



## Research Article

# Perinatal Morbidity & Mortality following repeat Cesarean section due to five or more previous Cesarean Section done in Tertiary centre in KSA

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**Abbreviations:** BT- Blood Transfusion; C/S- Caesarean Section; IIAL- Internal Iliac Artery Ligation; IUFD- Intrauterine Fetal Death; PPH- Postpartum Haemorrhage; NICU- Neonatal Intensive Care Unit; NO.- Number; RDS- Respiratory Distress Syndrome; SICU- Surgical Intensive Care Unit; TTN-Transient Tachypnae of Neonate



## Abstract

**Objectives:** To highlight and determine the maternal and neonatal outcome and associated risks for patients who have undergone their 6th and more caesarean sections.

**Design:** Case control study.

**Setting:** Tertiary Centre (Security Forces Hospital – Riyadh – Saudi Arabia).

**Patients:** 80 patients selected to study group who have undergone their sixth and more caesarean sections in Security Forces Hospital. Between June 2006 and May 2010. This group was compared to 80 patients who have undergone their third to fifth caesarean sections during the same time period and immediately following the studied case.

**Main outcome measured:** Age and parity of women in study and the control group were correlated with the number of previous caesarean sections. Intra operative and post-operative maternal complications including presence and grade of adhesions, intra partum and postpartum hemorrhage, use of measurement and methods (both medical and surgical) to control bleeding such as Bakry balloon, Internal iliac artery ligation, etc., were highlighted. Bowel injury, blood transfusion, admission to surgical intensive care, incidence of placenta previa and accreta, post-operative complications like paralytic ileus, wound infection were also noted. Further, neonatal outcome including birth weight, Apgar score, and need for neonatal intensive care unit admission were reviewed.

**Results:** Patients in the study group had higher incidence of extensive adhesions (41.25%) compared to (12.25%) in the control group. Bowel injury was (2.5%) in study group with none in the control group. The incidence of placenta previa was (8.75%) in the study group as compared to (2.5%) in the control group, with placenta accreta complicating (28.57%) of placenta previa seen only in the study group. Blood transfusion was higher in the study group (20%) as compared to (5%) in the control group.

Neonatal admission to NICU was higher in the study group (27.5%) in comparison to the control group (12.5%). Also birth weight was lower in the study group.

**Conclusion:** The more the number of caesarean sections, the more the maternal and neonatal morbidity.

Patients should have proper counselling during antenatal follow up about the risks of repeated caesarean sections, and offered bilateral tubal ligation after the third or fourth caesarean sections.

## Introduction

Higher order repeat caesarean sections is becoming a very common practice especially in the Middle East and more so in Saudi Arabia, where large families are desired due to social and cultural factors, thus putting the women at a significant risk of surgical and anesthetic complications of repeated caesarean sections. Repeat caesarean sections have become very common over past decade, due to improvement in the safety of anesthesia and the use of prophylactic Antibiotics and Anticoagulants which lead to an overall decrease in the maternal morbidity and mortality. There are few studies published in the literature regarding the associated risks with higher order repeated caesarean sections and patients with lower number of repeat caesarean sections (one,

two, three and a maximum of four caesarean sections). Our study is one of fewer studies including the highest number of repeat caesarean sections including patients who have under gone six and more caesarean sections. The noted associated risks encountered with high order repeated caesarean sections, both maternal and neonatal , and which contradict with some other published data, encouraged us the conduct this study to highlight such morbidities in relation to the studied population in our institute.

## Material and Methods

This is a case control study done on a total of 83 women who have undergone six or more caesarean sections in the department of Obstetrics and Gynecology at Security Forces Hospital – Riyadh – Saudi Arabia, between June 2006 and May 2010. Three of these patients were excluded from the analysis due to incomplete hospital records. This study group (cases) was matched to a control group of 80 women with previous two (46 patients), and three (26 patients) and four (8 patients) caesarean sections. The patient selected are those who had the caesarean section around the same period, and immediately following the studied case, controlled by the same maternal age and body mass index.

The case records of the study and control groups were reviewed by the help of electronic medical record viewer chart in accordance to questionnaire set for each case and control which includes:

1. The patients' characteristics include maternal age, weight, height, parity, gestational age, number of previous caesarean sections.

