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Original Article

Comparison of Pre-Operative Blood Loss in Seropositive and Seronegative Pregnant Women Undergoing Elective Cesarean Section

Amina Akbar, Sadia Zainab*, Saira Mahboob, Sadaf Zohra***, Sadia Khan***, Khalida Parveen*****

Pakistan Air Force Hospital, Islamabad Pakistan, *PNS Hafiz, Islamabad Pakistan, **PNS Shifa, Karachi Pakistan, ***Pak Emirates Military Hospital/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: To compare the intraoperative blood loss and adhesions, peri-operative blood and intravenous iron supplementation between hepatitis seropositive and seronegative pregnant women undergoing elective cesarean delivery.
Study Design: Cross-sectional, analytical study.
Place and Duration of Study: Departments of Anesthesiology and Gynecology & Obstetrics, Combine Military Hospital, Okara Cantt Pakistan, from Oct 2018 to Mar 2019.
Methodology: After approval of the hospital ethical committee, 134 (n=67 in each Group) pregnant women were included in our study by convenient sampling. Patients were divided into two groups. Group-A included seronegative pregnant women, whereas Group-B were seropositive pregnant women.
Results: There was no difference in the age (p=0.357), gravidity (p=0.159), parity (p=0.226) and the number of cesarean sections (p=0.475) between the two groups. There was no difference in the two groups regarding peri-operative haemoglobin change, with an insignificant reduction of 0.60±1.21 g/dL in Group-A versus a reduction of 0.50±1.08 g/dL in Group-B. A mild level of adhesion was observed intraoperatively in 26(35.6%) in Group-A versus 27(37.5%) in Group-B; p=0.170. Mild difficulty securing hemostasis was reported in 25(34.2%) vs 29(40.2%) patients; p=0.329. 61(83.5%) did not require a peri-operative blood transfusion in Group-A versus 59(81.9%) in Group-B; p=0.528.
Conclusion: Our study has shown that the peri-operative haemoglobin level, blood product and intravenous iron supplementation, intra-operative adhesions encountered, and difficulty in hemostasis were comparable between sero-positive and sero-negative viral hepatitis pregnant women.

Keywords: Adhesions, Blood loss, Hemostasis, Hepatitis B, Hepatitis C, Seropositive.

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INTRODUCTION

Hepatitis serology screening is performed during preoperative assessment during lower segment cesarean section. Studies have shown the incidence of hepatitis B and C in the general population (6.46% to 28.1%) in Pakistan and up to 7.29% in pregnant women presenting in obstetrics.[1-3] These patients are at an increased risk of peri-operative morbidity and mortality, as peri-operative mortality of 10%, 30% and 80% have been reported in chronic liver disease Child-Pugh class A, B and C, respectively.[4] Most of the peri-operative mortality in liver disease patients is due to hepatocellular injury caused by hypotension, haemorrhage, sepsis, acute hepatitis, effects of hepatotoxic drugs, systemic vasoconstriction with hepatic insufficiency due to neuroendocrine stress response or decompensated liver failure.[5,6] Intraoperative haemorrhage in liver disease may be due to coagulation factors deficiency, thrombocytopenia, oesophagal or ectopic varices or portosystemic shunting.[7] In addition, there is a high risk of transmission of hepatitis viral to healthcare workers in the peri-operative period. Hence, universal precautions are applied whenever patients are operated on who are known or suspected to have transmissible liver disease.[8,9]

According to the authors' knowledge, limited data is available in studies regarding peri-operative outcomes of pregnant women who are only seropositive without liver decompensation. In addition, the authors could not find any reference where co-existing sero-positivity in pregnancy was studied as a risk factor for adhesion or difficulty maintaining hemostasis in repeat LSCS. Therefore, our study aimed to compare the peri-operative haemoglobin change, peri-operative blood transfusion, iron supplementation, and intra-abdominal adhesions between seropositive and seronegative pregnant women undergoing elective cesarean delivery with a history of previous lower segment cesarean section.

METHODOLOGY

After the approval of the hospital ethical committee (IERC/OBS/2018/02), the cross-sectional

Correspondence: Dr Saira Mahboob, Department of Anesthesia, PNS Shifa, Karachi, Pakistan
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analytical study was conducted at the Departments of Gynecology & Obstetrics and Anesthesiology, Combined Military Hospital, Okara Cantonment Pakistan, from October 2018 to March 2019. WHO calculator was used to calculate a sample size with an expected incidence of 9.68% of hepatitis B and C seropositive cases.[10]

Inclusion Criteria: Pregnant women aged 18-35 with singleton pregnancy at term who had previously undergone cesarean delivery and underwent elective cesarean section were included in the study.

