

# Maternal and perinatal outcome in placenta previa with scarred and unscarred uterus: a comparative study in a tertiary care centre and medical college

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## ABSTRACT

**Background:** The incidence of placenta previa is increasing over the decades in view of increased incidence of caesarean delivery. Hence increasing the complications of scarred uterus during delivery. **Aim:** To compare maternal and perinatal outcome in placenta previa with scarred and unscarred uterus. **Materials and methods:** A case control study of 202 cases were divided into two groups - A (Scarred uterus involving 62 cases) and B (unscarred uterus involving 140 cases) for the study period of June 2017 to December 2019. Patients attending OPD/Labour room with complaints of antepartum haemorrhage or diagnosed placenta previa by ultrasonography after 24 weeks of gestation were included in the study. **Results:** Incidence of placenta previa in scarred uterus is 0.243% and unscarred uterus was 0.55%. Intraoperative complications like placental bed bleeding (p value - 0.000), atonic PPH (Post-Partum Haemorrhage) (p value-0.001), medical management of PPH (p value-0.001), pressure sutures (p value-0.306), accreta (0.000), bladder injury and repair (p value-0.000) were more in scarred uterus when compared to unscarred uterus. The birthweight, NICU (Neonatal Intensive Care Unit) admissions did not differ between scarred and unscarred uterus. **Conclusions:** In this study the intraoperative complications and postoperative morbidity was higher, which was statistically significant in scarred uterus group when compared to unscarred uterus group.

**Keywords:** Placenta accreta, scarred uterus, unscarred uterus, placenta previa.

Placenta previa complicates 0.3% - 0.5% of all pregnancies and is a major cause of third trimester hemorrhage. Almost 30 % maternal deaths in the Asian population are due to major obstetrical haemorrhage in placenta previa, especially due to rise in the incidence of cesarean sections.<sup>1,2</sup> It has been observed over the period of years the incidence of placenta previa is increased globally<sup>3</sup> due to increased incidence of caesarean delivery. Complications arising from adherent placenta are postpartum haemorrhage, peripartum hysterectomy, DIC leading to

increased hospital stay, hence increasing both maternal morbidity and mortality.<sup>4</sup> Complications arising from premature delivery and birth asphyxia leading to increased perinatal mortality and morbidity.<sup>5</sup>

Uterine scarring secondary to caesarean delivery, dilation and curettage, infection and trauma lead to abnormality of endometrial surface and function leading to compromised vascularisation which reduces the differential growth of lower segment which prevents migration of placenta as pregnancy advances.<sup>6</sup>

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The aim of this study is to evaluate the risk factors, outcomes, complications for cases of placenta previa in previously scarred uterus.

**Materials and methods**

This is a prospective case control study in a tertiary care medical college hospital Karnataka Institute of Medical Sciences HUBLI is a teaching medical college with post graduates and catering as a tertiary care centre for 5 districts with an average of 51.9 lakh population from Dharwad, Gadag, Koppal, Haveri and Sirsi. The duration of study was from June 2017 to November 2019. Our centre has an average delivery rate of 1000 deliveries per month with average maternal mortality rate of 132 and perinatal mortality rate of 526 for the period of 3 years.

All women were diagnosed placenta previa by scan after 24 weeks of gestation were taken for the study. Patients attending OPD/Labour room with complaints of antepartum haemorrhage or diagnosed placenta previa by ultrasonography after 24 weeks of gestation were included in the study. Detailed history of present and previous pregnancies was noted

They were divided into Group A in which placenta previa of any type occurring in unscarred uterus and Group B in which placenta previa of any type occurring in a previously scarred uterus like previous caesarean section, previous history of dilatation and curettage, previous myomectomy.

The age incidence, parity, gestational age, type pf placenta previa and occurrence of placenta previa in scarred uterus with previous 1 LSCS, 2 LSCS, previous D and C were compared. Incidence of occurrence of antepartum haemorrhage (APH), clinical severity of APH was noted. Intraoperative complications like atonic PPH, placental bed bleeding, adhesions, placenta accrete and percreta were compared between the scarred and unscarred uterus group.

