UTERINE RUPTURE IN LABOUR A 10-YEAR REVIEW

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SYNOPSIS

This is a 10 year review of uterine rupture recorded at the Kandang Kerbau Hospital from September 1972 to December 1982.

There were 62 cases altogether; 31 occurred in uteri with previous surgical scar and 31 in "intact" uteri (ie, those with no previous operative scar).

There was one maternal death (1.61%). Maternal morbidity included bladder injuries, infection and deep vein thrombosis.

The overall incidence of foetal loss was 25.8%.

INTRODUCTION

The aim of this paper is to find out the causes of uterine rupture, the best method of treatment and its prevention.

MATERIALS AND METHODS

By tracing the obstetric records from 1972-1982 at the Kandang Kerbau Hospital, 62 cases of uterine rupture were analysed. These cases were divided into two groups.

A) The "intact" uteri (ie, those with no previous scar)
B) The scarred uteri which consisted of
   a) lower segment Caesarean section scars (28 cases)
   b) upper segment scars (3 cases)

i) One at the fundus uteri as a result of wedge resection from adenomyosis.
ii) Two as a result of termination of pregnancy (one was a crescentic tear at the fundus uteri and the other was a tear at the cornu).

RESULT

Incidence

During this 10-year period there were 239,903 deliveries in the hospital. There were 22,561 lower segment Caesarean sections performed. Hence the incidence of overall uterine rupture for the 10 year period is one in 3869 deliveries. The incidence of rupture in intact uteri is one in 7738 cases. Out of 28 cases of ruptured lower segment Caesarean scars, 3 were performed in Singapore (one at a private hospital, two at other government hospitals) and one from abroad. The incidence of scar dehiscence is therefore one out of 940 lower segment Caesarean sections (24 out of 22,561 Caesarean sections).

Table I
Aetiology of uterine rupture in the "intact" uterus

Grande multiparity	7
Cephalo-pelvic disproportion	8
Forceps (Wrigley's or N. Barnes)	4
Kiellands forceps rotation delivery	1
Ventouse	3
Previous pelvic floor repair	1
Nullipara (normal vaginal delivery)	1
Previous molar pregnancy	1
Abnormal presentation	
Breech delivery	2
Transverse lie	1
Manual removal of placenta	2
Total	**31**

Aetiology (Table 1)

A The intact uteri

Analysing the 31 cases of intact uteri which ruptured during labour,the main aetiological factors were grande multiparity and undiagnosed cephalo-pelvic disproportion.

13 cases were on oxytocin augmentation. The concentration of oxytocin used varied between 1.5 to 3 units per pint 5% dextrose. In most of these cases unrecognised cephalo-pelvic disproportion precipitated the uterine rupture.

B The scarred uteri

There were 31 cases in this group.

28 had previous lower segment Caesarean section scars. In 6 cases there was a history of wound infection with secondary suture or record of a T-shape tear in the lower segment. These were meant for elective lower segment Caesarean section in a subsequent pregnancy. However the patients were already in advanced stage of labour on admission and delivered before a lower segment Caesarean could be done as an emergency.

Clinical presentation (Table II and III)

A The intact uteri

Severe postpartum haemorrhage is the commonest presentation. The second common presentation was sudden cessation of foetal movement followed by a tensed abdomen.

B The scarred uteri

In those with lower segment Caesarean scars the dehiscence is often "silent" and detected by routine vaginal examination after vaginal delivery. The scar is thinly stretched and avascular.

Only 3 cases of scarred uteri were on oxytocin. This was at a concentration of 2 units of oxytocin in 500 ml of 5% dextrose. It is unlikely that the oxytocin per se caused the rupture of the scar.

When the scar is in the upper segmnt, the picture is more dramatic and presents as an acute abdomen.

Operative procedure (Table IV)

i) Total hysterectomy or subtotal hysterectomy
The choice depends on
a) the general conditions of the patient
b) the extent of the uterine tear
c) the ability of the medical personnel to cope with the situation

Ideally, a total hysterectomy is preferably. In a severely ill patient a subtotal hysterectomy may be a quicker procedure and prove life-saving.

After performing a total hysterectomy, care should be taken to inspect the vagina for any extension of the rupture. Otherwise bleeding may continue from an undiagnosed laceration extended to the vagina.

ii) Repair of the uterine rupture and sterilisation
When the tear in the uterus is small and the patient has completed her family, a repair of the uterus with simultaneous tubal ligation may be preferably to a hysterectomy as this carries less morbidity.

iii) Repair of the ruptured site alone
For those who have as yet to complete the family and the extent of the tear is small, a repair of the ruptured site is justifiable. However, it leaves a weakened scar. In a subsequent pregnancy an elective lower segment Caesarean section is mandatory.

In this series there were 7 pregnancies in a "repaired" uterus. All had viable babies delivered by elective Caesarean section (Table V).

