June 1996

Risk of uterine rupture after the partographic 'alert' line is crossed--an additional dimension in the quest towards safe motherhood in labour following caesarean section

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Risk of Uterine Rupture after the Partographic 'Alert' Line is Crossed - An Additional Dimension in the Quest Towards Safe Motherhood in Labour Following Caesarean Section

Pages with reference to book, From **120** To **122**

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Abstract

To determine if prolonged active phase of labour is associated with increased risk of uterine scar rupture in labour following previous lower segment caesarean section,a retrospective cohort study (1988-91) was done to analyse active phase partographs of 236 patients undergoing trial of labour following caesarean section, 7 (3%) of whom had scar rupture. After onset of active phase (3 cm cervical dilatation), a 1 cm/h line was used to indicate "alert". A zonal partogram was developed by dividing the active phase partographs into 5 time zones: A (area to the left of "alert" line), B (0-1 h after "alert" line), C(1-2 h after "alert" line), D (2-3 h after "alert" line) and EF (>3 h after "alert" line), The relative risk of uterine scar rupture was calculated for different partographic time zones. The relative risk of uterine scar rupture was 10.5 (95% confidence interval 1.3-85.5, p=O.Ol) at 1 hour after crossing the "alert" line; 8.0(95% confidence interval 1.6-40.3, p=0.009) at 2 hours after crossing the "alert" line; and 7.0(95% confidence interval 1.6-29, p=O.O2) at 3 hours after crossing the "alert" line. In women undergoing trial of labour following caesarean section, prolonged active phase of labour is associated with increased risk of uterine rupture. A zonal partogram may be helpful in assessing this risk in actively labouring women who cross the partographic "alert" line (JPMA 46:120, 1996).

Introduction

In the prevention of uterine rupture in women undergoing a trial of labour following caesarean section, timely diagnosis and prompt management of labour dystocias has been recommended[1].. Chazotte and Cohen[2] have commented that "arrest disorders might indicate or predispose a patient to uterine rupture, a trial of labourshouldbe discontinued if there is no prompt response to uterine stimulation". However, there is controversy about the upper limit of duration of normal active phase of labour[3] and the length of labour beyond which the increased risk of uterine rupture in women with previous caesarean section warrants intervention is not clearly known.

This retrospective cohort study evaluates the relationship between prolonged labour during the active phase and uterine scar rupture in women having a trial of labour following a previous caesarean section. "prolonged labour" is defined as crossing of a partographic "alert" line during active phase and "uterine rupture" is defined as a uterine scar separation necessitating operative intervention lateral pelvimetry. Women with more than one caesarean, a classical caesarean, placentapreviaorrefusal to undergo a trial had a repeat elective caesarean (n=152) and were excluded. Partographic records could not be retrieved in 10 cases, 9 of vaginal deliveiy and 1 of caesarean section due to "fetal distress". Thus, in total 236 ase.s were evaluated.

Subjects and Methods

The AgaKhan University Department of Obstetrics and Gynaecology provides secondaiy and tertiary level care to a largely self- referred population. During 1988-91, out of 398 consecutive patients with

previous caesarean section, 246 (67.8%) were selected for a labour trial based on the presence ofa non-recurrent cause forcaesareansection and an adequate maternal pelvis, as judged by clinical assessment and erect

All patients signed an informed-consent and were managed according to a uniform policy during labour. Partograms were commenced according to the WHO guide lines[4] . Vaginal examination were performed every 2-4 hours or earlier if indicated. After the diagnosis of active phase (labour established with regular uterine contractions and cervical dilatation of 3 cm) a 1 cm/hour line was used as the "alert" line. Fetal heart rate was continuously monitored throughout labour. Amniotomy and oxytocin were used for the same indications as for patients with unscarred uteri. The initial dose of oxytocin, 1 mIU/min, was doubled eveiy 30 min until the patient had adequate uterine activity (3-4 contractions in 10 min, each lasting for 45 seconds) or until the maximum dose of32 mIU/min was reached.

Partograms were analysed by drawing at each hour after the "alerf line 3 lines which divided the partogram into zones A,B,C,D,E and F as shown in Figure.