The management of PPH requiring either drugs like oxytocin, prostaglandins or surgical procedures like placental bed pressure sutures, stepwise uterine artery devascularisation, B lynch sutures, internal iliac artery ligation were compared. Additional procedures like application of paracervical clamps, Foleys tamponade, subtotal hysterectomy or total hysterectomy were noted and compared. Occurrence of adhesions, placenta accreta, bladder injury was also noted and compared. Occurrence of postpartum complications, ICU admissions, ARDS, AKI, puerperal sepsis, surgical wound infection were noted and compared. The occurrence of anaemia, quantitative requirement of blood and blood product transfusions,

duration of hospital stay were noted and compared. The perinatal parameters like gestational age, birth weight, sex of the baby was noted and compared. Perinatal morbidity in form of preterm, low birth weight, jaundice, RDS, neonatal sepsis requiring NICU admission and perinatal mortality were noted and compared in scarred and unscarred groups.

All the collected data was entered into excel sheet and after appropriate data cleaning, the data was transferred and analyzed using SPSS software version 22. Results were analyzed by using mean, standard deviation, chi square test & other appropriate statistical tests for significance.

**Results**

There were 62 subjects in the scarred group, and 140 subjects were in the unscarred group included in the final analysis. Among the scarred group, 44(70.97%) reported one previous LSCS, 16(25.81%) reported two previous LSCS and remaining 2(3.23%) had a history of 3 LSCS plus D&C.

**Table 1: Summary of baseline characteristics (N=202)**

Parameters	Group		P value
	Scarred (N=62)	Unscarred (N=140)	
Age in years Median (IQR)	26 (23 to 28)	25 (23 to 28)	0.169
Parity			
Primi	0 (0%)	43 (30.71%)	
G2	31 (50%)	42 (30%)	*
G3 And More	31 (50%)	55 (39.29%)	
Haemoglobin level			
Hb (gm/dl) at admission (N=202)	10.7 (9.8 to11.53)	10.4 (9 to 11.3)	0.078

\* No statistical test was applied due to 0 subjects in the cell

The median age was 26 (range 23 to 28) in the scarred group, and it was 25 (range 23 to 28) in the unscarred group. The difference between the two groups was statistically not significant ( p value 0.169 ). In parity, the majority of

**Table 2: Comparison of present USG between group (N=202)**

Placenta previa	Group		Chi square	P value
	Scarred (N=62)	Unscarred (N=140)		
By USG				
I	23 (37.1%)	50 (35.71%)		
II	4 (6.45%)	15 (10.71%)		
IIA	6 (9.68%)	14 (10%)	2.530	0.772
IIB	4 (6.45%)	15 (10.71%)		
III	6 (9.68%)	13 (9.29%)		
IV	19 (30.65%)	33 (23.57%)		
Intraoperative				
I	23 (37.1%)	48 (34.29%)		
IIA	10 (16.13%)	27 (19.29%)		
IIB	4 (6.45%)	13 (9.29%)	1.482	0.830
III	6 (9.68%)	17 (12.14%)		
IV	19 (30.65%)	35 (25%)		

participants belonged to the unscarred group. The median of haemoglobin (Hb) admission was 10.7 (gm/dl) (range 9.8 to11.53) in the scarred group, and it was 10.4 (gm/dl) (range 9 to11.3) in the unscarred group, and the difference in

between two groups was statistically not significant (p value 0.078) (table 1).

**Table 3: Comparison of history of APH between group (N=202)**

APH	Group		Chi square	P value
	Scarred (N=62)	Unscarred (N=140)		
Yes	30 (48.39%)	107 (76.43%)	15.482	<0.001
No	32 (51.61%)	33 (23.57%)		

Out of 62 people in scarred group majority of 23 (37.1%) participants belonged to type I placenta previa and out of 140 unscarred people 50 (35.71%) participants belonged to type I. The difference in the proportion of two groups were statistically not significant (p value 0.772). The difference in the proportion of intraoperative and group (scarred and unscarred) was statistically not significant. (p value 0.830) (table 2).

**Table 4: Comparison of operative complications between-group (N=202)**

Operative complications	Group		Chi square	P-value/ Fisher exact
	Scarred (N=62)	Unscarred (N=140)		
<b>Intraoperative</b>				
Placental bed bleed	21 (33.87%)	14 (10%)	17.093	<0.001
Atonic PPH	19 (30.65%)	16 (11.43%)	11.077	<0.001
DIC	1 (1.61%)	0 (0%)	*	*
Adhesions	7 (11.29%)	0 (0%)	*	*
Accreta	21 (33.87%)	4 (2.86%)	38.113	<0.001
Hypotension	3 (4.84%)	0 (0%)	*	*
Bladder injury + Repair	7 (11.29%)	0 (0%)	*	*
<b>Postoperative</b>				
ICU admission	15 (24.19%)	4 (2.86%)	22.957	<0.001
Wound infection	1 (1.61%)	3 (2.14%)	0.062	1.000
Burst abdomen	1 (1.61%)	0 (0%)	*	*
Post op fever	0 (0%)	2 (1.43%)	*	*
AKI + dialysis	0 (0%)	1 (0.71%)	*	*
LRTI	2 (3.23%)	2 (1.43%)	0.715	0.588

