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# ASSOCIATION OF SCAR TENDERNESS AND OTHER CLINICAL SIGNS WITH SCAR COMPLICATIONS IN PATIENTS UNDERGOING THE TRIAL OF LABOR AFTER CESAREAN SECTION

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## ABSTRACT

**Objective:** To determine association between scar tenderness and other clinical signs of scar complications in patients undergoing a trial of labor after cesarean section.

**Methodology:** This case-control study was conducted in the Department of Obstetrics and Gynaecology, Lady Reading Hospital, Peshawar from June 2017 to June 2019. Patients with scar complications at repeat emergency cesarean section, after a failed trial of labor, were taken as cases. Controls were patients, who were found to have intact scars at repeating emergency cesarean delivery after trial of labor. Cases were compared with controls for the presence of scar tenderness, maternal tachycardia, and Cardiotocography (CTG) abnormalities. Data were analyzed using SPSS Version 23.0.

**Results:** Sixty-six women were enrolled, with an age range of 21-40 years with a mean age of  $27\pm 43.42$  years for cases, and  $28.66\pm 4.85$  for controls. The association of scar tenderness alone ( $p=0.2$ ), maternal unexplained tachycardia alone ( $p=0.886$ ), and abnormal CTG alone ( $p=0.44$ ) with scar complications were not significant. A significant association was observed between a combination of scar tenderness, abnormal CTG, and maternal tachycardia with scar complications ( $p=0.006$ ,  $aOR=21.33$ ,  $CI:2.37-19.20$ ).

**Conclusion:** A combination of clinical signs including scar tenderness and unexplained maternal tachycardia as well as abnormal CTG serve as a valid indicator of impending scar complications and should be included in the monitoring of women undergoing the trial of labor after a previous cesarean.

**Keywords:** Scar Tenderness; Scar Dehiscence; Maternal Tachycardia.

## INTRODUCTION

The issue regarding the growing rate of cesarean section (CS) globally, has focused on vaginal birth after cesarean (VBAC).<sup>1</sup> Though after CS, the rate of vaginal delivery is increasing propitiously due to concern over maternal as well as perinatal mortality and morbidity it is still limited.<sup>2</sup> VBAC can be encouraged by appropriate monitoring of labor along with the facility of timely intervention. In general, the spontaneous VBAC success rate is between 60-82% in published studies.<sup>3,4</sup>

Nevertheless, there is an obvious rise in perinatal and maternal morbidity and mortality in the event of a failed trial of labor.<sup>5,6</sup> Rupture of the uterine scar is the utmost important risk of VBAC, and one of the prerequisites of VBAC is monitoring for the feature of scar complications. These include monitoring of cardiotocography

Cardiotocography (Cardiotocography (CTG)), abdominal pain persisting between contractions, acute onset scar tenderness, hematuria or abnormal vaginal bleeding, maternal tachycardia or shock, cessation of uterine activity, and loss of station of the presenting part. Out of these, the most persistent finding is an abnormal Cardiotocography (CTG), found in nearly 66-76 % of cases along with rupture.<sup>7</sup> Among 22% of patients abdominal pain has been reported,<sup>8</sup> abnormal vaginal bleeding in 11-67% and maternal shock in 22-46% of patients.<sup>9</sup> Palpation of the abdominal scar can suggest possible scar dehiscence. Though it's an established clinical practice, its predictive value has not been confirmed in studies.<sup>9</sup>

In the recent past, no comprehensive study has been done in Pakistan, on the association of clinical signs with impending scar complications in patients having a

trial of labor after previous cesarean delivery. Hence, the objective of this study was to find out the association of scar tenderness alone and in combination with other features with scar complications in patients experiencing repeat emergency cesarean section after a trial of labor is terminated. The results of this study will provide us with local statistics, which can help to make changes to our departmental protocols and will also open a window for further research.

