Original Research Article

Study of maternal and fetal outcome in previous caesarean section

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Abstract

Objective: Cesarean section is a lifesaving procedure for the mother and the fetus that is firmly ensconced in obstetric practice. This study was conducted to determine the effects of repeated caesarean sections on maternal and fetal outcome. **Methods:** It is a prospective observational study which was conducted at a tertiary centre over a period of 12 months with a sample size of 1000 patients which included 500 patients with previous history of LSCS and 500 patients with previous vaginal deliveries. Cases were matched for age and parity. Intra partum, postpartum complications, abnormal placentation, maternal and perinatal outcomes were studied. **Results:** In the study group, 28 patients had placenta previa and in the control group 5 patients had placenta previa. Among the study group, uterine dehiscence was observed in 24% of patients, intraperitoneal adhesions in 13.60%, bladder injury in 7.40%, classical scar was given in 1.6%, and uterine artery ligation was done in 3.2% of patients. PPH was seen in 5% of patients, 5.8% patients received blood transfusion in the study group, 2.2% patients were hysterectomized, 7.6% patients had wound sepsis and 0.8% patients required ICU care. In patients with previous vaginal deliveries, PPH was observed in 3% cases, blood transfusion was given in 3.4% patients and none of the patients underwent emergency obstetric hysterectomy. Regarding neonatal outcome, a statistical significant difference was observed with respect to mean birth weight, neonatal resuscitation required and NICU admission. **Conclusion:** This study shows that the maternal and perinatal morbidity and mortality increases with previous caesarean sections.

Key Word: caesarean section.

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INTRODUCTION

Cesarean section is a lifesaving procedure for the mother and the fetus thatis firmly ensconced in obstetric practice. Today, it is one of the most commonly performed surgical procedures. The advances in the medical field like the safety of lower uterine segment technique, the evolution of anaesthetic proficiency, availability of blood and blood products, powerful and effective antibiotics, improvement in surgical techniques and skills, advances in neonatal intensive care, have characterized the evolution of this procedure in 21st century. In the last one decade, the increasing number of cesarean sections (up to 30%) and the decreasing one of vaginal births after cesarean section (less than 10%) emphasize the problem of multiple cesarean deliveries and their impact on maternal morbidity (Marshall NE *et al.*, 2011; Hemilton BE *et al.*, 2012). In 1985, the WHO stated: "There is no justification for any region to have CS rates higher than 10-15%." A figure below 5% implies that a substantial portion of women don't have access to surgical obstetric care; on the other hand a rate more than 15% indicates overutilization of the procedure for other than life saving reasons(WHO,1985; WHO,1993). With the increase in primary cesarean section, there is increase in repeat cesarean section. In India, CS rate ranges from 8.48 to 41.9% (Chhabra S and Arora G, 2006). The secondary increase in repeat cesarean section delivery has been associated with increase in the complications particularly those due to abnormal placentation (Poonia S *et al.*, 2016). There are several significant maternal complications such as bladder injury,

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fistula formation, intra operative blood loss, uterine and internal iliac artery ligation, obstetric hysterectomies, surgical site infections, septicemia, coagulopathies, requirement of neonatal resuscitation and NICU admissions and most of them increased as a trend with increasing number of repeated operations. Half of cesarean hysterectomies are performed in women with one or more prior cesarean section (Hernandez JS *et al.*, 2013). Besides that, as early or immediate complications, more difficult to quantify are late risks for bowel obstructions and pelvic pain from peritoneal adhesive disease, both of which increase with each successive cesarean section (Mankuta D *et al.*, 2013). Many studies have reported on postoperative infectious morbidity in patients undergoing multiple repeat cesarean section such as urinary tract infection, wound infection and endometritis (Rashid M and Rashid RS, 2004; Makoha FW *et al.*, 2004; Uygur D *et al.*, 2005). It has been reported that risk of postoperative infection is proportional to volume of blood loss during cesarean section, as high blood loss increases the tissue damage from prolonged retraction and manipulation and more suture application (Tran TS *et al.*, 2000). A considerable obstetrical hazard of repeated cesarean section is the increased incidence of antepartum and postpartum uterine scar rupture with subsequent increase in both maternal and fetal morbidity and mortality. Another preoperative risk of multiple repeat cesarean sections threatening the life of both mother and fetus is placenta previa, especially when placentation is abnormally adherent. The incidence of placenta previa and placental adherence including placenta accreta and increta is significantly higher among women who have 3 or more cesarean deliveries compared to those with lower number of cesarean section (Qublan HS and Tahat Y, 2006). The present study was done to assess the maternal and fetal outcomes and complications in cases of previous caesarean sections.