2. Intra operative and post-operative course including types of anesthesia, severity of adhesions which was subjectively graded by the operating surgeons according to the American Fertility Society Classification of Adnexal Adhesions, where filmy and a vascular adhesions involving between 1 to 25% of a total area were classified as mild. Dense vascular adhesions which involved 26 to 50% of the pelvic areas were classified as moderate adhesions. Extensive adhesions where more than 50% of the area was involved were classified as severe. Estimated blood loss, the incidence of placental abnormalities, uterine ruptures whether complete or dehiscence were noted. Further bladder and bowel injury, blood transfusion, the use of antibiotics (intra and post-operative) were highlighted. The need for additional means to manage postpartum hemorrhage like internal iliac ligation, the use of Bakry Balloon, and internal iliac occlusion by catheter was also noted. This, in addition to admission to surgical intensive care unit. Post-operative complications including paralytic ileus, wound infection, urinary tract infection, chest infection, pyrexia and need for readmission were looked at, in addition to the length of stay.

3. Neonatal outcome including birth weight, Apgar score at five minutes, admission to neonatal intensive care and mortality were also investigated.

4. Issues on contraception due to long term safety of the mother including intraoperative tubal ligation were noted.

## Results

Analysis of patients' characteristics showed that the mean maternal age in the study group was 38.3 years, and that in the control group was 37.7 years, the maternal weight in study group and in control group was 86.7 and 83.3 kg respectively. The height of patients in the study group was 153 cm, and in the control group was 154 cm (Table 1). Table 2 shows the parity in both the study and the control groups. Table 3 shows the number of previous caesarean sections with 72 patients (90%) in the study group had their 6<sup>th</sup> caesarean sections and 10% (8 patients) had their 7<sup>th</sup> or more caesarean sections.

In the control group 57.5% (46 patients) had their 3<sup>rd</sup> caesarean sections, 32.5% (26 patients) had the 4<sup>th</sup> caesarean sections, with 10% (8 patients) had the 5<sup>th</sup> caesarean sections. Intra operative finding Table 4 showed the patients who had ruptured scar in the study group were five (6.25%), two of whom had complete rupture and three with scar dehiscence. In control group two (2.5%) had scar dehiscence, none had complete rupture. There was significant difference in the incidence of severe adhesions, where 33 patients (41.25%) in the study group were found to have it, unlike 10 patients (12.25%) in the control group. Hence mild adhesions were observed more in the control group (28.75%) as compared to the study group (22.5%). There were two cases complicated by bowel injury in the study group. In both these cases, there were massive adhesions and the general surgical team was involved with bowel dissection, there were no bowel injuries in the control group. There were 7 cases of placenta previa (8.75%) in the study population, out of whom two (28.57%) were complicated by placenta accreta, one of placenta accrete cases had massive hemorrhage and require blood transfusion (received 12 packed red blood cells+6 fresh frozen plasma+use of Recombinant F V111, 2 times), ended in hysterectomy, and was admitted to surgical intensive care, and post operatively developed wound infection. The second case of placenta inccreta, placenta was left in situ and was followed up by serial U/S and B-HCG until spontaneous resolution occurred. The patient had wound infection in the post-partum period. None of placenta previa that complicated the two (2.5%) cases in the control group were accrete or inccreta. The need to use Bakry Ballon to control post-partum bleeding was conducted in four cases of the study group (5%), but only in one case (1.25%) of the control group.

Transfusion of blood products (packed red blood cells, Platelets or Fresh Frozen Plasma) was needed in 16 cases (20%) in the study group, and in 4 patients (5%) in the control group. The only needed admission to the surgical intensive care was for two cases in the study group (2.5%). (Both of whom was complicated by severe post-partum hemorrhage and needed massive blood transfusion). None of the patients in the control group needed intensive care unit admission. For post-operative complications such as paralytic ileus (Table 5) it was (7.70%) in the study group and more than the control group (3.45%). Wound infection complicated two cases (2.5%) in the study group, and none in the control group. Two cases in the control group had asthma exacerbation, while there was none in the study group. There were no cases complicated by urinary tract infection in both groups. Only one case in the study group needed readmission due to wound infection. Post-partum depression complicated one case in the study group. The length of hospital stay over 8 or more days in the study and control group was 7.5% versus 3.75% respectively (almost double in the study group). However, the mean length of stay in both groups was 5.9 days, as patient with placenta previa in control group were admitted for observation long period before surgery (both admitted with early APH). The use of General Anesthesia in the study group (37.75%) was almost double that in the control group (15%) (Patient preference mainly) and all cases of placenta previa had general anesthesia (surgeon preference). Regional anesthesia was used in 52 cases (65%) in the study group, while it was used in cases 68 cases (85%) in the control group (Table 6).

