Original Article

Maternal morbidity in repeat cesarean sections

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Abstract

Objective: To study intra-operative and post-operative morbidities in women undergoing repeat cesarean sections.

Methodology: It is a prospective, observational study conducted at Tribhuvan University Teaching Hospital (TUTH), Maharajgunj, Kathmandu, from April 14th 2011 to April 13th 2012 The study group consisted of all women undergoing repeat cesarean section (RCS) and related morbidities associated at the time of RCS throughout post-operative period until discharge or followed up visit were studied covering all aspects of management care even at readmission.

Results: A significant association between the number of repeat CS with placenta previa (χ^2 test, P value of 0.005), dense adhesion (χ^2 test, P value of 0.044) and abnormal scar integrity (χ^2 test, P value of 0.020) were noted. Scar dehiscence/rupture was seen in 2/24 (8.3%) with scar tenderness and 3/209 (1.4%) without scar tenderness, which appears to be an important finding. Post-operatively: hemoglobin deficit in dense adhesions (ANOVA test, P value of 0.009) was significant. With regards to UTI a significant association was noted in adhesion (χ^2 test, P value of 0.005) and prolonged surgery of more than an hour (P value 0.041).

Conclusion: Repeat cesarean section, especially after two cesarean confers perioperative morbidities adversely affecting post-operative recovery. Scar dehiscence and rupture or dense adhesions posing difficult dissection, necessitating forceps application and delivery, inadvertently ending in extension of uterine incision corroborates that RCS continues to contribute to morbidity over subsequent pregnancies.

Key words: Maternal morbidities, previous scar, repeat cesarean section

Introduction

The rate of primary cesarean is rising, that by and large has influenced RCS rates due to on demand cesarean for fear of scar rupture in preference to vaginal delivery after CS(VBAC).[1-6] The risk of uterine rupture has been put forward by many studies as 92% of uterine rupture occurs in women with a prior cesarean.[7-11]

In RCS one may be cautioned against alarming maternal morbidity because of the associated risk of placenta previa and placenta accrete that may inadvertently affect the outcome.[12-14] The incidence of placenta previa increases form 3.2% in first repeat cesarean section (RCS) to 5.1% and 6.9% in second and third RCS respectively and same applies for the occurrence of placenta accreta with the incidence of 0.31%, 0.57% and 2.13% respectively.[12-13] This has added to the risk of hysterectomy in 0.42%, 0.90% and 2.41% for first, second and third RCS respectively.[12]

Moreover the chance of bowel, bladder and ureteral injury, not infrequent working in the area of dense adhesion, requires increased operation time.[12] Significant association has been found between adhesion and related morbidities in RCS that has further contributed in maternal morbidities.[15-17] Perioperative complication with the need of blood transfusion, febrile illness, deep vein thrombosis (DVT), pulmonary embolism may prolong hospital stay predisposing proneness for nosocomial infection. Increased incidence of wound dehiscence and endometritis associated in RCS further contributes to morbidity of RCS post-operatively.[12]

In contemporary practice the most common indication for RCS is previous cesarean section.[18] Data regarding maternal morbidities associated with repeat cesarean sections are of utmost importance for counseling women before they decide whether to undertake a trial of labor after a cesarean section for non-recurrent indication or to undergo a planned RCS. Data is useful to alert the operating surgeons in advance so that they can exercise to minimize intra-operative and postoperative morbidities. However listing complications associated with RCS in emergency/ elective cesarean or in non/laboring women are still insufficient. Therefore this study aims to find out morbidities associated with RCS for clinical significance.

Methodology

This was a prospective observational study conducted in the department of Obstetrics and Gynaecology, TUTH, Maharajgunj, Kathmandu. The study period was one year starting from 14th April 2011 to 13th April 2012.

All women undergoing repeat CS meeting inclusion and exclusion criteria were enrolled in the study following their informed consent. Inclusion criteria were pregnant women with one or more previous cesarean sections, singleton pregnancy and transverse incision in the lower uterine segment during RCS. Women with previous pelvic surgery other than CS, women with significant medical disorders that is likely to directly affect the maternal outcome adversely, previous upper segment cesarean section and those women who remain out of contact on 10th post-operative day were excluded from the study.