Maternal mortality

Out of 62 cases of uterine rupture there was only one maternal death (1.61%). This occured in a 37 year old woman with a history of 2 previous lower segment Caesarean sections. At emergency Caesarean section she was found to have a tear in the lower segment with extension to form a broad ligament haematoma on the right. Cardiac arrest occurred during closure of the abdomen. The mortality rate is higher when the broad ligament is torn. In other series the maternal mortality varies from nil to 12% (Table VI)

Table II
Clinical presentation

Scarred uteri		Intact uteri	
A. LSCS scars		1. Postpartum haemorrhage after spontaneous vaginal delivery	10
1. Silent dehiscence at repeat LSCS	6	b) after forceps	5
2. On routine vaginal examination		c) after Kiellands rotation	1
a) after spontaneous vaginal delivery	4	d) after ventouse	2
b) after forceps or ventouse	8		
c) after Kiellands forceps rotation	1	2. Intrauterine death	2
3. Blood stained liquor	3	3. Oblique lie	1
4. Decrease fetal movement, head in LIF, FHNH	1	4. Traumatic breech delivery	3
5. Abnormal CTG	1	5. Sepsis	2
6. Primary PPH	1	6. Blood stained liquor	1
7. Secondary PPH	1	7. after pelvic floor repair	1
b. Upper segment scars Acutc abdomen	3	8. transverse lie after stabilising induction	1
		9. after MRP	2
Total	**31**		**31**

Table III
Findings at laparotomy

Scarred uteri		Intact uteri	
A. Lower segment Caesarean section scars		Site of rupture	
i) "Windows"	1		
ii) partial dehiscence	17	i) at lower segment	19
iii) complete dehiscence	3	ii) lower uterine segment with extension to broad ligament	11
iv) complete dehiscence with extension	7	iii) upper segment (cornu)	1
B. Upper segment			
i) at cornu	1		
ii) crescentic tear at fundus uteri	1		
iii) posterior tear from fundus uteri to cervix (wedge resection for adenomyosis uteri)	1		
Total	**31**	**Total**	**31**

Table IV
Operative procedures

Operation	Scarred Uteri	Intact	Total
Total hysterectomy	10	21	31
Subtotal hysterectomy	2	2	4
Repair of the uterus	14	7	21
Repair of the uterus and ligation	5	1	6
Total	**31**	**31**	**62**

Table V

Results of conservative surgery

	Scarred uterus	Intact
Number of subsequent Pregnancies and live births	6	1
Sheehans syndrome	—	1
Lost to follow up	—	1
On follow up	8	4

Table VI

Maternal mortality in cases of uterine rupture

		Maternal Death No of Death	Per cent	Uterine rupture No of cases
1. Boulle	1956-62	21	12	174
2. Cavanagh	1954-63	0	0	41
3. Farrell	1955-65	1	3.7	26
4. Zeller	1955-64	2	4.7	43
5. Present Series	1972-82	1	1.61	62

Maternal morbidity (Table VII)

This included injury to the bladder with fistula formation, haematoma, urinary tract infection and deep vein thrombosis.

The fistula rate was 8.1% (5 cases out of 62). There were 3 vesico-vaginal fistula which healed spontaneously on conservative management.

There were 2 cases of uretero-vaginal fistula. Re-implantation of the ureter was done successfully in one case. The other had resultant ureteric stricture and hydronephrosis. She refused corrective surgery.

Table VII

Morbidity

	Scarred	Intact
Bladder injuries	3	1
a) Vesico-vaginal fistula	2	1
b) uretero-vaginal	0	2
Urinary tract infection	6	4
Secondary suture	1	0
Re-laparotomy and internal iliac artery ligation	1	0
Thrombophlebitis	0	1
Broad ligament haematoma	0	2
Jaundice	1	0
Deep vein thrombosis	0	1

Foetal outcome with uterine rupture (Table VIII)

The overall incidence of foetal wastage was 25.8%. There were 16 cases of foetal death out of 62 cases. Other series showed

Boulle and Crichton (2)	82%
Garret (6)	27.8%
Marquiles (4)	58.8%

Table VIII

Foetal outcomel following uterine rupture

Foetal outcome	Scarred	Intact
Live birth	22	24
Still birth	9	7
Total	31	31

DISCUSSION

Incidence

In this 10-year series the overall incidence of ruptured uterus was one in 3869 deliveries.

Cavanagh (1) gave an incidence of one in 1216 deliveries also in a 10-year series.

The incidence of uterine rupture in intact uterus was one in 7738 deliveries. Various authors (2, 4) showed variable reports from one in 670 to one in 3232 deliveries (Table IX).

Table IX

Incidence of uterine rupture

	Years	Cases	Incidence
1. Boulle	1956-62	174	1 : 670
2. Cavanagh	1954-63	41	1 : 1216
3. Farrell	1955-65	26	1 : 1800
4. Zeller	1955-64	43	1 : 1111
5. Present Series	1972-82	62	1 : 3869

The commonest cause of rupture of an intact uterus is grande multiparity. Although these women have had normal vaginal deliveries before, the present baby was larger and often unrecognised cephalo-pelvic disproportion was the contributing factor.