Exclusion Criteria: Pregnant women with previous complicated cesarean section; ongoing/ anticipated antepartum or post-partum haemorrhage; emergency lower section cesarean section and patients with impaired liver function test; coagulopathy or showing signs of decompensated viral hepatitis B or C related liver disease were excluded from the study.

The patients were divided into two groups by non-probability consecutive sampling. Group-A included seronegative for hepatitis B or C patients, whereas Group-B included hepatitis B and C seropositive patients. The hepatitis profile was performed on presentation to the outdoor department and taken as baseline status. The liver enzymes and coagulation profile were repeated one day prior to surgery. The indication for cesarean section was decided by either of two classified gynaecologists with more than 5-year post-graduate experience. No changes in the obstetrical plan or pre-anaesthesia preparation were made for the study. The primary outcomes were: a change in haemoglobin and the requirement for peri-operative blood and blood products.

The secondary outcomes included difficulty maintaining hemostasis, intraabdominal adhesions observed, and post-operative intravenous iron supplementation. The two obstetric surgeons graded the intraoperative adhesions on a four-point scale as none, mild, moderate or severe.[11] The subjective difficulty in maintaining hemostasis was classified on a four-point scale as none, mild, moderate or severe. LSCS, where obstetricians requi-red increased time (greater than 15 minutes) to main-tain hemostasis, were labelled as mild, those requiring spongostan to maintain hemostasis as moderate and uterine artery ligation as severe difficulty in hemo-stasis. The patient requiring a hysterectomy for hemostasis and greater than 1000ml blood loss were excluded. The blood loss was estimated bsy an anaesthetist using the gauze visual analogue method.[12]

The data was analyzed using Statistical Package for Social Sciences (SPSS) version 23.00. The quantitative data like age, previous obstetric history and change in haemoglobin were presented as mean±SD. An Independent sample t-test was used to calculate significance. The qualitative data like the requirement of blood transfusion, IV iron supplementation was presented as frequency and percentage. Chi-square was used to calculate significance. The *p*-value of ≤ 0.05 was taken as statistically significant.

RESULTS

A total of 145 cases were included in our study (n=73 in Group-A and n=72 in Group-B). The mean gravidity was 3.42±1.57 in Group-A versus 3.8±1.95 in Group-B; *p*=0.159. the parity was comparable between groups, *p*-0.226 (2.0±1.14 vs. 2.2±1.49). The mean abortions in Group-A were 0.3±1.17 vs. 0.5±1.09 in Group-B, *p*=0.205 (Table-I).

Table-I: The Demographic Profile of Study Groups (n=145)

Variables	Group-A	Group-B	*p*-value
Age (years)			
18–34	64(87.7%)	61(84.7%)	0.638
≥35	9(12.3%)	11(15.3%)	
Gravidity			
≤4	59(80.9%)	53(73.6%)	0.328
≥5	14(19.2%)	19(26.4%)	
Previous Cesarean Section			
1	34(46.6%)	32(44.4%)	0.649
2	24(32.9%)	20(27.8%)	
3	9(12.3%)	13(18.1%)	
4	5(6.8%)	7(9.7%)	

There was no difference in the two groups regarding peri-operative haemoglobin change, with an insignificant reduction of 0.6g/dL±1.21 in Group-A versus a reduction of 0.5 g/dL±1.08 in Group-B. Most patients did not require blood transfusion perioperatively. Red Cell concentrate was the most common blood product transfused in both groups (15.0% in Group-A versus (9.7% in Group-B). The mean blood loss was well within ranges for a normal cesarean section, 487.6 ml in Group-A versus 365.9 ml in Group-B. The comparison of the two groups regarding haemoglobin, blood loss, blood transfusion and IV iron supplementation are tabulated in Table-II.

The intra-operative adhesions and level of difficulty in achieving hemostasis were classified as four points by the obstetrician. The comparison between the levels of adhesions observed by the surgeon's difficulty in maintaining hemostasis is shown in Table-III.

Table-II: Comparison of Study Groups in regards to Blood Loss, Transfusion and Iron Supplementation (n=145)

Variables	Group-A	Group-B	*p*-value
Pre-operative hemoglobin (g/dL)	11.0±1.33	10.5±1.24	0.661
Post-operative hemoglobin (g/dL)	10.1±1.37	10.5±1.24	0.066
Change in hemoglobin (g/dl)	-0.6±1.21	-0.5±1.08	0.444
Per-operative blood loss	487.6±124.6	365.9±171.7	0.066
Peri-Operative Blood and Blood Products Transfusion			
None	61(50.8%)	59(49.2%)	0.156
Red cell concentrate alone	11(61.1%)	7(38.9%)	
Red cell concentrate with fresh frozen plasma	1(16.7%)	5(83.3%)	
Fresh frozen plasma alone	-	1(100%)	
Postoperative Intravenous Iron Supplement			
Yes	14(46.7%)	16(53.3%)	0.651
No	59(51.3%)	56(48.7%)	