For the study, a questionnaire was developed which was pretested. Demographic data and details of medical and obstetric history of women were recorded. Women undergoing RCS, were either observed intra-operatively or reviewed later from charts for the following intra-operative maternal morbidities: Intra-peritoneal adhesions, scar rupture/ dehiscence, extension of uterine incision/tear, difficult delivery/use of forceps, placenta accreta, placenta previa, uterine atony, excessive blood loss, blood transfusion, hematoma formation, bowel/ ureteral / bladder/ vessels injuries, uterine artery/ internal iliac artery ligation, B-lynch application, hysterectomy, maternal death and operating time. Postoperatively they were observed for the following morbidities till discharge: Post-operative hemoglobin deficit, postpartum hemorrhage, blood transfusion, ileus, hematoma, pelvic infection, chest infection, puerperal pyrexia, re-laparotomy, urinary tract infection, pulmonary embolism, endometritis, thrombosis, thrombophlebitis, sepsis, wound infection, wound dehiscence, secondary suturing, ICU/CCU admission, postoperative ventilator and length of hospital stay. Following discharge from hospital they were followed up on 7th or 10th post-operative day during the stitch removal and any post-operative morbidity found was recorded. Those patients whose stitches were removed on 7th post-operative day were called up on the 10th post-operative day by telephone. If they had any problem they were asked to visit hospital and when CS related complication was found, it was noted.

The data collected were transformed into specially designed master chart and finally analyzed by SPSS 20 software. Chi square test and ANOVA test were used to study the association between different variables.

Results

A total of 238 repeat cesarean sections represented 6% of total deliveries and 15.8% of all cesarean deliveries in TUTH during the study period of 1 year. Out of 238 repeat LSCS – 5cases were excluded from the study. This included 2 cases with previous

upper uterine incision and 3 cases of repeat LSCS for twin pregnancy. Following exclusion 233 cases were studied of which 128 cases (54.9%) underwent emergency RCS and the remaining 105 cases (45.1%) underwent elective RCS.

The mean age of women undergoing 1st RCS (28.42±3.80 years) was significantly less than those women undergoing 2nd RCS (31.46±3.53 years). (ANOVA test, **P value 0.005**). The mean POG for 1st RCS was 38.46±1.50 weeks and for 2nd RCS was 37.14±1.49 weeks, this difference in POG was statistically significant (ANOVA test, **P value 0.002**).

Significantly more dense adhesion in 2nd RCS in comparison with 1st RCS (61.5% Vs 29.6%) was noted. (χ^2 test, **P value of 0.044**). Difficulty was encountered in delivering fetus in 10 cases (4.3%), all in cephalic presentation; forceps were used in 5 cases. Abnormal scar integrity (scar dehiscence or rupture) was seen in 3 of 1st RCS (1.4%) {Dehiscence (2), rupture (1)} and 2 of 2nd RCS (15.4%), which was significant. (χ^2 test, **P value of 0.020**).

Placenta previa was found in 3 cases (23.1%) of 2nd RCS and 5 cases (2.3%) of 1st RCS. (χ^2 test, **P value of 0.005**). UTI was the most common morbidity observed in postoperatively. More UTI was seen in Em RCSs (16.41%) compared to El RCSs (13.33%). Hb deficit was found to be more in cases of emergency RCS (1.12 Vs 0.91 in elective cases). A significant association between scar tenderness and abnormal scar integrity was seen in 1st RCS (χ^2 test, **P value of 0.016**), whereas the association was non-significant for 2nd RCS (χ^2 test, **P value of 0.392**). Scar dehiscence was also observed in 3/209 (1.4%) women who had no scar tenderness.

The mean duration of surgery was longer for cases with dense adhesion i.e. 54.6±19.8 mins. It was 45.0±12.1 mins for cases with minimal adhesion. (ANOVA test, **P value of 0.000**). The mean Hb deficit was 0.86±0.80 mg/dl for minimal adhesion cases and 1.22±1.06 mg/dl for dense adhesion cases, which was significant (ANOVA test, **P value of 0.009**). A significant association of UTI with dense adhesion was observed in the study (χ^2 test, **P value of 0.009**). Puerperal pyrexia was observed in 5.48% cases with dense adhesion and in 0.87% cases with minimal adhesion. (χ^2 test, **P value of 0.056**).

A significant association was observed between prolonged surgery (i.e. more than 60 minutes) and wound infection (χ^2 test, **P value of 0.000**) and also between prolonged surgery and UTI (χ^2 test, **P value of 0.041**).