Gordon and Rosenthal (8) suggested a pendulous abdomen as a pre-disposing factor associated with grande multiparity. Most of our cases were thin and had no pendulous abdomen.

Menon (9) suggested malnutrition as a cause of uterine rupture. None in this series showed any signs of malnutrition.

Boulle and Crichton (2) found a high prevalence (27%) of stillbirths or heonatal death in a preceding

pregnancy. He concluded that the rupture could be due to an undetected scar. Only 2 cases in this series gave a history of previous stillbirths.

Compared to an earlier series (10) there is an apparent increase in the number of lower segment Caesarean scar dehiscence in the recent 3 years with an apparent decrease in the upper segment scars. This is partly due to the rising incidence of lower segment Caesarean section rate since 1978. With rising affluence the average size of the baby is now larger at birth. There are few grande multipara nowadays. The population now aims at a 2 child norm.

Prevention of uterine rupture

Public Education

The public should be educated to come for early antenatal care. The risks of termination of pregnancy should be understood by the patient. With abortion freely available on demand, the risk of perforation of the uterus at the time of termination of pregnancy and subsequent uterine rupture later must be borne in mind.

Prevention in a scarred uterus

a) Upper segment scars

In 3 cases the scars gave way at about 34 to 35 weeks of gestation. It is best to hospitalise those with upper segment scar at 32 weeks of gestation. As soon as she goes into labour emergency Caesarean section can be carried out.

Classical Caesarean section is rarely done nowadays. There is no record of any case with classical Caesarean section with uterine rupture in this series. Most of the cases that had classical Caesarean section done had simultaneous tubal ligation.

b) Lower segment Caesarean scars

Every case should be assessed antenatally. If pelvic deformity and cephalo-pelvic disproportion can be excluded then the patient can be given a trial of vagina delivery under close monitoring in labour. Intrapartum monitoring with a cardiotocograph is useful for early detection of scar rupture (as shown in one case in this series Table II).

Immediately after the third stage in a vaginal delivery routine examination of the scar should be done (13 cases were detected thus).

If severe postpartum haemorrhage occurs, exploration of the uterus is mandatory.

Scars with poor healing eg, sepsis, re-laparotomy and suture, T-shape laceration in the lower segment should be electively delivered by Caesarean section in a subsequent pregnancy.

In this series,
a) 3 had a history of wound sepsis and required secondary suture
b) one had a T-shaped tear in the lower uterine segment
c) one had a borderline pelvis with a previous scar
d) one with infected wound and sepsis but no re-suture of wound

These 6 cases were scheduled for elective Caesarean section in a subsequent pregnancy. However, they were admitted to the labour ward in labour and delivered before emergency Caesarean section could be carried out.

A successful delivery vaginally after a previous lower segment Caesarean section should not give one a false sense of security. The scar may yet give way in the next delivery (as shown in 6 cases in this series).

In this series there were 2 cases of uterine rupture as a result of perforation from previous termination of pregnancy.

According to Salzman (12), if the previous Caesarean section was performed in early labour when the lower segment was poorly formed, then the scar would not heal well. In this series only 5 cases had lower segment Caesarean section done when the labour was not well established eg, for severe pre-eclampsia, cord prolapse and transverse lie.

There are only 3 cases with upper segment scars in this series. (i) One due to previous wedge resection of the fundus uteri for adenomyosis uteri, (ii) 2 cases from unrecognised perforation of the uteri during termination of pregnancy (11). Upper segment scars tend to give way around 35 weeks of gestation and known cases should be admitted for close monitoring in the antenatal ward by 32 weeks.

CONCLUSION

A woman with a "repaired" uterus as a result of uterine rupture in a previous pregnancy may embark on a subsequent pregnancy safely under the vigilant care of the attending obstetrician.

Any woman with a history of termination of pregnancy may have an undiagnosed perforation of the uterus (11) with resultant rupture of the uterus in labour in a subsequent pregnancy. Those with a previous history of termination of pregnancy should be monitored carefully in labour.

The scarred uterus (with a scar in the lower segment) should not be put on oxytocin augmentation unless an intravenous infusion pump and cardiotocograph foetal heart monitoring are available. Often the previous operation may be performed in another hospital or abroad. It is therefore not possible to know whether any post-operative complications had occurred.

There is a noticeable change in the trend of uterine rupture in Singapore. Now grande multiparity is a rarity with the population aiming at a 2 child norm. Dehiscence of previous Caesarean scars and perforations from previous termination of pregnancies become more frequent compared with an earlier series in the same hospital.

ACKNOWLEDGEMENTS

I would like to thank the Director of Kandang Kerbau Hospital Dr Koh Thong Sum for his kind permission to publish this paper.

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