PPH- Postpartum haemorrhage, DIC – Disseminated intravascular coagulation, ICU – Intensive care unit, Post op – Postoperative, AKI – Acute kidney injury, LRTI – Lower respiratory tract infection. \*No statistical test was applied-due to 0 subjects in the cell

Out of 62 scarred people, 30 (48.39%) participants had a history of APH, and Out of 140 participants in the unscarred group, 107 (76.43%) participants had a history of APH. The difference in the proportion of the two groups was statistically significant (p value < 0.001) (table 3).

**Table 5: Comparison of operative technique between group (N=202)**

Operative technique	Group		Chi square	P-value/ Fisher exact
	Scarred (N=62)	Unscarred (N=140)		
Medical management	19 (30.65%)	16 (11.43%)	11.077	<0.001
B Lynch sutures	2 (3.23%)	3 (2.14%)	0.209	0.644
Para cervical clamps	4 (6.45%)	6 (4.29%)	0.428	0.500
Pressure sutures	6 (9.68%)	8 (5.71%)	1.046	0.369
Uterine artery ligation	9 (14.52%)	16 (11.43%)	0.378	0.539

\* No statistical test was applied-due to 0 subjects in the cell

Out of 62 participants in the scarred group, majority of 21 (33.87%) participants had placental bed bleed, 21

(33.87%) participants presented with accrete, 19 (30.65%) participants presented with atonic PPH. Out of 140 participants in the unscarred group, the majority of the 16 (11.43%) participants showed atonic PPH. The difference in the proportion of placental bed bleed, atonic PPH, accreta, ICU admission vs group (scarred and unscarred) was statistically significant (p value < 0.05).

Out of 62 people in the scarred group, majority of participants received medical management, and in 140 participants in unscarred group 16 (11.43%) participants received medical management and the difference in the proportion of medical management between group (scarred, unscarred) was statistically significant (p value <0.05) (table 5).

Out of 62 people in the scarred group, majority 10 (16.13%) of participants reported subtotal hysterectomy and foley's tamponade each. In 140 participants in the unscarred group, 5(3.57%) reported foley's tamponade and 4(2.86%) reported internal iliac artery ligation, the difference in the proportion of subtotal hysterectomy, foley's tamponade and internal iliac artery ligation between group (scarred, unscarred) was statistically significant (p value < 0.05) (table 6).

The median of birth weight was 2.54 (range 2.1 to 3) in the scarred group, and it was 2.4 (range 1.88 to 2.85) in the unscarred group, and the difference in the proportion of birth weight and the group was statistically not significant (p value 0.138). In NICU admission, 14 (23.73%)

participants belonged to the scarred group, and 40 (30.53%) participants belonged to the unscarred group. The difference

**Table 6: Comparison of operative outcomes between group (N=202)**

Operative outcomes	Group		Chi square	P-value/ Fisher exact
	Scarred (N=62)	Unscarred (N=140)		
Internal iliac ligation	8 (12.9%)	4 (2.86%)	7.761	0.009
Subtotal hysterectomy	10 (16.13%)	3 (2.14%)	13.959	<0.001
Total hysterectomy	3 (4.84%)	0 (0%)	*	*
Foley's tamponade	10 (16.13%)	5 (3.57%)	9.857	0.003

\* No statistical test was applied-due to 0 subjects in the cell

in the proportion of NICU admission between the group was statistically not significant (p value 0.138). the difference in the proportion of duration of NICU, perinatal mortality between the group was statistically not significant (p value >0.05) (Table 7).