Contraception (Table 7) in the form of bilateral tubal ligation was performed in 42 (52.5%) women in the study group, in contradistinction to 17 women (21.24%) in the control group. Table 8 shows the number of babies born with low birth weight (less than 2500 gm) were 20 (25%) in the study group in comparison to 13 (16.25) babies in the control group. There was no difference in Apgar score at 5 minutes in both groups. (One case in study group and four cases in control group). Neonatal admission to NICU was needed in 22 babies in the study group (27.5%), unlike 10 babies (12.5%) in the control group. Neonatal admission to NICU was mainly due to RDS and TTN, although the gestational age was similar in both groups. There was one case of IUFD in each the study and the control groups diagnosed at 36 and 33 weeks respectively (Table 8).

**Table 1:** Patient characteristics: Age, Weight & Height of the study and control groups.

Patient characteristics	Study groups No=80	Control group No=80
1. Maternal age	38.38rs	37.67rs
2. Weight	86.74 kg	83.33 kg
3. Height	153.9 cm	154 cm

**Table 2:** Parity in Study and Control groups.

Parity	Study groups No=80	Control group No=80
0-2	0	13 (16.25%)
3-4	0	34 (42.5%)
5-6	70 (87.5%)	16 (20%)
≥7	10 (12.5%)	17 (21.25%)

**Table 3:** Number of previous caesarean section in Study and Control groups.

Number of previous c/s	Study groups No=80	Control groups No=80
2	0	46 (57.5%)
3	0	26 (32.5%)
4	0	8 (10%)
5	72 (90%)	0
6	8 (10%)	0
7	0	0
8	0	0

**Table 4:** Intra Operative Events in Study and Control groups.

Operative Events	Study groups No=80	Control group No=80
Complete uterine rupture	2 (2.5%)	0
Incomplete uterine rupture	3 (3.75%)	2 (2.5%)
Extensive uterine rupture	33(41.25%)	17 (21.25%)
Moderate adhesion	8 (10%)	10 (12.5%)
Mild adhesion	18 (22.5%)	23 (28.75%)
EBL≥1000 ml	10 (12.5%)	0
Bowel injury	2 (2.5%)	0
Bladder injury	0	0
Placenta previa	7 (8.75%)	2 (2.5%)
Placenta accreta	2 (2.5%)	0
Need for I.I.AL or Bakry balloon or I.I.A catheter	4 (5%)	1 (1.25%)
Need for BT	16 (20%)	4 (5%)
SICU Admission	2 (2.5%)	0

**Table 5:** Post-Operative Events in Study and Control groups.

Post-Operative complication	Study groups No = 80	Control group No = 80
Paralytic ileus	3 (3.75%)	2 (2.5%)
Wound infection	2 (2.5%)	0
U T I	0	0
Chest infection	0	2 (asthma exacerbation)
Need for readmission	1 (1.25%)	0
Post-partum depression	1 (1.25%)	1 (1.25%)
<b>Length of stay</b>		
Mean Length of stay	5.9 days	5.9 days
3-5 days	49 (61.25%)	61 (76.25%)
6- days	25 (31.25%)	16 (20%)
≥8 days	6 (7.5%)	3 (3.75%)
<b>Use of prophylactic antibiotics</b>		
Single dose	15 (18.75%)	16 (20%)
≥24 hrs	65 (81.25%)	63 (78.75%)

**Table 6:** Type of Anesthesia in Study and Control groups.

Anesthesia type	Study groups No=80	Control group No=80
Regional	52 (65%)	68 (85%)
General	27 (33.75%)	12 (15%)
Regional converted to General	1 (1.25%)	0