METHODS

This was a prospective, comparative, observational and cross-sectional study conducted in the Post Graduate Department of Gynaecology and Obstetrics; Shri Maharaja Gulab Singh Hospital; an associated Hospital of Govt. Medical College Jammu. This hospital based study was carried out for a period of one year i.e. Nov 2016 – Oct 2017. Women admitted in SMGS Hospital after 28 weeks period of gestation who fulfilled the inclusion criteria were enrolled after briefing them about the purpose of study. Cases were selected randomly, using random sampling method.

500 patients with history of previous LSCS were selected for study purpose and equal number of patients with history of previous vaginal delivery were taken as controls.

Exclusion Criteria

- Previous history of classical caesarean section.
- History of previous surgery on uterus(Myomectomy).
- History of abortions or MTP.
- Multifetal pregnancy.
- History of placenta previa in previous pregnancy.
- Patients with other medical disorders.

The data was analyzed using computer software Microsoft Excel and SPSS version 21.0 for Windows. Data reported as mean ± standard deviation and proportions as deemed appropriate for quantitative and qualitative variables respectively. The statistical difference in mean value between two groups was tested using unpaired ‘t’ test. The qualitative data was compared using Chi-square test. A p-value of <0.05 was considered as statistically significant. All p-values reported were two-tailed.

RESULTS

Distribution of patients in both, Cases and Controls, were similar. Mean age of patients in Cases was 27.53 years, while that of Controls was 27.36 years, the difference between the two being statistically not significant ($p=0.53$). Also, the difference between the two groups with respect to parity was not significant($p=0.43$). Incidence of placenta previa in cases was 5.60%, while in controls it was 1%. In our study, increased incidence of adherent placenta was found in the study group as compared to control group. 9(1.8%) cases of adherent placenta was found in the study group as compared to control group where none of the adherent placenta were seen. Among the study group, uterine dehiscence was observed in 24% of patients, intraperitoneal adhesions in 13.60%, bladder injury in 7.40%, classical scar was given in 1.6%, and uterine artery ligation was done in 3.2% of patients. PPH was seen in 5% of patients, 5.8% patients received blood transfusion in the study group, 2.2% patients were hysterectomized, 7.6% patients had wound sepsis and 0.8% patients required ICU care.

Table 1: Operative details among the study group

Complications	Cases(n=500)
Type of CS	Elective-187(37.4%) Emergency-313(62.6%)
Anaesthesia	Spinal-476(95.2%) General-24(4.8%)
Skin incision	Pfannensteil-360(72%) Midline-140(28%)
Uterine dehiscence	112(24%)
Intraperitoneal adhesions	68(13.60%)
Bladder injury	37(7.40%)
Bowel injury	Nil
Uterine rupture	2(0.40%)
Lower segment scar	492(98.4%)
Classical scar	8(1.6%)
Uterine artery ligation	16(3.2%)

Table 2: Comparison of adverse maternal outcome in study and control group

Adverse outcome	Study group	Control group
PPH	25(5%)	15(3%)
Blood transfusion	29(5.8%)	17(3.4%)
ICU admission	4(0.8%)	Nil
Hysterectomy	11(2.2%)	Nil
Wound sepsis	38(7.6%)	2(0.4%)
Maternal death	1(0.2%)	Nil

Table 3: Group comparison of Apgar score at 5 minutes in cases and controls

Apgar score at 5 minutes	Cases (n=500) No. (%)	Controls (n=500) No. (%)	Statistical inference (Chi-square test)
<7	8 (1.60)	5 (1.00)	χ^2=0.31; p=0.57;
≥7	492 (98.40)	495 (99.00)	Not significant
Total	**500**	**500**	

Apgar score <8 was more in Cases (1.60%) as compared to Controls (1%), the difference, however, was not significant (p=0.57).