**Table 7: Comparison of neonatal complications between group (N=202)**

Neonatal complications	Group		P value
	Scarred	Unscarred	
Low birth weight in Kg	2.54 (2.1,3)	2.4 (1.88,2.85)	0.138
NICU admission	(N=59)	(N=131)	
Yes	14 (23.73%)	40 (30.53%)	0.336
No	45 (76.27%)	91 (69.47%)	
Cause for admission	(N=14)	(N=40)	
LBW	3 (21.43%)	14 (35%)	
Jaundice	1 (7.14%)	3 (7.5%)	
RDS	6 (42.86%)	12 (30%)	
LBW, RDS	3 (21.43%)	8 (20%)	*
PROM	1 (7.14%)	1 (2.5%)	
GDM	0 (0%)	1 (2.5%)	
TOF	0 (0%)	1 (2.5%)	
Duration NICU in hrs	(N=14)	(N=40)	
1 to 8	11 (78.57%)	23 (57.5%)	0.372
9 to 16	2 (14.29%)	11 (27.5%)	
17 to 27	1 (7.14%)	6 (15%)	
Perinatal mortality	(N=62)	(N=140)	
Yes	5 (8.06%)	14 (10%)	0.664
No	57 (91.94%)	126 (90%)	

NICU – Neonatal intensive care unit, LBW – Low birth weight, RDS – Respiratory distress syndrome, PROM – Premature rupture of membrane, GDM – Gestational diabetes mellitus, TOF – Tetralogy of fallot.

\* No statistical test was applied due to 0 subjects in the cell

During univariate binary logistic regression analysis, the factors which have shown statistically significant association with APH in USG grading (I) and intra operative grading (I) (Table 8).

**Table 8: Factors associates with APH in study population univariate logistic regression analysis (N=202)**

Factor	Un-adjusted odds ratio	95 % CI of odds ratio		P value
		Lower	Upper	
Unscarred group (Baseline=Scared group)	3.459	1.837	6.512	<0.001
Age	1.033	0.955	1.117	0.414
Parity (Baseline=Primi)				
G2	0.696	0.312	1.556	0.378
G3 and more	1.119	0.501	2.500	0.783
Hb at admission	0.872	0.739	1.028	0.103
USG grading (Baseline=IV)				
I	0.339	0.158	0.730	0.006
II	2.006	0.785	5.127	0.146
III	1.382	0.391	4.879	0.616
Intra operative grading (Baseline=IV)				
I	0.334	0.157	0.712	0.004
II	2.212	0.848	5.766	0.105
III	1.827	0.533	6.261	0.338

**Discussion**

Placenta previa is an essential cause of maternal and foetal morbidity and mortality and is on the forefront in the deadly triad for maternal mortality followed by eclampsia and sepsis in india.<sup>7</sup> Advancing maternal age appears to increase the risk of placenta previa independent of other factors.<sup>8</sup>

The present study showed the majority of the women in both the groups belonged to middle age group which was similar to results by Katke RD. Majority of the patients in the study were between 25-30 years of age (group A - 53.3%, group B - 48%). 26.7% of women with scarred uteri were over 36 years of age as compared to 4% of women in group B (p=0.04, significant)<sup>9</sup>. Frequency of placenta previa is 3.46% and found to be more common in young age and in grand multipara.<sup>10</sup> In study by Rajini P et al., primi para contributing 29.2% without any predisposing factors. Which was clearly showing increasing in the incidence of placenta previa in primigravida.<sup>11</sup> The results of the present study did not match with them as there was majority of multigravida women in both the groups. But the results were consistent with Reddy et al in which 69% were multiparous and Gayatri et al in which para 3 in scarred uterus was 45% and in unscarred cases in para 2 was 30%.<sup>12, 13</sup> Pregnant women presenting with placenta previa and prior cesarean have a higher risk of placenta accreta.<sup>14</sup>

In the current study placenta previa grade I was more predominant whereas in the study by Katke RD, the incidence of grade III and grade IV placenta previa was highest in the group A (66.7% each), whereas the maximum number of patients in group B had a grade 2 placenta previa (32%) (p=0.99, nonsignificant).<sup>9</sup>

The antepartum haemorrhage (APH) was in the majority of scarred uterus cases in the present study. The prevalence of APH was a high rate among pregnant women with placenta previa.<sup>15</sup>

In the current study among the intraoperative complications, placental bed bleeding was dominantly present in the scarred group and statistically significant. There are a few methods to prevent and treat placenta previa bleeding immediately after cesarean delivery and control intraoperative bleeding during the cesarean operation. A safe intraoperative method to control placenta previa bleeding is required. However, there is no standard gold treatment of placenta previa hemorrhage<sup>16</sup>. Clamping of ascending branch of cervical artery by applying clamps vaginally is a natural method, affordable with no cost and at the same time appears to be safe, potentially practical and more useful in controlling bleeding from the placental bed in the lower uterine segment.<sup>17</sup> Atonic postpartum haemorrhage is common among high-risk pregnancies.<sup>18</sup> The current study showed the statistical significance of atonic postpartum haemorrhage and medical management in both the groups. Uterine atony is the most common cause of postpartum

hemorrhage. Atony is treated initially by bimanual uterine compression and massage, followed by drugs that promote uterine contraction.<sup>19</sup>