**Table 7:** Contraception in Study and Control groups.

Contraception	Study groups No=80	Control group No=80
1. Bilateral tubal ligation		
Performed	42(52.5%)	17 (21.25%)
Not performed	38(47.5%)	63(78.75%)
2. Other contraception need	24 (30%)	36 (45%)
3. No contraception	14 (17.5%)	27 (33.75%)

**Table 8:** Neonatal in Study and Control groups.

Neonatal outcome	Study groups No=80	Control group No=80
<b>Birth weight</b>		
a. ≥2000 gm	1(1.25%)	1(2.5%)
b. 2001-2500 gm	19(23.45%)	1(13.75%)
c. 2501-3000 gm	45(55.55%)	27(33.75%)
d. ≥3000 gm	16 (19.75%)	30 (37.5%)
<b>Apgar score at 5 minutes</b>		
a. ≥9	80 (98.76%)	77 (95.06%)
b. ≤7	1 (1.23%)	4 (4.9%)
NICU admission	22 (27.16%)	10 (12.34%)
Death	1 (1.23%)	1 (1.23%)

## Discussion

The incidence of caesarean sections increased from 12% in May 2000 to 24.6% in 2010 in the institute where the study was done (Security Forces Hospital). During the period of the study (2006 to 2010) caesarean sections rate increased from 16% to 24.6%, the probable increase in the rate may be due to the fact that Security Forces Hospital became a Tertiary center (in the year 2005) dealing with high risk cases with transfer of low risk ones to a secondary affiliates hospital with which the hospital contracted because increased number of patients. Other causes of such increase in caesarean sections rate may be to the newly adopted attitude towards breech presentation and multiple pregnancies and with the low threshold of caesarean section for such cases. Repeat caesarean sections still remain a major surgical procedure and are definitely not without risks on the patients, neonates and the operating surgeons and anesthetists. Out of the total number of caesarean sections of 5568 cases done during the study period, 1.44% where due to 6 or more previous caesarean sections. The association of placenta previa was (13.75%) in such cases with placenta accrete and increta constituting (28.6%) of cases, and although the figure appear high but it is still less than 67% quoted by [1] and for four and more previous caesarean sections and where it was anticipated that placenta previa would be 11 times more in patients who were 40 years and older and 7 times more in patients with a party of five and more a fact that should alert us about our population with high parity and anticipation of higher incidence of placenta previa in future pregnancies with repeat caesarean sections. The high incidence in our studied population may be due to the fact that the mean age of the studied population was 38 years i.e. somewhat advanced maternal age. The higher incidence of repeated caesarean sections in our institute probably accumulated quickly due to the effect of the modified Graigin's dictum of "twice a caesarean section then always a caesarean section" and which is the policy in our institute, and with preferable bilateral tubal ligation after 3 or 4<sup>th</sup> previous caesarean section, if agreed upon by the couple, not a common event. The association of higher order repeat caesarean section and placenta previa in [2] study was not recorded.

In the [3] study this combination of repeat caesarean section, age, etc., made up to 5% of the studied groups. Both these studies (Rashid et al and Soltan et al), in addition to our study was done in the same ethnic group population. The low incidence of placenta previa in the other two studies may be due to the younger age of their parents, where an average of 33-34 years was in the majority of cases, unlike our population who had a mean age of 38 years. Hence the association of placenta previa with older

age was illustrated, and is a fact that was agreed, as already mentioned earlier on. The actual parity of the patient and not only the number of scars on the uterus, may be another factor that could contribute to the placenta previa, but unfortunately there was lack in that information in the Rashid et al and Soltan et al studies. Other complication associated with high order repeat caesarean sections included uterine rupture, which was seen in almost 6% of our studied population and was apparently silent (before any uterine contractions). This incidence was much less than the 27% prevalence mentioned by [4], where it was noted to be more in patients with 3 or more previous caesarean sections, and less in patients with lesser number of previous caesarean sections. The percentage of uterine rupture in our series was more than that reported by [5]. No cases of uterine dehiscence or fenestration were reported by Soltan et al except for one case. The major problem of extensive adhesion formation was shared in all studies, where it reached 41% in our studied population, more than double the number of those patients having lesser number of repeat caesarean sections (17%). In Soltan et al series this problem was 3 fold increased in four and more previous caesarean section (63.6%) and was (54%) in the Rashid et al series. Bowel injury was encountered but to a lesser extent (2.5%). Another morbidity encountered by our studied population, was massive blood loss with the need for blood transfusion encountered in (20%) of our studied population, more than [6], but almost like that of Rashid et al and Soltan et al. The need for admission to surgical intensive care unit was in (2.5%) of our cases and was similar to that of Rashid et al (3%) and more than Soltan et al.

