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Research Article

Is scar tenderness a reliable sign of scar complications in labor?

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ABSTRACT

Background: Cesarean section has come a long way from being a risky & restrictive surgery to one that is safe and quick. Due to a rise in the rates of primary caesarean section globally, repeat caesarean section has also become very common. The chief concern during labor with scarred uteri is that of scar rupture which can have devastating fetal and maternal consequences, including mortality. Several studies monitoring for the features of scar rupture like abnormal cardiotocography (CTG), severe 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 exist with the exception of scar tenderness which has not been evaluated separately in any study. The present prospective observational study was undertaken in a tertiary care hospital to evaluate the sensitivity and specificity of scar tenderness as a sign of scar complications in labor.

Methods: 78 women with one previous caesarean delivery in spontaneous labor at term undergoing trial of scar were monitored for progress of labor and observed for vaginal bleeding, scar tenderness, maternal pulse and blood pressure every 30 minutes. Scar tenderness was elicited by pressing below and behind the pubic symphysis in between uterine contractions while engaging the woman in conversation and noting for a visible wince. Fetal heart rate auscultation was done as per protocol. Trial of scar was terminated for scar tenderness, unexplained maternal tachycardia, fresh vaginal bleeding, fetal heart rate abnormalities and non-progress of labor.

Results: The sensitivity and specificity of scar tenderness as a predictor of scar complications was 92.3% and 3.8%, while accuracy was 33.3%. The likelihood ratio of a positive sign of scar tenderness being associated with scar complications in labour is 1.48. Maternal tachycardia was not a significant predictor of scar complications in labour (p value=0.2). Past history of D&E has relative risk of 2.85 for scar complications.

Conclusions: Scar tenderness is a sensitive sign of scar complications and should continue to be elicited for all women undergoing trial of labor after previous caesarean.

Keywords: Scar tenderness, Uterine rupture, Dehiscence, TOLAC, VBAC

INTRODUCTION

Since the first modern caesarean in 1881, caesarean section has come a long way from being a risky & restrictive surgery to one that is safe and quick, so much so that caesarean section on demand is becoming a valid indication for caesarean delivery in many places. This has led to increasing rates of primary as well as repeat caesarean sections globally (from about 20% in Australia and United States to about 30% in a ten year period).¹ If one is based in the UK, the primary caesarean rate is around 16%, while the repeat caesarean rate is as high as 67%.² Overall 10% of the obstetric population has

experienced prior caesarean delivery.² This figure is very similar to that for Indian women (10.6%).³

Due to a rise in the rates of primary caesarean section globally, repeat caesarean section has also become very common. Indeed the chances of a repeat caesarean are quoted at 90% after a primary caesarean according to data from the United States.⁴ In order to bring down these high rates, trial of labor after caesarean (TOLAC) or vaginal birth after caesarean (VBAC) has emerged as an important tool. The reported success of VBAC varies from 56-80%¹, and is dependent on a multitude of antepartum and intrapartum factors.^{5,6} The chief concern during labor with scarred uteri is that of scar rupture which can have devastating fetal and maternal consequences, including

mortality (6% and 10% respectively).^{7,1} Monitoring for the features of scar rupture is thus one of the prerequisites of VBAC. These include abnormal cardiotocography (CTG), severe 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.⁸ Of these, an abnormal CTG is the most consistent finding and present in almost 80% patients with scar rupture⁹. Abdominal pain is reported in 22%¹⁰, abnormal vaginal bleeding in 11-67%, maternal shock in 22-46%, and cessation of uterine activity was not reported in any of the 76 women in the study by Rodriguez.¹¹ Thus other features are less sensitive and specific for uterine rupture, with the exception of scar tenderness which has not been evaluated separately in any study.

This study aims to evaluate the sensitivity and specificity of scar tenderness as a tell-tale sign of scar rupture in labor. In addition, maternal tachycardia is also studied as an independent predictive variable. This study will help to determine whether these factors are of sufficient relevance to continue to be included under the signs of monitoring for scar rupture.

METHODS

A prospective observational study was conducted at a large tertiary care teaching hospital in New Delhi delivering approximately 25000 women per year. This study was carried out over a 6 month period (1st Jun to 30th Nov 2011). The number of deliveries during this period was about 13000. The cesarean rate during this period was 15.3%.

All women who were eligible for trial of scar (previous one cesarean, cephalic presentation and spontaneous labor at term) were considered. Informed consent as for VBAC was taken. Monitoring of trial of scar was done by observation of vaginal bleeding, scar tenderness, maternal pulse and blood pressure every 30 minutes. Scar tenderness was elicited by pressing below and behind the pubic symphysis in between uterine contractions while engaging the woman in conversation and noting for a visible wince. Fetal heart rate monitoring was done by intermittent auscultation every 30 minutes in the first stage and every 15 minutes in the second stage, followed by continuous CTG where required. Assessment for cervical changes was done every four hours or as required. Trial of scar was terminated for scar tenderness, unexplained maternal tachycardia, fresh vaginal bleeding, fetal heart rate abnormalities and non-progress of labor. The patients for whom trial of scar was terminated for scar tenderness have been included in this analysis.