In this study, placental bed bleeding and accreta was majorly observed in the scarred group, and atonic PPH, medical management, uterine artery ligation was equally observed as the majority in unscarred group. Similarly, there was the only case of placenta accreta in unscarred group (6.7%) in a study by Katke RD.<sup>9</sup> In another study intraoperative bowel and bladder injuries were 3.8% (n=2) and 13.2% (n=7) respectively. Of women with placenta previa, 26.9% (n=14) had placenta accreta.<sup>2</sup> Bilateral uterine artery ligation before the delivery of the placenta in women with placenta accreta can effectively reduce the amount of intraoperative blood loss, the incidence of PPH, and the risk of complications, such as hysterectomy.<sup>20</sup>

Atonic postpartum hemorrhage and placental site bleeding due to adherent placenta accreta can be safely controlled by bilateral uterine artery ligation followed by B-lynch compression suturing in women who desire to remain fertile.<sup>21</sup> In the present study, both the groups showed statistical insignificance for the B-lynch sutures. Koyama E et al. concluded that a combination of the B-lynch brace suture technique and uterine artery embolization may be an alternative treatment for emergency bleeding during cesarean section in patients with placenta previa accreta.<sup>22</sup> In this study, internal iliac artery ligation (IIAL) was used majorly for scarred uterus. Study by Joshi V et al. concluded that IIAL was useful in the treatment and prevention of post partum haemorrhage PPH from any cause. Early resort to IIAL effectively prevents hysterectomy in women with atonic PPH. In traumatic PPH, IIAL facilitates hysterectomy or repair as indicated and prevents reactionary haemorrhage.<sup>23</sup> However, Iwata A et al. reported that in cases of placenta previa accreta, ligation of the internal iliac artery did not significantly contribute to hemostasis during cesarean hysterectomy.<sup>24</sup> A significant proportion of its arterial supply from descending cervical and vaginal arteries. These arteries continue to perfuse the lower segment even after uterine artery ligation, which fails to control hemorrhage.<sup>8</sup> In these circumstances, IIAL is more effective by diminishing blood flow in the uterine, cervical, and vaginal vessels. This technique of stepwise evascularization of uterus which includes bilateral uterine and ovarian artery ligation is effective in decreasing the blood loss, but uterine ischemia followed by synechiae formation, premature ovarian failure, and secondary amenorrhea has been reported

subsequent to this procedure.<sup>25, 26</sup> Current results also conclude a statistically significant relation between the groups in subtotal hysterectomy.

Significant vertical lateral compression sutures with inserting inflated balloon of foley's catheter is an effective method for controlling bleeding in cases of placenta previa/accreta.<sup>27</sup> A study done by Ali MK et al. recommend that 2-way foley's catheter tamponade could be an option to control immediate postpartum hemorrhage resulting from major placenta previa during the cesarean section as it is simple, cheap, nearly non-invasive method and should be considered to reduce the risk of peripartum hysterectomy. Similarly, present study revealed statistically significant relation for foley's tamponade between both the group. Temporary occlusion of the abdominal aorta with preset balloon to assist the cesarean section for patients with placenta previa complicated by placenta accreta can effectively reduce the amount of intraoperative blood loss and markedly reduce hysterectomy rate.<sup>28</sup>

#### **Conclusion**

In this study the intraoperative complications and postoperative morbidity was higher, which was statistically significant in scarred uterus group when compared to unscarred uterus group. Hence we conclude from our study that decreasing the primary cesarean rate and mandatory doppler study for anterior placenta previa in a previously scarred uterus in addition to planned tertiary care hospital delivery with a team of expert obstetricians well trained in internal iliac artery ligation, total hysterectomy with placenta insitu go in the long run to reduce intraoperative complications, along with expert anesthesiologist to manage patients in shock. Facility of preoperative internal iliac artery balloon catheterization would be life saving but not cost effective in our country and a good blood bank facility will reduce the maternal mortality and morbidity arising from complications of placenta previa.

**Conflict of interest:** None. **Disclaimer:** Nil.

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