

Safety of High Order Caesarean Section

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ABSTRACT

Background: Increase in caesarean section rate is global phenomena. Repeat elective Caesarean section is a major cause of this rise. Eastern culture encourages large family size. But high order caesareans (4th or above) Puts mother at higher risk of intraoperative and postoperative complications.

Objectives: Our objective was investigate whether women under going high order caesaren section (4th or above) are more at risk as compare to those who under go 2nd and 3rd caesarean section.

Methods: In a prospective comparative trial, the women who underwent their 4th or above caesarean section were included in study group, while control group comprised of every next woman who was to go through her 2nd or 3rd CS of same category (i.e. elective or emergency caesarean section). Fetomaternal outcomes were compared between two groups.

Results: Out of 48 study women 4th caesarean section was done in 43 and 5th caesarean section was performed in 5 cases. Severe intra peritoneal adhesions were significantly higher in study group (P< 0.012). Cranial attachment of bladder and thin membranes lower segment were more frequent in study group. Incidence of placenta previa was significantly higher in cases. Four patients in study group manifested complete placenta accreta ending up into caesarean hysterectomy while none of the controls exhibited complete placenta accreta. Neonatal outcome in both groups was fairly good without any mortality.

Discussion: Caesarean section rate should be decreased as most common indication of repeat caesarean section is previous caesarean section. Decision of primary caesarean section is important, trial of scar in singleton pregnancies should be encouraged, labour should be properly supervised and injudicious use of oxytocin should be discouraged. Women should be motivated to reduce family size to 2 or 3 childrens with history of repeat caesarean section and thoroughly educated about increased risk of high order caesareans.

Conclusions: Our study has supported the view that maternal risks are increased in higher order CS but successful delivery is possible if women are managed in tertiary care hospital.

Key words: Repeat Caesarean Section, High-order Caesarean Section, CS, Fetomaternal Morbidity.

INTRODUCTION

Caesarean section is the major surgery and increases the short and long term adverse effect for mother and baby¹. Increase in caesarean section rate is a global phenomena. Although rates vary internationally, about 15-20% pregnancies are delivered abdominally². Performance of elective repeat caesarean section is a main reason for this rise in caesarean rates, together with fetal distress, dystocia and breech presentation. In UK caesarean section rate in women with a previous caesarean is 67% as compare to 34% in Primigravida women according to results of national sentinel caesarean section audit³. In industrialized nations women are offered sterilization at 3rd caesarean section and in only exceptional cases they are given the further chance. In eastern cultures however large families

are encouraged and any attempt to limit the caesarean section to 2-3 is likely to be rejected⁴. Although, caesarean section is now considered safer because of innovations in surgical/anaesthesia techniques and easy availability of blood, yet high order caesarean sections are more likely to cause complications. A major obstetric hazard of repeat caesarean section is the increased risk of uterine scar rupture during pregnancy resulting in high fetal and maternal morbidity and mortality⁵. The risk of placenta previa and placenta accreta in subsequent pregnancies is also increased in this subgroup of women. Previous studies have found a strong relationship between previous caesarean delivery and placenta praevia with this attendant massive obstetrical haemorrhage and need for emergency hysterectomies which further increases maternal morbidity and mortality⁶.

A History of caesarean section increases the risk of subsequent intra abdominal entry because of adhesions, surgical trauma to bladder has been reported upto 1.6%².

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No one has yet recommended a definite upper limit for the number of caesarean sections to be performed on an individual woman. Individual case histories of women undergoing up to 13 caesarean sections have been reported.⁴ This study was planned to investigate whether women undergoing high order caesarean section (4th or above) are more at risk as compared to those undergoing 2nd or 3rd caesarean section. And to find out the maternal mortality and morbidity and any effect on fetal outcome.

METHODS

It was a prospective study conducted in the department of Obstetrics & Gynaecology, Shalamar Hospital, Lahore, during the period of one year from 1st June 2008 through 31st May 2009. All the women who were to undergo their 4th or above caesarean section were included in study group, while control group comprised of every next woman who was to go through her 2nd or 3rd CS of same category (i.e. elective or emergency caesarean section). Patients undergoing hysterotomy (caesarean delivery before 28 weeks of gestation) were excluded from the study. A proforma was filled which included the following information:

- a) Demographic and clinical features including maternal age, gestational age (Weeks) mode of operation whether elective or emergency, type of anaesthesia used and whether tubal ligation was performed at the time of caesarean.
- b) Intra operative and post operative course which included severity of adhesions, condition of isthmic myometrium, estimated blood loss, need for blood transfusion, incidence of placental abnormalities, rupture of scar, incidence of caesarean hysterectomy, bladder or bowel injury, admission to ICU, incidence of wound infection, urinary tract infections, chest infections, pyrexia, and maternal mortality were noted.