Discussion

During the study period 37.66% of all deliveries were by CS and RCS contributed to 15.8% (238) of these CSs. In the USA, RCS accounts for almost one-third of all cesarean deliveries.[37] A prospective cohort study in 4 Asian countries identified cesarean delivery for previous cesarean scar as the most common indication (7% of all deliveries).[18] In a study done in an academic tertiary hospital and a general tertiary hospital in Cairo Egypt in 2011 the CS rate was 37.8% and 36.5% respectively, and the most common indication for CS was previous CS accounting for 31% and 27.8% of all CS respectively.[61]

The mean POG for 1st RCS was 38.46±1.50 weeks and the mean POG for 2nd RCS was 37.14±1.49 weeks. (ANOVA test, **P value 0.002**). Similar significant difference in POG has been reported by Liang-kun Ma et al.[34] in their study. Dense adhesion noted during CS was found to be significantly increased with increasing number of RCS (χ^2 test, **p value of 0.044**). Similar significant association has been reported by Nisenblat et al.[16], F.W. Makoha et al.[13], Uygur et al.[15], Soltan et al.[17] and Liang-kun Ma et al.[34] in their studies

Abnormal scar integrity (scar dehiscence or rupture) was seen in total 5 cases: 3 in 1st RCS and 2 in 2nd RCS (15.4%), which was significant. (χ^2 test, **P value of 0.020**). Similar significant association between uterine scar separation and number of RCS has been reported by Uygur et al.[15] Scar dehiscence was also observed in 3 women who had no scar tenderness. The study by Liang-kun Ma et al[34] has also reported 2 cases of uterine dehiscence in women who had no signs or symptoms prior to the surgery. Thus it can be concluded that scar dehiscence don't always present with signs or symptoms.

The index study has shown significant association between placenta previa and number of repeat CS. (χ^2 test, **P value of 0.005**). Similarly significant increase in incidence of placenta previa with number of cesarean sections has been reported by Silver et al[12] and Makoha et al.[13]

A study be Hanley et al.[62] have found significantly greater postpartum complications in Em RCS compared to El RCS, whereas in this study increased morbidities in the form of hematoma, extension of uterine incision, Hb deficit and UTI was associated with Em RCS but the association is not statistically significant.

Puerperal pyrexia was seen in 7.7% of repeat 2 CS cases and in 1.8% of repeat 1 CS cases but this association is not statistically significant. Study by Makoha et al.[13] has shown similar non-significant association. UTI was seen in 14.5% and 23.1% cases of repeat 1 and repeat 2 CS respectively, but this result is not statistically significant. Study of Soltan et al.[17] has reported 27.4% UTI in 2nd RCS cases. No significant association of wound infection and number of RCS was observed in the index study. Similar non-significant association has been reported by Silver et al.[12]

Conclusions

Repeat cesarean sections, especially after two cesarean confers perioperative morbidities adversely affect post-operative recovery. Scar dehiscence and rupture or dense adhesions posing difficult dissection necessitating forceps application and delivery, inadvertently ending in extension of uterine incision corroborates that RCS continues to contribute to morbidity over subsequent pregnancies.

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Table 1. Intra-operative morbidities in RCS

Morbidities	Repeat 1 (n=220)			Repeat 2 (n=13)			Total n(%)	P value
	EL a1 n(%)	EM a2 n(%)	Total A = (a1+a2) n(%)	EL b1 n(%)	EM b2 n(%)	Total B = (b1+b2) n(%)		
Minimal Adhesion	49 (22.3)	62 (28.2)	111 (50.5)	4 (30.8)	-	4 (30.8)	115 (49.4)	0.044¥
Dense Adhesion	29 (13.2)	36 (16.4)	65 (29.5)	6 (46.2)	2 (15.4)	8 (61.5)	73 (31.3)	
Rupture of previous scar	-	1 (0.5)	1 (0.5)	-	-	0 (0)	1 (0.4)	0.020¥
Previous scar dehiscence	-	2 (0.9)	2 (0.9)	2 (15.4)	-	2 (15.4)	4 (1.7)	
Bladder high	29 (13.2)	32 (14.5)	61 (27.7)	6 (46.2)	1 (7.7)	7 (53.8)	68 (29.2)	0.056
Difficulty in delivery	5 (2.3)	5 (2.3)	10* (4.5)	-	-	0 (0)	10 (4.3)	0.279
Forceps applied	3 (1.4)	3 (1.4)	6 (2.7)	-	-	0 (0)	6 (2.6)	0.403
Incision extension	3 (1.4)	4 (1.8)	7 (3.2)	-	-	0 (0)	7 (3)	0.366
Intentional	2 (0.9)	2 (0.9)	4 (1.8)	-	-	0 (0)	4 (1.7)	0.496
Incidental	1 (0.5)	2 (0.9)	3 (1.4)	-	-	0 (0)	3 (1.3)	0.556
Placenta previa	2 (0.9)	3 (1.4)	5 (2.3)	3 (23.1)	-	3 (23.1)	8 (3.4)	0.005¥
Hematoma formation	-	2 (0.9)	2 (0.9)	-	-	0 (0)	2 (0.9)	0.631
Duration of surgery (mins, mean±SD)	48.3±15.3	47.2±16.3	47.7±15.8	47±14	46.7±2.9	46.9±12.2	47.6±15.6	0.869

