Session No. 21—18th October, 1956.
From Unit "A"—Kandang Kerbau Hospital for Women.
Moderator: PROFESSOR B. H. SHEARES.

RUPTURED UTERI

A Case of Partial Uterine Rupture of Previous L.S.C.S. Scar

Case Report

Presented by Doctor I. Salmon

Booked Case (4 A.N. visits)—Regd. No. 17864.

Admitted on 12th September, 1956 at 11.35 p.m.
Para 2—Gravida 3.
L.M.P. 26.11.55)
) 41 weeks maturity.
E.D.D. 3. 9.56)

PAST OBSTETRIC HISTORY:

1st child—Normal Delivery in China 14 years ago. Died at age of 3 years. B.W. unknown.

2nd. child—L.S.C.S. for posteriorly situated partial placenta praevia in Kandang Kerbau Hospital on 15.1.55.
B.W.=7 lbs. 12 ozs.
Baby alive and well
Puerperium—Pyrexial for first 2 days.
Abdominal wound slightly septic on 8th day, but healed by 10th day.

PRESENT OBSTETRICAL HISTORY:

Patient was not in labour on Admission.

1st stage began 3.30 a.m.—13.9.56.

GENERAL EXAMINATION:

General condition satisfactory.
Pulse 80/minute. Blood Pressure 114/70
Heart and Lungs—N.A.D.

OBSTETRIC EXAMINATION:

Fundus at height of term.
No painful uterine contractions.
Vertex R.O.A. Head not engaged
F.H. 140/minute, regular.

Previous L.S.C.S. Abdominal scar = Keloid formation.
No abdominal tenderness.

V.E.: Cervix not effaced. Os 1 finger
M.I. Vx. above brim
Pelvis — adequate.

MANAGEMENT:

(1) Sedation and Expectant treatment.

(2) Hourly check on F.H. and Maternal pulse rate.

PROGRESS:

7.00 a.m. Labour progressing satisfactorily.
Moderate uterine contractions
Head engaging.
F.H.H. 140/minute, regular.

9.00 a.m. Patient having strong intermittent pains at 1-2 minute intervals.
Head engaged.
M.R. Bladder distended.
Catheterised. Urine clear.

V.E.: Cervix effaced. Os ¾ dilated.
M.R. Vx. presentation: Station — 2 cm.
Patient sedated.
Evidence of Acidosis—combated with I/V. drip 20% Dextrose. ½ hourly check on F.H. and M.P.

9.30 a.m. Patient catheterised. Urine lightly blood stained.
Patient distressed by severe continuous abdominal pains.
General condition good.
Generalised lower abdominal tenderness present.

V.E.: Findings as previously, but there was some fresh blood mixed with liquor when head was gently pushed up. Clots felt on left side of lower uterine segment.

Provisional Diagnosis of Rupture made. Immediate laparotomy and repeat L.S.C.S. done at 10.00 a.m.

FOUND: Partial rupture 2" long over previous L.S.C.S. scar on left side extending downwards, but not involving left uterine vessels. Small subperitoneal haematoma.
No free blood in peritoneal cavity.
Peritoneum over L.U.S. intact
Bladder not involved in rupture.
Live female infant 7 lbs. 9 ozs delivered.
Wounds edges pared.
Repair of rupture and closure of L.U.S. Incision and abdominal wound done.

Puerperium:-Uneventful—Apyrexial.
Abdominal wound union good. Mother and Child discharged in satisfactory condition — 20.9.56 (7th day of puerperium).

Discussion

Doctor I. Salmon said that spontaneous rupture of a Caesarean Scar may occur before or during labour. Holland in 1920 investigated the results among 448 women who bore children following a previous Caesarean section and found an incidence of *4%* of ruptured classical scars in his series. Recently Chesterman in 1953 in an analysis of the case histories of *1874* women who bore children after a previous Caesarean Section showed that the scar ruptured in 33 cases, an incidence of only *1.76%*. He believes that the incidence is less than half that of the earlier figures due to better surgical techniques and increasing use of the lower segment operation in later year.

Rupture through a lower segment scar is much less frequent than rupture through the vertical upper segment or classical scar. According to Earnes (1956) the incidence of rupture of uterus occurring the "trial vaginal delivery" is 1% with lower segment scars and 2% with classical scars.

Most of the ruptures of lower segment scars are of the incomplete type and frequently only a portion of the scar gives way and can be successfully repaired as in the case presented today. Classical ruptures, on the other hand, tend to be *complete* with involvement of the peritoneum.

The maternal and foetal mortality rates are much lower with the lower segment rupture than with classical scar rupture. Chesterman reported in his series of 33 cases of Uterine rupture that the classical scar rupture was responsible for the loss of 2 mothers and 17 infants. whereas no mother died and only one infant (a premature neonatal death) followed lower segment rupture.

