.7	2255±476.7	<0.001***

1. - P-value>0.05 means non-significant, p-value<0.05 means significant, p value<0.001 means highly significant
2. - - Mean ± SD = Mean ± standard deviation

Table 5: Frequencies of NICU in all studied groups

Admitting to the NICU		Control group (No previous cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
No	N	93	91	83	0.057
	%	93%	91%	83%	
Yes	N	7	9	17	
	%	7%	9%	17%	
Total	N	100	100	100	
	%	100%	100%	100%	

Table (6): Neonatal death in all studied cases.

Neonatal death		Control group (No previous CS)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
No	N	100	99	96	0.071
	%	100%	99%	96%	
Yes	N	0	1	4	
	%	0%	1%	4%	
Total	N	100	100	100	
	%	100%	100%	100%	

**: P ≤0.01

Table (7): Comparison between all studied groups regarding Apgar score

Apgar score	Control group (No previous cesarean section)	Group 2 (one prior CS)	Group 3 (more than one prior CS)	P-Value
0-3	0(0%)	0(0%)	3(3%)	0.003**
4-6	17(17%)	18(18%)	33(33%)	
7-10	83(83%)	82(82%)	64(64%)	
Mean ± SD	7.84 ± 1.3	7.77± 1.29	6.94± 1.7	<0.001***

-**: P ≤0.01, ***: P ≤ 0.001.

Table 8: Correlation between Apgar score and other studied parameters

Parameters	Apgar score	
	r	P-value
Gestational age at delivery	0.142*	0.014
Time of operation (mins)	-0.234**	<0.001
Estimated blood loss (ml)	-0.298**	<0.001
Neonatal birth weight	0.283**	<0.001
Number of prior CS	0.074	0.462
Anesthesia type	0.019	0.748
Placental previa	-0.168**	0.004
Placental accretia	-0.144*	0.012
NICU admission	-0.376**	<0.001