Scar rupture was defined by finding the fetus within the abdominal cavity. Dehiscence was defined as a defect in the lower segment with the membranes bulging. Thin scar was defined as a papery thin lower uterine segment with thickness less than 4 mm.

The study was approved by the institutional ethics committee. Statistical analysis was conducted using SPSS 14.0.

RESULTS

Of all the women who underwent cesarean delivery for failed trial of scar, the ones with scar tenderness in labor are included in the analysis. Operative findings are described in Table 1.

The sensitivity and specificity of scar tenderness as a predictor of scar complications was 92.3% and 3.8% respectively from Table 2. The accuracy of scar tenderness as a predictive variable was only 33.3%, while the positive and negative predictive values were 32.4% and 50% respectively. The likelihood ratio of a positive sign of scar tenderness being associated with scar complications in labour is 1.48. Scar tenderness therefore is a sensitive sign of scar complications, although not a very specific one.

In addition, maternal tachycardia was not a significant predictor of scar complications in labor (p -value=0.2), being nearly equally present in cases with and without scar complications (15 vs. 22). Overall tachycardia was present in 57.6% women with scar complications.

Although all patients were operated for suspected scar complications, the effect of other confounding variables was also noted. There was no significant effect of parity (1 vs. 2 or more, p -value=0.6), onset of labor (spontaneous vs. induced, p -value=0.1), or indication of primary caesarean (elective vs. emergency, p -value=0.32), in women who had or did not have scar complications (rupture, dehiscence or thinning of scar) in labor. However, women who had a history of uterine instrumentation such as dilatation & evacuation (D&E) in the past had a higher incidence of scar complications (p -value=0.014, significant) although the absolute numbers were small (5/6 women with history of D&E had scar complications compared to 21/72 women with no history of D&E). Thus, the relative risk of scar complications with history of D&E is 2.85.

Both groups of patients (with and without scar complications) did not differ in terms of the interconceptional period, gestation at delivery and baby's birth weight (Table 3).

Table 1: Operative findings in patients operated for suspected scar complications (n=78).

Finding	Number (%)
Scar rupture	3 (3.8)
Scar dehiscence	9 (11.5)
Thin scar (<4 mm) but intact	14 (17.9)
Normal scar	52 (66.7)

Table 2: Accuracy of scar tenderness.

Scar tenderness	Scar complications		Total
	Yes	No	
Yes	24	50	74
No	2	2	4
Total	26	52	78

Table 3: Other confounding variables.

Variable	Scar complications	No scar complications	p-value
Interconceptional period (months)	44.23±20.61	43.77±18.90	0.92
Gestation at delivery (weeks)	38.93±1.66	39.59±1.30	0.06
Birth weight (kg)	3.094±0.37	3.158±0.41	0.52

DISCUSSION

This study was carried out to ascertain the significance of scar tenderness as a subjective sign of scar complications in labor. Its importance arises from being a relatively easily elicited sign in women who may not have access to continuous CTG monitoring, although continuous CTG is one of the prerequisites of VBAC. It also appears early as compared to other features of scar rupture such as maternal shock, loss of station of the presenting part or hematuria. From our study, it is a sensitive indicator of scar complications in labor, whether scar dehiscence or rupture, with a likelihood ratio of 1.48 of being associated with scar complications. Maternal tachycardia alone is not a good predictor of scar complications.

Some studies on VBAC elaborate on scar tenderness as one of the reasons for failure of trial of scar. In one study on 101 women undergoing trial of scar, 10 women had scar tenderness, of which rupture was noted in one case & dehiscence in another.¹² In another study of 205 women, 12 had scar tenderness of which 4 had dehiscence noted intra-op.¹³ Another study segregated the intra-operative findings of women with failed trial into scar dehiscence and thinned out scar. Of 4 and 28 women in the two subcategories respectively, 3 and 17 women had scar tenderness in labor. Thus some women with scar

complications did not present with scar tenderness.¹⁴ Rubina et al in a study of 120 women found three cases of scar tenderness of which one had a ruptured uterus at cesarean.¹⁵ The only other study that was available was one of 99 women, where 1 woman had scar tenderness with intact scar while one case of dehiscence of scar did not have scar tenderness.¹⁶ Thus, only isolated case studies deal with the issue of scar tenderness per se as one of the causes of failure of trial of scar.

In our study, scar complication rates were not affected by the parity, onset of labor, indication for previous cesarean, inter conceptional period, gestation at delivery and birth weight. Similar findings have been reported in the study by Davey et al.¹⁷ In an extensive review of literature, no studies have been conducted on the predictive accuracy of scar tenderness, although there are multitude studies on trial of labor after cesarean delivery. The highlights of this study are that it is a prospective study and focuses only on cesarean deliveries done for scar tenderness. One of the drawbacks of this study is that patients who did not have scar tenderness but underwent cesarean delivery for other indications and were found to have scar complications have not been included in this study. This may lead to a very low specificity as found in our study. A prospective study which correlates all the signs and symptoms of scar dehiscence with intra-

operative findings would be better suited to evaluate the real picture.

Nevertheless, scar tenderness in labor can serve as a sensitive indicator of scar complications and should continue to be elicited for all women undergoing trial of labor after previous cesarean.

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