Table 4: Group comparison of neonate birth weight in cases and controls

Neonate birth weight (kg)	Cases (n=500) No. (%)	Controls (n=500) No. (%)	Statistical inference (Chi-square test)
<2.5 (LBW)	70 (14.00)	62 (12.40)	χ^2=0.42; p=0.51; Not significant
≥2.5 (normal weight)	430 (86.00)	438 (87.60)	
Total	500	500	
Mean birth weight ± Standard deviation	2.81 ± 0.45	2.87 ± 0.51	
Statistical inference (unpaired 't' test)	t=1.97; p=0.04; Significant		

Table 5: Comparison of patients in cases and controls according to adverse fetal outcome

Adverse fetal outcome	Cases (n=500) No. (%)	Controls (n=500) No. (%)	Statistical inference (Chi-square test)
Neonatal resuscitation	60 (12.00)	12 (2.40)	χ^2=33.06; p<0.0001; HS
NICU admission	88 (17.60)	19 (3.80)	χ^2=48.39; p<0.0001; HS
Neonatal death	10 (2.00)	5 (1.00)	χ^2=1.08; p=0.29; NS

HS – Highly significant; NS – Not significant

On comparing neonatal outcomes, Apgar score <8 was more in Cases (1.60%) as compared to Controls (1%), the difference, however, was not significant (p=0.57). In Cases, there were 14% neonates with low birth weight and 86% neonates with normal weight, while in Controls, there were 12.40% neonates with low birth weight and 87.60% neonates with normal weight. The difference between the two groups was statistically not significant (p=0.51).

However, mean neonate birth weight was significantly less in Cases as compared to Controls (2.81 vs 2.87 kg; p=0.04).Neonatal resuscitation was observed significantly more in Cases as compared to Controls (12% vs 2.40%; p<0.0001). Similarly, NICU admission was more in Cases as compared to Controls (88 vs 19; p<0.0001). However, neonatal deaths were comparable in both the groups (p=0.29).

DISCUSSION

Antepartum haemorrhage is one of the most challenging obstetric complications encountered in a pregnant women and is one of the leading causes of vaginal bleeding in 2nd and 3rd trimester. It is associated with increased risks of maternal and infant morbidity and mortality as such but when associated with prior CS deliveries, the risk increases many fold. Hence, given the increased incidence of placenta previa following previous caesarean deliveries, must be acknowledged as a real concern by obstetricians. With the rising CS delivery rates that we have been experiencing over the last few decades, there is notable increase in maternal morbidity and mortality. We observed that our patients in both the groups, group A and group B belonged to the same age group, with a minor difference with no statistical significance (p value 0.53). Also, when statistically evaluated no significant difference was observed with respect to parity in both the groups(p value=0.43).In our study the incidence of placenta previa in the study group (group A) was 5.60% in comparison to the control group (group B) where the incidence was only 1% which was quite comparable with the study by Lydon *et al*.(1997) who found incidence of placenta previa at second birth with prior caesarean first birth to be 2.5% while it was 1.22% in Nielson *et al*.(1989) study. Swetha B *et al*.(2016) found 6% incidence of placenta previa in patients with previous LSCS as compared to 1.75% in patients with previous vaginal deliveries.Itedal AMA *et al*.(2015) found an incidence of 18% in patients with previous one or more LSCS as compared to 10.25% in patients with previous vaginal deliveries. In other study conducted by Nankali A *et al*.(2014), 3.63%of placenta previa was found in patients with previous LSCS. In a Study by Uzma S *et al*.(2015) the distribution of placental localisation showed that the frequency of placenta previa in the study sample was noted to be 27.5% in patient who had caesarean section deliveries in previous pregnancies. The studies didn't include any control group in their study. Singh S *et al*.(2016) found incidence of 3% among patients with previous LSCS. 9 patients among 28 patients with placenta previa and previous scar had adherent placenta. Among these 9 patients who had adherent placenta, 4 had placenta accreta, 3 had placenta increta and 2 had placenta percreta. No adherent placenta was found in the control group. Out of these 9 patients with adherent placenta in the study group, 5 were operated in an elective operation theatre and 4 were operated as emergency cases. Among the 2 patients with placenta percreta, obstetric hysterectomy was performed in both the patients. One of the patient had postpartum haemorrhage on the operating table and experienced haemorrhagic shock. She was transfused with 6 units of packed RBC's and 8 units of fresh frozen plasma but the patient died due to cardiac arrest. In the other patient with placenta percreta, hysterectomy was performed, patient had bladder injury which was repaired and Foleys catheter was kept for 21 days. This patient made uneventful recovery in the postoperative period and was discharged after removing the catheter on 21st postoperative day. In patients with placenta increta, which was observed in 3 patients with previous scar, hysterectomy was performed in all of them. 2 of them had PPH on table, one of them was transfused with 3 units of PCV's and 4 units of FFP's and other was transfused with 5 units of packed cells and 4 units of FFP's. One of them had bladder injury which was repaired. One of them needed ICU care and was shifted to the ward after 5 days. All of the patients recovered uneventfully. It was also observed that all of the patients with placenta accreta required hysterectomy. 3 out of 4 patients with placenta accreta had PPH during the surgery and each of them was transfused with 4 units of packed cells and 4 units of FFP's. Bladder injury occurred in 3 of the patients which required prolonged catheterisation for 21 days. Two of these patients were shifted to an ICU for hemodynamic monitoring. One of them had wound sepsis and required secondary resuturing. All of these patients were discharged after recovery. Regarding operative details, we in our study noticed that more of our patients i.e. 313(62.6%) were operated as emergency cases as compared to 187(37.4%) who were operated as elective cases. Since, it is prerogative of the anaesthetist to decide about the type of anaesthesia to be given to our patient, we observed that 476(95.2%) patients in the study group received spinal anesthesia as compared to 24(4.8%) patients who received general anaesthesia. This also turned out to be statistically highly significant. Also, we made a note of the type of incision given which turned out to be 72 % pfannensteil and 28 % midline infra umbilical incision. While observing the type of incision given on the uterus, we observed that