**Forceps used in 5 cases, J shaped extension along with forceps needed in 1, J shaped incision needed in 3 and 1 case was due to deflexed head. ¥ Significant P value*

Table 2. Post-operative morbidities in RCS

Morbidities	Repeat 1 (n=220)			Repeat 2 (n=13)			Total A+B n(%)	P value
	EL a1 n(%)	EM a2 n(%)	Total A = (a1+a2) n(%)	EL b1 n(%)	EM b2 n(%)	Total B = (b1+b2) n(%)		
Post-operative blood transfusion	-	4 (1.8)	4 (1.8)	1	-	1 (7.7)	5 (2.1)	0.251
Puerperal pyrexia	2 (0.9)	2 (0.9)	4 (1.8)	1	-	1 (7.7)	5 (2.1)	0.251
UTI	11 (5)	21 (9.5)	32 (14.5)	3	-	3 (23.1)	35 (15)	0.307
Chest infection	1 (0.5)	-	1 (0.5)	-	-	0 (0)	1 (0.4)	0.734
Thrombophlebitis	2 (0.9)	2 (0.9)	4 (1.8)	-	-	0 (0)	4 (1.7)	0.496
Wound infection	2 (0.9)	2 (0.9)	4 (1.8)	-	-	0 (0)	4 (1.7)	0.496
Secondary Suturing	-	1 (0.5)	1 (0.5)	-	-	0 (0)	1 (0.4)	0.734
Hb deficit (mg/dl, mean±SD)	0.93±0.78	1.12±0.97	1.04±0.9	0.73±1.13	0.93±0.75	0.78±1.03	1.03±0.91	0.309
Hospital stay (adjusted days, mean±SD)	3.51±2.1	3.46±2.77	3.48±2.5	3.80±1.81	3.33±0.57	3.69±1.6	3.49±2.46	0.760

Table 3. Scar tenderness and uterine scar status at emergency RCS

Scar tenderness	RCS	Scar status (Intra-operative)				Total
		Intact	Thinned	Dehiscence	Rupture	
No (n = 209)	Repeat 1	195	2	1	0	198
	Repeat 2	9	0	2	0	11
Yes (n = 24)	Repeat 1	16	4	1	1	22
	Repeat 2	1	1	0	0	2
Total 233		**221**	**7**	**4**	**1**	**233**

Table 4. Morbidities related to adhesions

Morbidities	Minimal adhesion (n=115)			Dense adhesion (n=73)			P value
	Repeat 1 a1 n(%)	Repeat 2 a2 n(%)	Total A = (a1+a2) n(%)	Repeat 1 b1 n(%)	Repeat 2 b2 n(%)	Total B = (b1+b2) n(%)	
Placenta previa	3 (2.6)	1 (0.9)	4 (3.5)	2 (2.7)	2 (2.7)	4 (5.5)	0.513
Difficulty in delivery	5 (4.4)	-	5 (4.4)	3 (4.1)	-	3 (4.1)	0.937
Extension of Uterine incision Intentional Incidental	3 (2.6) 2 (1.7) 1 (0.9)	- - -	3 (2.6) 2 (1.7) 1 (0.9)	4 (5.5) 2 (2.7) 2 (2.7)	- - -	4 (5.5) 2 (2.7) 2 (2.7)	0.319
Puerperal pyrexia	1 (0.9)	-	1 (0.9)	3 (4.1)	1 (1.4)	4 (5.5)	0.056
UTI	13 (11.30)	-	13 (11.30)	16	3 (4.1)	19 (26.0)	0.009¥
Wound infection	4 (3.48)	-	4 (3.48)	-	-	0 (0)	0.107
Duration of surgery (mins, mean±SD)	45.0±11.9	43.8±18.9	45.0±12.1	55.3±20.7	48.8±9.5	54.6±19.8	0.000¥
Hb deficit (mg/dl, mean±SD)	0.88±0.75	0.38±1.72	0.86±0.80	1.26±1.10	0.86±0.58	1.22±1.06	0.009¥
Hospital Stay (adjusted days, mean±SD)	3.5±1.3	3.5±2.9	3.5±2.8	3.9±1.9	3.3±1.3	3.4±1.3	0.751