The severity of pelvic adhesions were subjectively graded by operating surgeon according to American fertility society classification of adnexal adhesions⁷. Filmy / avascular adhesions involving between 1% and 25% of total area are classed as mild, dense / vascular involving 25-50% of pelvic area are moderate and cohesive adhesions involving > 50% of area severe. Different visual estimates of the condition of the isthmic myometrium were used as employed by Juntunen et al 2004⁶,

- a) Membranous or lacerated isthmic layer (Fenestration), through which fetal membranes could be seen.
- a) Non transparent but very thin layer of muscular fiber with an estimated thickness < 2mm.

- b) Normal or almost normal layer with clearly recognizable muscular tissue.

Complete placenta accreta was diagnosed when no plane of cleavage between placenta and the low uterine segment was found on attempting to remove the placenta. Partial placenta accreta was diagnosed when a part of placenta have to be removed piece meal or having bleeding from part of implantation site⁸.

In our department we try to adhere to the following protocol for pregnancies after multiple repeat caesarean sections.

Women are encouraged to make regular antenatal visits, antenatal Ultra sonography is used routinely for dating pregnancy, monitoring of fetal growth and surveillance. At third trimester placental localization is carried out and if placenta praevia of major degree is recognized Doppler ultrasonography is requested to rule out placenta accreta. Elective caesarean section is performed between 37-38 weeks, preterm emergency caesarean sections are acceptable in the event of preterm labour or severe pregnancy induced hypertension. Regional anesthesia is encouraged.

In general, pfannenstiell incision is used to open abdominal gravity, longitudinal incision is made if previous surgeries were carried out through longitudinal incision or patient's previous record show previous severe pelvic adhesions.

Complete placenta accreta is treated by hysterectomy, conservative measures are employed for partial placenta accreta such as packing or compressions sutures. Hysterectomy is carried out if conservative measurements fail to control the haemorrhage.

Parenteral antibiotic is given at cord clamping and 8 hourly thereafter for 24 hours; followed by oral antibiotics for 5 days. High risk patients for DVT are encouraged early mobilization and good hydration. Ted stockings as well as low molecular weight heparin is administered in patients with history of previous DVT.

Perinatal features including birth weight, number below 10 percentile, Apgar score at 5 min, preterm below 37 wks of gestation and admission into NICU were noted.

Statistical analysis was carried out using SPSS 12 (Student Version). Discrete variables were analysed using Pearson Chi square method and continuous variables using Mann Whitney Method. Statistical significance was taken as $p < 0.05$.

RESULTS

During one year study period 48 patients underwent more than 3 CS. Out of these fourth CS was done in

43 and fifth CS was done in 5 cases. In control group, 21 patients had their 2nd CS and 27 underwent 3rd CS. The demographic and clinical characteristics of both groups are shown in Table-I. Both groups were comparable with regards to mean maternal age, mean gestational age, mode of CS and choice of anaesthesia. In the study group, four patients underwent caesarean section prior to their scheduled time; 2 due to onset of labour and 2 because of preeclampsia. Among the control group, emergency caesarean section was performed in 5 cases; 2 due to pre labour rupture of membranes, 2 due to onset of labour, and one for abruptio placentae with non assuring fetal heart tracing. Significantly more patients chose to have tubal ligation in study group as compared to controls (44 vs15 $p=0.000$).

Table II summarises intraoperative complications in two groups. The intra-operative finding of membranous isthmic myometrium was more common in study group; however, only one patient presented with complete uterine rupture. She went into labour before her schedule surgery and had to be shifted to hospital in emergency. Both mother and baby survived. Severe peritoneal adhesions were encountered significantly more frequently in our study patients as compared to the controls (52.1% vs. 27.1% $p=0.01$). The further evaluation of this subset of patients indicated that presence of severe peritoneal adhesions was correlated to the increasing number of CS (Fig I). Severe adhesions were present in 14.3% of cases after one CS and the incidence rose to 75% at 5th CS.

The presence of placenta previa was significantly high in study group as compared to control (25% vs. 6.3%; $p=0.01$). Adherent placenta was encountered with equal frequency in both groups, but the prevalence of completely adherent placenta previa was higher in study group (Table II). The frequency of bladder injury, blood loss and need for transfusion was comparable in both groups. Three cases in study group needed caesarean hysterectomy in order to treat placenta accreta as compared to none in control group.