among all the patients in the control group who underwent CS were given lower segment scar whereas among 28 placenta previa patients in the study group 8(28.57%) patients received a classical scar. In terms of morbidities, we observed in our study group, 112(22.4%) patients had uterine dehiscence, 68(13.60%) had intraperitoneal adhesions, we had 37(7.40%) patients who had bladder injury and none of the patients had bowel injury. When we compared uterine dehiscence in our patients with other studies, we observed that there were increased percentage of patients having scar dehiscence i.e., 22.4% as compared to a study by Poonia S *et al.*(2016) who found 6.6% uterine dehiscence in previous 2 or more LSCS. In a study conducted by Nisenbalt *et al.*(2006) 1.1% uterine dehiscence was observed whereas 2% uterine dehiscence was observed in a study by Cook *et al.*(2013) Rashid *et al.*(2004) found uterine dehiscence of 1% and uterine rupture of 2% in patients with previous LSCS. Intraperitoneal adhesions were found in 13.60% of patients with previous LSCS whereas study by Poonia S *et al.*(2016) found abdominal wall adhesions in 33.33% of patients. As per Tulandi*et al.*(2009) 24.45% had adhesions after 2 CS and 42.8% had adhesions after 3 CS. As per Nisenbalt V *et al.*(2006) 34.6% had adhesions. Parikh *et al.*(1964) found excess adhesions in 36 % of patients for an LSCS in his study. The most frequent adhesions seen were adhesions of the anterior abdominal wall, bladder and uterus with the parietal peritoneum. The risk factors for the adhesion formation are individual predisposition, presence of blood in abdominal cavity, tissue ischemia, infection, excessive use of surgical instruments and direct manipulation of abdominal organs(Nisenbalt V *et al.*(2006). Dense adhesions may lead to complications like excessive bleeding, organ injury, difficulty and delay in delivering the baby, long term complications like chronic pelvic pain. In our study,out of 500 patients with previous LSCS, bladder injury was observed in 7.4% of cases. In a study by Anjum Ara *et al.*(2017) only 3.33% of patient were found to have bladder injury. 6 out of 9(66.66%) patients with adherent placenta in our study had bladder injury. However, rate of bladder injury was found to be 15% by Aggarwal Richa *et al.*(2012) and Nighat Sultana *et al.*(2011) in patients with placenta accreta with previous LSCS. When we compared the adverse maternal outcome in the study and control group, we found that 5% patients in the study group and 3% patients in the control group had PPH. The requirement of blood transfusion was 5.8% in the scarred group and 3.4% in the patients without previous scar. Among 28 patients with placenta previa and previous LSCS, 9 patients (32.1%) required massive blood transfusion. About 2.4% patients (12 out of 500) required more than 4 transfusions in the study group. A study by Silver *et al.*(2006) found 2.3% rate of transfusions in patients with previous LSCS and about 0.75% patients required more than 4 transfusions whereas a study by Choudhary *et al.*(2015) found that 7.5% patients among all patients with previous LSCS needed blood transfusion. In our study, uterine artery ligation was done in 3.2% of patients with previous LSCS, whereas in a study by Poonia S *et al.*(2016) uterine artery ligation was done in 15 % of patients. In a study by Mathuriya G *et al.*(2013) uterine artery ligation was done in 20% of scarred uterus. None of the patients who had LSCS in the control group underwent uterine artery ligation. 4(0.8%) patients in the previous scar group needed an ICU care while as no one amonst the control group was shifted to an ICU. The rate was 5% in a study by Poonia*et al.*(2016) 0.90% patients were admitted to an ICU by the study by Silver *et al.*(2006). Another observation of importance that was noted was that there was no patient in the control group that required hysterectomy whereas 11(2.2%) patients in the study group needed emergency hysterectomy. When compared with other studies, 5% patients underwent hysterectomy in a study by Poonia*et al.*(2016). As per Rashid M *et al.*(2004) 1%, Nisenbalt V *et al.*(2006) 1.1% and Silver M *et al.*(2006) 0.90% required obstetric hysterectomy. Wound sepsis was an alarming situation observed in our patients when we observed 38(7.6%) patients did developed wound sepsis in comparison to 2 patients in the control group. Among 38 patients with wound sepsis in the study group, 24 of them required secondary suturing and rest 14 of them healed by secondary intention. Silver *et al.*(2006) in their study found surgical site infection rate of 1.23%. In a study by Sobande A *et al.*(2006) 3.4% patients had surgical site infections. Poonia S *et al.*(2016) found the rate of 22% wound sepsis in her study. When the fetal outcome in these patients was observed, we found that 393(78.60%) patients had gestational age between 37-40 weeks in the study group as compared to 413(82.60%) patients in the control group. 92(18.40%) patients had gestational age between 33-36 weeks and 15(3.0%) patients had gestational age 28-32 weeks in the study group. Amongst the control group, 79(15.80%) had gestational age between 33-36 weeks and 8(1.6%) had gestational age between 28- 32 weeks. The difference proved to be statistically highly significant and the explanation could be that patients with APH have higher tendency to go to preterm labour or sometimes we need to terminate the pregnancy for obvious indications. Regarding apgar score, no significant difference was found in our study, as 98.40% and 99% of patients had A/S more than 7 in the study and control group respectively. A/S< 7 was observed in 1.60% and 1% of patients in the study and control group respectively. In our study, while comparing the mean birth weight in the two groups, a statistically significant difference was observed where the mean birth