¥ *Significant P value*

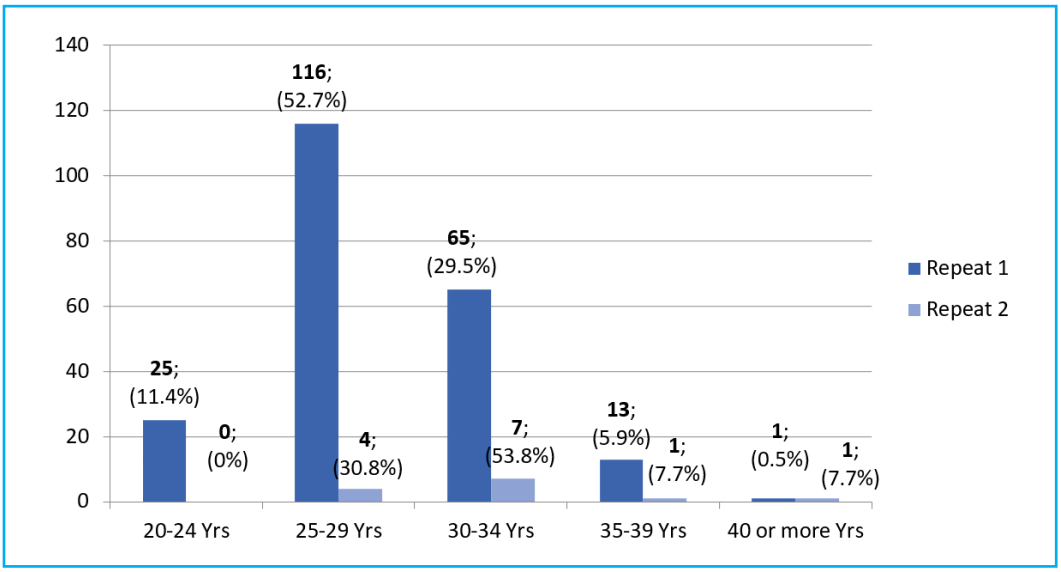

Figure 1. *Distribution of age in repeat 1 and repeat 2 CS (n=233)*

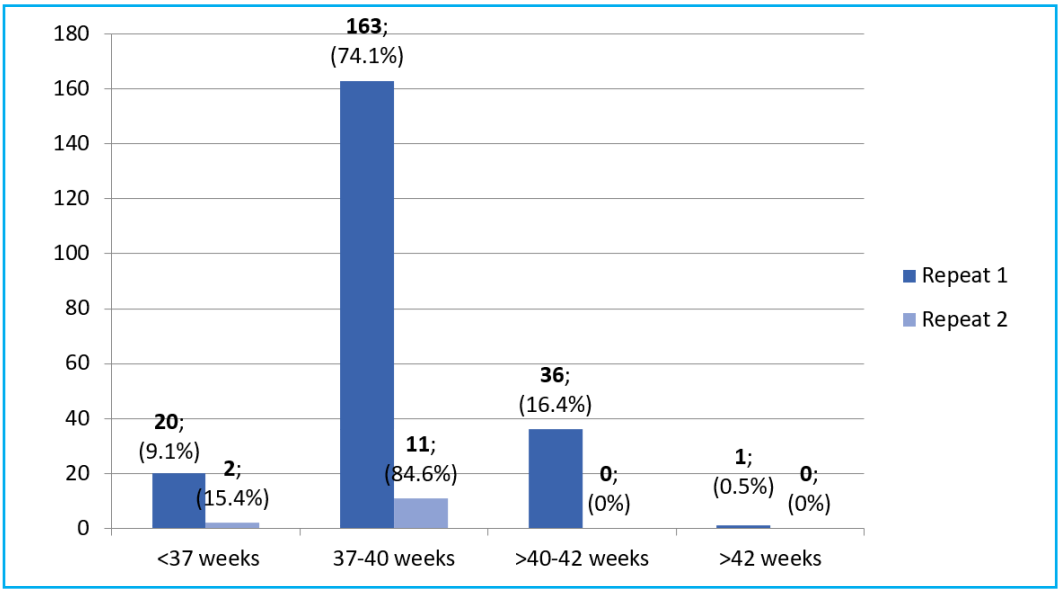

Figure 2. *Distribution of period of gestation in repeat 1 and repeat 2 CS (n=233)*