Postoperative fever and respiratory tract infections were seen in significantly more cases of study group than control group (Table III). Three patients in study group who underwent caesarean hysterectomy needed postoperative intensive care. There was no maternal death in either group.

Table IV summarizes neonatal outcome which was comparable in both groups regarding mean birth weight, Apgar score, preterm deliveries, and neonatal admissions.

Table I: The demographic and the clinical features.

Variable	Study(n=48)	Control (n=48)
Maternal Age (Years)		
Mean (SD)	31.81 (4.26)	29.81 (4.62)
≤35	38(79.2%)	44(91.7%)
>35	10(20.8%)	4(8.3%)
Gestational Age (Weeks)		
<37	4(8.3%)	5(10.4%)
≥37	44(91.7%)	43(89.6%)
Mode of CS		
Elective	44(91.7%)	43(89.6%)
In labour/SROM	4(8.3%)	5(10.4%)
Anaesthesia		
Regional	45(93.7%)	44(91.7%)
General	3(6.3%)	4(8.3%)
Tubal Ligation		
	44(91.7%)	15(31.3%)

Table II: Intraoperative complications

Finding	Study Group (n=48)	Control Group (n=48)
Thin lower uterine segment	16 (33.3%)	9 (18.7%)
Severe peritoneal adhesions*	25 (52.1%)	13 (27.1%)
Cranial bladder attachment	24 (50%)	20 (41.7%)
Bladder injury	2 (4.2%)	1 (2.1%)
Bowel injury	0	0
Placenta previa**	12 (25%)	3 (6.3%)
Placenta Accreta		
Partial	1 (2.1%)	4 (8.3%)
Complete	4 (8.3%)	0
Blood loss>1000ml	9 (18.7%)	6 (%)
Transfusion	9 (18.7%)	9 (18.7%)
Caesarean hysterectomy	3 (6.3%)	0
Complete uterine rupture	1 (2.1%)	0

* P value: 0.012 m ** P value: 0.011

Table III: Postoperative Complications

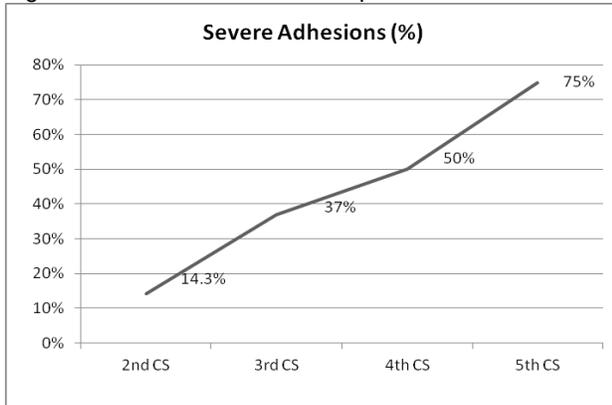
	Study Group (n=48)	Control Group (n=48)
Wound infection	2 (4.2%)	0
UTI	2 (4.2%)	1 (2.1%)
Postoperative fever	9 (18.8%)	2 (4.2%)
Respiratory Tract infection	4 (8.3%)	2 (4.2%)
ICU admission (Days)	3 (6.3%)	0
Maternal mortality	0	0

Table IV: Neonatal Outcome

	Study Group (n=48)	Control Group (n=48)
Birth weight (gms) [Mean (SD)]	3077 (462)	2915 (410)
A/S <7 at 5min	3 (6.2%)	4 (8.4%)
Preterm	4 (8.4%)	5 (10.5%)
NICU admission (Days)	8 (16.7%)	11 (22.9%)
Neonatal death	0	0

A/S = Apgar score; NICU = Neonatal intensive care unit

Figure-I: Presence of severe intraperitoneal adhesions.



DISCUSSION

Multiple caesarean sections are commonly performed in many cultures due to preference for larger family size. It is generally considered that increasing number of CS will add to the fetomaternal risks associated with abdominal delivery⁹. The results of our study have indicated that good fetomaternal outcome is possible in most cases undergoing high order CS provided these women receive good obstetrical care in a tertiary care hospital.