The use of medical and surgical procedures like internal iliac artery ligation, use of internal iliac Artery Balloon Catheter inserted pre operatively as well as Bakry Balloon intra operatively, this in addition to the use of misoprostol, carboprost(hemabate) and Recombinant Factor V11, all of which helped to reduce morbidity and mortality from bleeding and the need for admission to surgical intensive care unit. Further the use of prophylactic antibiotics helped to reduce both wound and urinary tract infection. A unique observation noted in our study group is that 23.5% of babies delivered were with low birth weight (<2499) in comparison to (13.7%) of babies in lower order repeat caesarean section group, this observation was not noted in other series, this may probably be due to increase in fibrosis of uterine wall and/or interference with blood supply to uterus and placenta with repeat caesarean section. [7] advocated delivery of babies by 39 weeks to avoid neonatal illnesses like Respiratory Distress Syndrome, newborn sepsis, seizures, necrotizing enterocolitis, hypoxic ischemic encephalopathy, reduced umbilical cord arterial PH of <7.0, low Apgar score, as well the need for ventilator support within 24 hours of birth. This last fact may explain the high incidence of admission to Neonatal Intensive Care Unit of (27.2%) of cases in our studied group, because caesarean sections were done between 37 and 38 weeks of pregnancy for fear of starting spontaneous uterine contractions and ending in ruptured uterus hence rendering adherence to Kainu et al recommendation non applicable, but at the higher cost of admission to Neonatal Intensive Care Unit. Although [5] is aware of the modified dictums of Craigin mentioned previously about repeat caesarean sections, yet the author believes that good supervision the patient can have no limits to delivery by caesarean sections and as much as they wish. This in addition to [2,3] where the conclusion was that higher order caesarean sections do not pose more on the mother and baby than that normally encountered with lower order caesarean sections. This conclusion should be guarded and considered with care, in future, after the data presented in our study where the patients should not be left to go with the redundant and false feeling of reduced injury and easy delivery in future pregnancies without short and long term complications and should be counseled about that.

Although the desired number of children may be the main issue in communities for religious or financial reasons and fear of marital disharmony, yet the long term effect on the mother, mainly persistent pain due to adhesion, after repeat caesarean sections where adhesions bands can “tie down” or “pull” on organs and may need surgical

intervention, hence increase in the financial cost of wellbeing of the mothers. This in addition to other problems like ectopic pregnancies, increase incidence of placenta previa which impose a continuous burden and stress on the treating physician and anesthetist because of the morbidities and mortalities associated with the surgery on the patient. Nationwide the escalating cost of repeated caesarean sections should be considered and in poor communities' tubal ligation should be sought by second to third repeat caesarean section [8] and where neither hospital care nor facilities may be continuously available. Also any future gynecology operation carried out on such patients with repeat higher order caesarean section will pose difficult surgery and with increased incidence of organ injury.

## Conclusion

The more the number of the previous caesarean sections, the more is the increase in maternal and neonatal morbidity, mainly due to increase in incidence placenta previa, post-partum hemorrhage, blood transfusion and early delivery with its consequences to the neonates. Patients should have proper counseling about the risk of repeated caesarean sections, and should be offered permanent sterilization after the third or fourth operation.

In societies where large families are encouraged, effort should be made towards decrease in the incidence of the total caesarean sections through decrease the number of primary caesarean sections and giving proper chance of vaginal birth after previous one caesarean section (VBAC). Further offering of external cephalic version for breech presentation at 36 to 37 weeks should be done, and giving of a chance for vaginal delivery for good number of multiple pregnancies should also be encouraged.

Cost and availability of surgical operation in less privileged communities should be seriously considered and measures taken to reduce the number of deliveries by caesarean sections.

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