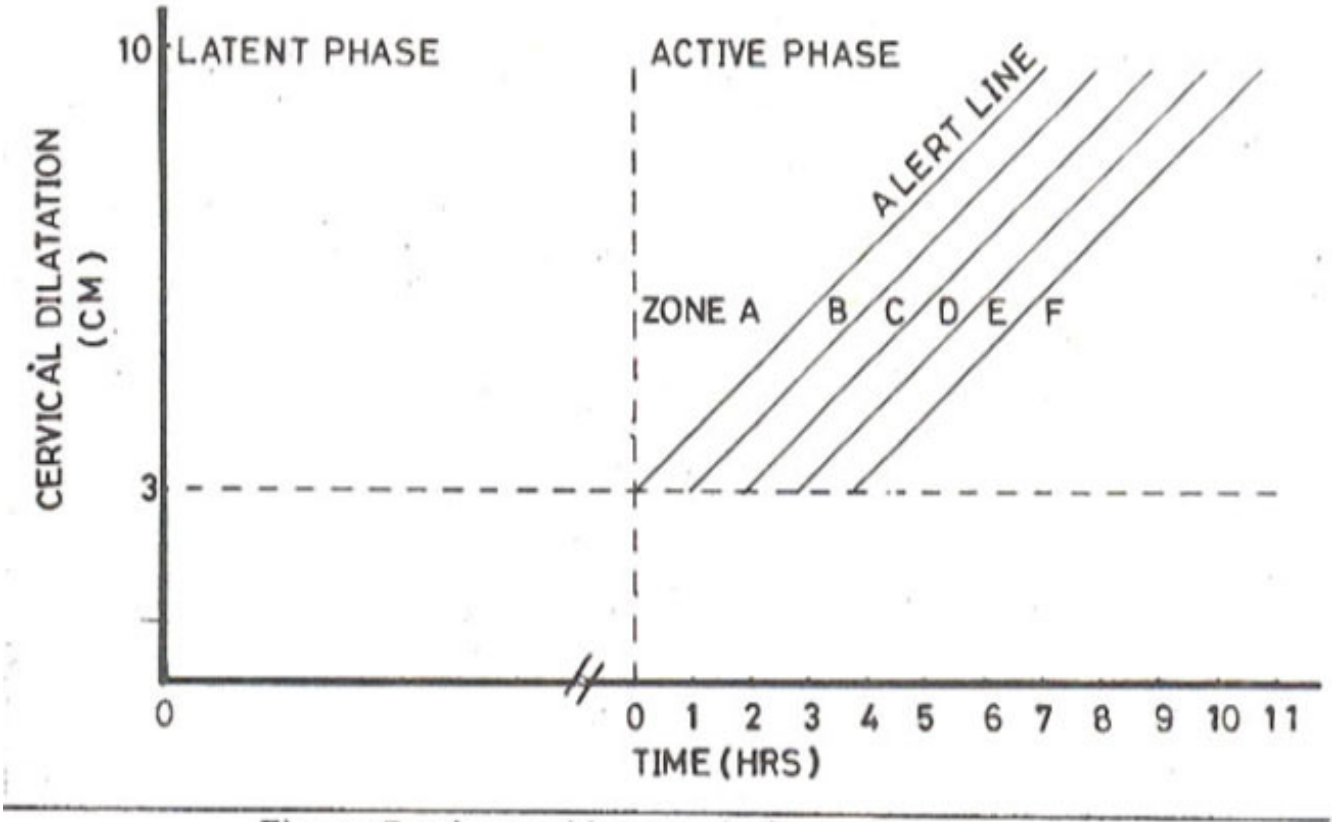

Figure. Cervicographic zones in first stage of labour

In the definition of prolonged active phase there is controversy about the lag time after the "alert" line[3]. We, therefore, used three different lag times.afterthe "alert" line in analysis: firstwith 1 hourlagtime making zones A-B normal and C-F prolonged; second with 2 hour lag time making zones A-C normal and D-F prolonged; and third with 3 hour lag time making zones A-D normal and E-F prolonged. Our null hypothesis was one of no association between active phase labour prolongation and uterine scar rupture.

We tested the null hypothesis for each one of the three lag times by calculating and comparing rupture rates for normal and prolonged labour. The differences in baseline characteristics were tested with analysis ofvariance andtestof linear trend. Relative risk (95% confidence inteivals) and Fisher's exact test were used for analysing the differences in rate of scar rupture according to different definitions of prolonged active phase. Statistical analysis was performed with Epi Info software (version 6.0, Centres

for Disease ContrOl, Atlanta, U.S.A.).

Results

Successful vaginal delivery was achieved in 190 (77.2%) out of the total of 246 cases. Of the rest (56), 26 cases had repeat caesarean section for slow progress of labour in the first stage, 2 had caesarean sections for non-descent of foetal head in the second stage, 27 had caesarean sections for "fetal distress" (abnormal cardiotocographic trace with or without meconium and fetal scalp pH of <7.2) and 1 had caesarean section for suspected scar rupture during the second stage of labour. There were-7 (3%) cases of uterine scar rupture.

The general characteristics of the 236 subjects whose partograms were analysed are shown in Table I.

Table I. Characteristics of women having a trial of labour following caesarean section and their outcome according to different partographic zones.