## METHODOLOGY

This was an unmatched case-control study carried out in the department of Obstetrics & Gynaecology, Lady Reading Hospital, Peshawar from June 2017 to June 2019. Enrolled patients were, those with a history of previous cesarean section (CS), having repeat emergency cesarean section after a trial of labor was terminated. Patients with scar complications (thinned out the scar, scar dehiscence) at repeat cesarean were classified as cases and those having intact scars were defined as controls. After the selection of each case (as defined above), the next available women who had fulfilled the criterion for controls (given above) were selected as controls. This ensured a case and control ratio of 1:1. Cases and controls were then compared for various features like scar tenderness alone during the trial of labor, unexplained maternal tachycardia alone, abnormal Cardiotocography (CTG) alone, a combination of scar tenderness with abnor-

mal Cardiotocography (CTG), and maternal tachycardia separately and a combination of all the features including scar tenderness, abnormal Cardiotocography (Cardiotocography (CTG)) and maternal tachycardia. Data about all these features along with the patients' age, parity, clinical condition, and labor progress was obtained from the patient's hospital document. Patients referred with complications of the trial of labor (obstructed labor, ruptured uterus, non-progress of labor scar rupture/dehiscence); with intrauterine fetal death and previous two or more cesarean sections were excluded from the study.

The study protocol was approved by the Ethical Committee of Lady Reading Hospital Peshawar, and all included patients were provided written informed consent. On probability consecutive sampling technique was done. The sample was calculated using the Open EPI online calculator for sample size estimation using a 95% confidence interval, level of significance as 5%, Power of study as 80%, Proportion of control with exposure as 0.4%, and the odds ratio of 4.3 for Association of abnormal Cardiotocography (CTG) and Scar complications.<sup>11</sup> Patient information was recorded on pre-designed forms. Data were analyzed using SPSS, Version 23.0. Continuous variables were reported as mean and standard deviation and categorical variables as numbers (percent). The Chi-square test was applied for the association between categorical variables. Multivariate

logistic regression analysis was carried out to find adjusted odd ratios and to assess the independent effect of each variable.

## RESULTS

There were 66 women in the study. Group A (cases) comprised of 33 patients and Group B (controls) consisted of 33 patients in 1:1. The mean age of Group A patients was 27.42±4.42 years and of Group B patients was 28.66±4.85 years. The mean BMI of Group A was 25.54±4.54 kg/m<sup>2</sup> and of Group B was 25.93±4.39 kg/m<sup>2</sup> respectively. There were 16 (48.48%) primiparas in Group A and 08 (24.24%) primiparas in Group A had 17 (51.51%) multiparous patients and Group B had 25 (75.75%) multiparous patients. In Group A history of previous successful VBAC was present in 11 (33.33%) patients and in Group B 13 (39.39%) patients had previous successful VBAC.

Table 1 describes the logistic regression analysis for association of scar tenderness and other signs with scar complications. According to the table, combined effect of scar tenderness, abnormal Cardiotocography (CTG), and maternal unexplained tachycardia had a significant association with scar complications (p=0.006) with an adjusted odds ratio of 21.33 and the upper and lower level of confidence interval as 2.37 and 19.20 respectively.

Table 1: Summary of Logistic Regression Analysis for Association of Scar Tenderness and Other Signs with Scar Complications

	Group A N (%)	Group B N (%)	b (SE)	95% CI for Odds Ratio			
				p- value	Adjusted Odds Ratio	Lower	Upper
Constant	-	-	-.575 (0.417)	0.16	0.56	-	-
Scar Tenderness (ST) Alone	8 (24.24)	12 (36.36)	-.580 (.544)	0.287	0.56	0.193	1.627
Abnormal CTG Alone	3 (9.09)	6 (18.18)	-.118 (0.821)	0.44	1.78	0.403	7.84
Maternal Tachycardia Alone	4 (12.12)	5 (15.15)	.575 (.757)	0.886	0.88	0.178	4.441
ST Along with Abnormal CTG	4 (12.12)	4 (12.12)	-.118 (0.961)	0.902	0.88	0.135	5.84
ST Along with Maternal Tachycardia	2 (6.06)	1 (3.03)	1.269 (1.294)	0.327	3.55	0.28	44.88
ST with Tachycardia with Abnormal CTG	12 (36.36)	1 (3.03)	3.060 (1.121)	0.006	21.33	2.37	19.20

NOTE R2 = .255 (Cox & Snell), R2 = .341 (Nagelkerke). Model Chi-Sq. (df= 8), 19.471, p value = .013. \* = p<0.05, \*\* = p<0.01 & \*\*\* = p<0.001.