Table-III: Comparison of Intra-Operative Adhesions and Difficulty in maintaining Hemostasis in the Study Population (n=145)

Variables	Group-A	Group-B	*p*-value
Adhesions observed by surgeon			
No	36(52.9%)	32(47.1%)	0.563
Mild	26(49.1%)	27(50.9%)	
Moderate	8(40%)	12(60%)	
Severe	3(75%)	1(49.7%)	
Difficulty in maintaining hemostasis			
No	46(56.1%)	36(43.9%)	0.108
Mild	25(46.3%)	29(53.7%)	
Moderate	2(22.2%)	7(77.8%)	
Severe	-	-	

DISCUSSIONS

The prevalence of HBV and HCV has been reported from 2.4% to 5.64% and 0.098% to 8.7% in pregnant women worldwide.[13,14] Pregnant women with seropositive hepatitis carriers state have been studied by various authors regarding perinatal and maternal outcomes. Dabsu *et al* studied 9526 pregnant women in a tertiary care hospital in Karachi. They reported no statistically significant difference in major maternal or neonatal outcomes (low birth weight, APGAR at 1 and 5 minutes, live birth rate), mode of delivery etc., however, and they did not comment upon intra-operative conditions, including blood loss, intraabdominal adhesion or peri-operative blood requirements in their study.[15]

Our study has shown that although estimated intraoperative blood loss was well within the limits of expected limits for cesarean delivery, there was a significant difference in this loss between the seropositive and seronegative pregnant women despite having a similar demographic and intra-operative course. To avoid heterogeneity, we included pregnant women with normal coagulation profiles and platelet counts as evidenced by normal prothrombin time, activated prothrombin time and platelet count, irrespective of their serostatus. In the patient with liver disease, intra-operative blood loss depends on multiple factors, including impaired coagulation; thrombocytopenia or platelet dysfunction; hemodilution; hypothermia; activation of the fibrinolytic pathway; vascular injury and sequestration in extracorporeal circuits.[16] On the other hand, it has been shown that a decrease in procoagulant factor is balanced by reduced production of anticoagulant factors by the liver and protein C deficiency may even result in a thrombophilic state.[17] Lee *et al*. reported that patients with Child-Pugh class B or C had a higher risk of bleeding after colonoscopic polypectomy than class A patients.[18] The authors could not find any relatable literature that compared intra-operative blood loss between seropositive and seronegative pregnant women.

In the setting of secondary care setup, pregnant women with decompensated liver disease are usually referred to a tertiary care hospital with the availability of a hepatologist and intensivist in non-emergency surgeries. At our institute, an Enzyme-linked immunosolvant assay (ESSAY) was used to detect the presence of hepatitis B, and C. Polymerase chain reaction (PCR) for quantification of viral load was not done routinely. Patients were advised to follow up in the outdoor medicine department for the continued care of their disease.[17,18]

Multiple factors are involved in the development of intra-abdominal adhesions. Adhesions have been reported to be responsible for 15-20% of secondary infertility in females. These can result in follicular entrapment, impaired mobility, and blockade of fallopian tubes. Other authors have reported risk factors like increased numbers of prior LSCS, post-partum infections, age greater than 35 years, and body mass index ≥30 kg/m2 associated with a higher presence of adhesions in gynaecological surgeries. According to the authors' knowledge, no data is available regarding comparing adhesions in seropositive and seronegative pregnant women undergoing repeat LSCS. Our study

has shown no correlation between the level of adhesion and seropositivity.

LIMITATIONS OF STUDY

Our study had certain limitations. Firstly, we included only patients with seropositive liver disease that was not decompensated. Therefore, our results cannot be extrapolated on peri-operative outcomes in pregnant ladies with decompensated liver disease. Secondly, we did not study whether pregnant women had taken anti-viral treatment before admission. Hence, our results cannot deduce the peri-operative outcome in women treated for viral hepatitis.

CONCLUSION

Our study has shown intraoperative blood loss, adhesions observed, difficulty in securing hemostasis, peri-operative blood and blood product transfusion, as well as intravenous iron supplementation, was comparable in sero-positive and sero-negative pregnant women undergoing elective cesarean section.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

AA: Conception, interpretation of data, drafting the manuscript, approval of the final version to be published.

SZ: & SM: Study design, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

SZ: Data acquisition, interpretation of data, approval of the final version to be published.

SK: & KP: Study design, Drafting the manuscript, interpretation of data, approval of the final version to be published.

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