weight in the study group was 2.81±0.45kg and 2.87±0.51kg in the control group(p value=0.04). The mean birth weight in the cases was similar to the birth weights by Sobande A *et al.*(2006) and Rashid M *et al.*(2004) where the mean birth weights were 2.97 kg and 2.96 kg respectively. While observing the adverse neonatal outcome in both the groups, it was observed after statistical evaluation that the need for neonatal resuscitation between the two groups when compared was highly significant. It was seen that 60(12%) neonates in the study and 12(2.40%) neonates in the control group required resuscitation. Even NICU admissions were observed more in the neonates from the study group i.e. 88(17.60%) and 19(3.80) in the control group. The difference between the two was statistically highly significant(p value<.0001) whereas the difference between neonatal death rates in the two groups was comparable which included 2% neonatal deaths in the study group and 1% in the control group. While comparing our results with other studies we found that Pooniaet *al.*(2016) in their study in patients with previous 2 or more CS found neonatal resuscitation rates of 15% and 20% of neonates in their study required neonatal intensive care unit admissions whereas 5% had neonatal deaths. In study by Rashid *et al.*(2004) 4% neonates required resuscitation and 20% NICU admission and neonatal death rate was 1%. Overall, we did observe that the adversities in the form of fetal outcome were more in the study group than the control group. The reason could be multifold, as there were more of preterm, anemic patients, placenta previa in the study group.

SUMMARY

CS rates are increasing worldwide and an increase in the longer term complications of LSCS should be anticipated. The presumed long and short term safety of CS is probably one of the factors underlying the growth rate of CS. There is a need for better understanding of the relative risks associated with vaginal and CS birth to support decision making by both mothers and clinicians. Care must be exercised to avoid complications in subsequent pregnancies. Our study showed that the prevalence of placenta previa increases with the increasing number of the previous LSCS and is associated with adverse maternal outcome. This study provides a reason to decrease the elective CS rates and to encourage vaginal birth after CS. Increasing incidence of emergency LSCS may be decreased by encouraging all antenatal women to attend ANC clinics so that there with high risk factors can be identified earlier for better monitoring of labour and elective LSCS, if needed. Also, women should be counselled about the maternal risks and benefits of the planned vaginal birth after CS and elective repeat LSCS when deciding the mode of birth. Women must be explained about the related risks of multiple repeat CS and tubal ligation needs to be encouraged. Women undergoing repeat CS with placenta previa should be counselled about the associated risks of excess blood loss, need for blood transfusion and possibility of caesarean hysterectomy in case of life threatening haemorrhage.

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