## ■ DISCUSSION

In our study, a combination of clinical signs including scar tenderness, unexplained maternal tachycardia, and Cardiotocography (CTG) abnormalities have been found to have a statistically significant association with scar complications in patients having a trial of labor after previous cesarean birth.

For the past several years, the incidence of cesarean section (CS) has been rising. To decrease this growth rate, and reduce the immediate and long-term complications of repeat cesarean births, patients' financial as well as medical pressure have led to increased use of trials of labor after a cesarean section. The added risk of scar complications in these patients compared to patients with non-scared uteri needs modified care in labor. As scar complications can significantly increase maternal morbidity and are associated with perinatal mortality and morbidity. This modified care includes monitoring for timely diagnosis and management of scar complications. Along with the routine geometrial monitoring, emphasis is on certain signs for timely detection of complications. These include maternal vitals, scar tenderness, and fetal heart rate changes. This study was carried out to ascertain the significance and association of scar tenderness and other clinical signs alone and in combination with scar complications. After previous CS, vaginal birth is a persuasive choice that can serve as an alternative for repeat CS and help to lower the rate of CS as a good proportion of women meet the eligibility criterion of vaginal birth after previous cesarean delivery on average of 74.8%<sup>11</sup> and a fairly success rate of around 70.7%.<sup>12</sup>

Few studies were done on VBAC that detailed scar tenderness and other clinical signs alone and in combination as one of the important reasons for the failure of a trial of the scar. In our study, none of the clinical signs alone was significantly associated

with scar complications. Maimoona and colleagues also concluded from their study that scar tenderness alone is not associated with scar complications.<sup>12</sup> In a study done in India scar tenderness was found to be a reliable predictor of scar complications with sensitivity and specificity of 92.3% and 3.8%, respectively. The likelihood ratio of a positive sign of scar tenderness being associated with scar complications in labor is 1.48.<sup>5</sup> Similarly in another study done in Pakistan scar tenderness was found to be a strong predictor of scar complications with a sensitivity of 86.3 percent.<sup>10</sup> This is in contrast to our findings. In our study scar tenderness alone didn't show a statistically significant association with scar complications. This difference in findings can be explained by the relatively subjective nature of this clinical sign. Also, the appearance of this sign in labor can result in varying degrees of concerns and the resultant time to intervention may also vary. All of these can have an impact on the findings observed in different studies. In the same Indian study maternal tachycardia was not a significant predictor of scar complications in labor (p value=0.2).<sup>5</sup> Our study also shows the same finding i.e., maternal tachycardia is not significantly associated with scar complications. The study designs of both these two studies were different from our study.

Like the other two clinical signs of tenderness and maternal tachycardiac abnormalities alone were also not found to be associated with scar complications in our study. However, in a multicenter case-control study done by David and colleagues, there was a significant association of fetal heart rate abnormalities with scar rupture in the hour preceding the diagnosis of scar rupture.<sup>13</sup> In a case-control study done by Anderson, it was found that Cardiotocography (CTG) abnormalities alone are not predictive of scar complications.<sup>14</sup> Our study emphasizes the need to bear the broader clinical picture in mind before terminating a trial of

labor in favor of emergency repeat cesarean section taking into account scar tenderness, maternal unexplained tachycardia, and Cardiotocography (CTG) abnormalities in combination. Signs considered in isolation from each other can result in unnecessary repeat cesarean deliveries.

The previous practice of pre-labor assessment of uterine scar as a sole guide to deciding regarding VBAC is no longer in use in modern obstetrics because of its limited clinical utility. Labor pains are the best test to assess the integrity of uterine scar. However, scar complications in the event of VBAC almost double all the maternal and fetal complications of emergency cesarean delivery. So reliable signs and predictors of impending scar complications are the need of modern obstetrics.<sup>15,16</sup>

## ■ CONCLUSION

A combination of clinical signs including scar tenderness, Cardiotocography (CTG) abnormalities, and unexplained maternal tachycardia serve as valid indicators of impending scar complications and should be included in the monitoring of women undergoing the trial of labor after a previous cesarean.

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### Author's Contribution

NL conceived the idea, drafted the manuscript, and finalized the manuscript. QQ Collected the data and edited the manuscript. Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

### Conflict of Interest

Authors declared no conflict of interest

### Grant Support and Financial Disclosure

None

### Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.