	Partographic Zones						
	All	A	B	C	D	E & F	P*+
Total subjects n	236	108	42	30	33	23	
Trial successful (vaginal delivery)							
n	181	98	31	22	21	9	
(%)	(76.7)	(90)	(74)	(73)	(63)	(39)	
Age (Yrs)							
Mean	27.87	27.1	28.5	28.9	27.7	27.2	NS+
(SD)	(4.26)	(4.46)	(4.01)	(4.5)	(3.8)	(4.19)	
Parity							
n	97	43	21	10	14	9	NS*
(%)	(41.1)	(39)	(50)	(33)	(42)	(39)	
Use of oxytocin							
n	99	11	10	22	33	23	<0.05*
(%)	(42)	(10)	(24)	(73)	(100)	(100)	
Gestational age at delivery (Wks)							
Mean	38.3	38.6	38.1	38.5	37.6	38.4	NS+
(SD)	(1.53)	(1.26)	(1.2)	(1.51)	(2.9)	(1.43)	
Birth-weight (kg)							
Mean	3.18	3.11	3.12	3.32	3.4	3.13	NS+
(SD)	(0.49)	(0.52)	(0.39)	(0.44)	(0.58)	(0.51)	

* Determined by test of linear trend in proportions
\+ Determined by analysis of variance
NS Not significant

There was no difference in the distribution of the age, parity, gestational age at delivery and birth weight in the different partographic zones withthe exceptionof use ofoxytocin. Outofthe 7 cases of scar rupture, 1 patient was in zone B (1-2 hour period beyond the "alert" line), 3 patients were in zoneD (2-3 hourperiodbeyond the "alert" line) and 1 patient each was in zones E & F (beyond the3 hourline).

Table II. Relative risk of uterine scar rupture according to different lag times after the partographic "Alert" line.

Lag time after "alert" line	Scar dehiscence*		Relative risk (95% CI)	P+
	Before crossing the lag time	After crossing the lag time		
1 hour	1/150 (Zone A-B)	6/86 (Zone C-F)	10.5 (1.3-85.5)	0.010
2 hour	2/180 (Zone A-C)	5/56 (Zone D-F)	8.0 (1.6-40.3)	0.009
3 hour	4/213 (Zone A-D)	3/23 (Zone E-F)	7.0 (1.6-29.0)	0.021

*Date presented as number of cases with uterine scar rupture/all women exposed to normal or prolonged labout (partographic zone assignment of normal or prolonged labout).
+Fisher's exact 2-tailed p value.

Table II shows the relative risks (95% confidence intervals) of having a uterine scar rupture if the labour was prolonged according to different lag times afterthe “alert” line.
The risk increased by 10.5 times (95% confidence interval 1.3-85.5) for the 1 hour lag time after “alert” line; by 8 times (95%confidence interval 1.6-40.3) for the 2 hour lag time after “alert” line; and by 7 times (95% confidence interval 1.6-29) for the 3 hour lag time after “alert” line.

Discussion

The aetiology of uterine scar rupture during trial of labour following caesarean section is believed to arise from excessive tension generated during the active phase, which has a cumulative effect as labour becomes prolonged. However, until recently this association was not subjected to epidemiological scrutiny. Leung et al[5] were probably the first to show in a case-control study, an association between prolonged labour and uterine rupture in cases of trial of labour following previous caesarean section (women with uterine scar rupture were more likely to have been exposed to labour dysfunction than the control group with odds ratio: 7.2,95% confidence interval: 2.6-19.8). In their paper, prolonged labour was defined as active phase protraction (cervical dilatation rate <1.5 cm/h) or arrest of dilatation for >2 h. However, the measurement of duration of labour or the rate of its progress is subjective, particularly the demarcation between the end of latent phase and the onset of active phase can have large inter/intraobserver variation. The criteria for defining onset of active phase were not clearly delineated by Leung et al[6] raising doubts about the accuracy of assessing exposure to prolonged labour.
In our cohort study, the relative risk of uterine rupture in cases of prolonged labour was similar in size to the odds ratio reported by Leung et al[5] but the confidence intervals in our analysis were larger. This association between prolonged labour and uterine scar rupture cannot be explained on the basis of chance alone as the p value was <0.05 and the lower confidence limit was above one, but there are possible confounders and biases. In our analysis, the confounders were equally distributed mall the partographic zones except the use of oxytocin which showed a linear trend with prolonging labour (Table I). This is not unusual as the use of oxytocin to augment slow labour is considered safe in patients with previous caesarean section. We also attempted to minimise the biases arising from the difficulty in accurate assessment of exposure to prolonged active phase by the use of a more objective tool for assessing progress of labour, the partognun.
The precision of our findings is limited by the small sample size but it provides a useful frame-work to analyse the active phase partograms in trial oflabourfollowing caesarean section. The next step should be to cariy out further prospective cohort studies with objective and unbiased assessment of labour progress in order to determine the length of labour beyond which the risk of uterine rupture (and its complications) becomes far too high to exceed the expected benefits of vaginal delivery. We would, therefore, like to invite other researchers in Pakistan to perform similar analyses of partograms in women undergoing trial of labour following caesarean section in their obstetric units. Such a collaborative effort would be the first step in the right direction in developing nation-wide guidelines for the safe conduct of labour in women with previous caesarean section.
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Acknowledgements

The authors am grateful to Professor S.C. Robinson for his encouragement and support of this project and to all the consultants and staff for their untiring efforts in the management of patients with trial of labour following caesarean section during the course of this study.

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