Rupture of scarred uterus is the most dreadful complication that can occur either during pregnancy or labour and it is associated with significant fetomaternal risks. Our rate of 2.1% rupture of uterus in this study is comparable to 2-4% risk of rupture after previous 2-3 caesarean sections reported by similar studies⁴ but it is higher than the often quoted rate of 1% rupture of uterus seen after one CS.¹⁰ A thin and membranous lower uterine segment was frequent finding in our study group compared to controls (33.3% vs. 18.7%) yet only one patient presented with rupture of uterus. The actual rupture of uterus in these patients with membranous lower uterine segment was averted by timely delivery before labour because our patients were properly counselled to report immediately to hospital in case of labour pains.

Technical operative difficulties are important considerations in cases of progressively increasing

number of CS. Abdominal entry is made difficult due to the presence of intraperitoneal adhesions and this may result in organ injuries especially to the bladder which is often attached cranially. The incidence of severe intraperitoneal adhesions was significantly higher in our study group than controls ($p=0.012$). On further sub-analysis, a strong correlation was detected between number of CS and severity of intraperitoneal adhesions. The rate of severe adhesions rose from 14.3% at the time of second CS to 75% at fifth CS (Fig-I). Review of literature confirms our findings of high rate of severe adhesion formation in repeat CS.⁸ The urinary bladder was pulled and attached cranially in about 50% of our cases. This fact should be taken into consideration when opening the peritoneum. Some surgeons have used a vertical incision routinely to open abdominal wall after three to four previous Pfannenstiel incisions because it allows more room and good visualisation for safe preparation of the isthmic area and atraumatic delivery of the baby.⁷ Although midline incision is not absolutely necessary to prevent entry into bladder, yet it must be considered seriously in difficult cases with ugly looking previous abdominal scar and history of previous postoperative sepsis. Bladder injury in our study occurred in 4.2% of study women vs. 2.1% in controls. These figures are comparable to the rates of bladder injury after multiple CS cited in the literature.⁹ In comparison to bladder injuries, many investigators have reported relatively low incidence of bowel injury at repeat CS as uterointestinal adhesions are less common.² No incidence of bowel injury occurred in present study.

One of the major sources of maternal morbidity in repeat CS is the development of placenta previa in subsequent pregnancies. This fact is well reported in the literature and our study has confirmed the association of placenta previa with CS scar. The incidence of placenta previa was increased in study group. There were 12 cases of placenta previa in study group compared to 3 in the controls ($p=0.011$). Many factors may be responsible for increased incidence of placenta previa in cases of repeat caesarean section as compared to general obstetric population. Firstly, placenta previa is associated with increased parity; there is 7 fold increased risk with parity of 5 or more.¹¹ Secondly, the presence of CS scar may result in poor decidualization at the scar site which promotes trophoblastic invasion into the myometrium. The myometrial invasion prevents the placental migration when the uterus grows and lower segment develops. This leads to increased risk of placenta previa by 2-3 folds in the presence of previous scar.⁷ The invasion of myometrium by the blastocyst is responsible for increased incidence of adherent placenta. The frequency of adherent

placenta was comparable in both our groups; however the incidence of complete placenta accreta as compared to incomplete type was significantly increased in our study group. Some studies have reported similar results in literature. David et al (1997). have reported that presence of scar due to previous 4 or more caesarean sections increased the risk of placenta accreta by 8-9 fold as compared to 1.284 in the event of previous one caesarean section.¹² Surgery in the presence of placenta previa and accreta results in massive intraoperative haemorrhage and is responsible for major maternal morbidity and mortality. The caesarean hysterectomy is often needed to control bleeding in these cases with its associated surgical risks. All our patients with placenta accreta required blood transfusion and 3 of the 4 patients in study group with complete placenta accreta needed caesarean hysterectomy and were subsequently managed in high dependency unit with intensive monitoring.

About 92% of couples in the study group opted for tubal ligation at the time of 4 or more CS. This represents a much higher percentage as compared to the other Islamic countries such as Saudi Arabia. In Saudi Arabia tubal ligation is not favoured at 4th caesarean section because of cultural restraints to limit the family size.⁴

Studies have shown the increased frequency of repeat caesarean sections, every effort must be made to reduce the primary caesarean section rate. VBAC after 2 caesarean sections, especially in patients who were self motivated and had one vaginal delivery, can be offered in carefully selected patients. A pool data analysis by Tehseen et al (2010)¹³ indicates that a trial of labour by women, with history of previous two caesarean sections, is associated with success rate of 71.1% with associated risk of scar rupture of 1.36%. Women requesting to have a trial of labour should be counselled appropriately, considering available evidence; and should have the option of a carefully monitored vaginal delivery available to them¹³.

In conclusion our study has supported the view that maternal risks are increased in higher order CS

but successful delivery is possible if women are managed in tertiary care hospital.

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