Doctor S. M. Goon elaborated on the Incidence. Aetiology, Symptomatology and Treatment of Ruptured Uteri, and analysed the figures for Ruptured Uterus in Kandang Kerbau Hospital over the last 2 years

RUPTURED UTERUS: AN ANALYSIS OF 24 CASES IN THE YEAR 1954—1955

Incidence: 1954: No. of ruptures=10; Deliveries=20,301) 1:1796
1955: No. of ruptures=14; Deliveries=22,813)

Race:—Chinese =20
Indians = 3
Malays = 1

Age: Range: Youngest 20 years; Oldest 43 years
Average 31.9 years.
Mean: 50% at 31-35 age group.
78.8% over 30 years of age
87.5% over 25 years of age.

	Kandang Kerbau Hospital, Singapore 1954, 1955	*James D. Garnett, Pennsylvania 1954*
20 years & below	1	1
21 - 25:	2	0
26 - 30:	4	5
31 - 35:	12	9
36 - 40:	3	6
Over 40:	2	0

Parity: Range: Women who have had 1 to nine deliveries.

Average: Para 4.

Highest incidence: Para 5.

Para 1 : 5
2 : 4
3 : 1
4 : 3
5 : 6
6 : 1
7 : 1
8 : 2
9 : 1

Onset of Rupture:

Range: 32-44 weeks of gestation.
Average: 38 weeks.
All ruptures occurred in labour; no case of rupture during pregnancy was encountered.

Duration of Labour: (between onset and delivery—not onset -rupture interval).

Range: 1 hour 40 minutes to 92 hours.
Average: 18 hours 31 minutes.
Below 10 hours: 3 cases.
2 cases of previous Caesarean sections:
Duration—(a) 15 hrs. 30 mins.
(b) 1 hour 40 mins.

Etiology:

Classification is not very satisfactory here.
Authors like Powers and Gerard (1954). Delfs and Eastman (1945), and Goldstein (1947) may be quoted to support the contention that in some cases no cause of the rupture may be found. In the doubtful case, the difficulty is often in deciding whether the rupture had occurred in an unbooked and neglected labour, or as a result of the obstetric operation carried as treatment of the original condition.

Spontaneous : 13 cases =54.2%
Traumatic (probable): 3 cases) 45.8%
Traumatic : 8 cases) =45.8%

Anatomical: Site, except in the doubtful case, all were in the lower uterine segment.
Complete Ruptures: 12 cases.
Incomplete Ruptures: 11 cases.
Unclassified: 1 case.

Author	*Period Surveyed*	*Delivered*	*Ruptures*	*Incidence*
Dugger, 1945	10 years survey of literature	318,103	105	1: 3,029
Delfs & Eastman, 1945	25 years, J. Hopkins	53,574	53	1: 1,010
Lavery, 1955	2½ years, Baragwanath (Bantus)	6,857	50	1: 137
Jimenez, 1953	Yucatan, Mexico	1,800	18	1: 100
Present Series	2 years, Singapore	43,114	24	1: 1,796

Causes:—

	Spontaneous	*Traumatic*
Internal Version & Breech Extraction	—	4
Craniotomy and Forceps	—	4
Decapitation	—	1
Breech Extraction	—	1
Mid-Forceps	—	1
Obstructed labour Disproportion and Multiparity (1 hydrocephaly)	5	—
Brow	1	
Transverse lie	1	
Unclassified	4	
Previous Caesarean Section (L.U.S.)	2	

Direct injury to the pregnant abdomen, Precipitate labour, cervical dystocia, Congenital abnormalities of the uterus, Pelvic tumours obstructing labour, Previous myomectomy or Classical Caesarean scar and parenteral oxytocics. } were not encountered in the present series.

Signs and Symptoms:

	Present Series (24 cases)	*Garnett, 1954* (15 cases)	*Simon,.1950* (17 cases)	
Shock	13	13	9	
Haemorrhage	9	15	15	
Abdominal pain	3	4	13	
Uterine tenderness	3	3	13	
Cessation of Labour	—	—	10	
Gross haematuria	8		4	(In 4 cases where urine examined)
(As only sign	1)	—		
Uncanny superficiality of foetal parts	4			
Nil (Routine exploration of uterus after obstetric operation)	4			

Treatment:	*No. so treated*	*Mortality*
Conservative (Packing, blood, etc.)	4	4
Repair of rupture	6	1
Subtotal hysterectomy	10	2
Total hysterectomy	4	1

Maternal Mortality:

8 deaths out of 24 cases=33%.

Death according to age group:

20 and below	0
21 - 25	0
26 - 30	2
31 - 35	6
36 - 40	0

Death according to Race:

Chinese: 7 out of 20 cases.
Indians: 1 out of 3 cases.
Malays: 0 out of 1 case.

Foetal Mortality:

S.B.: 17)
) = 83.3%
N.N.D.: 3)

This high foetal mortality rate, as well as the high maternal mortality, is directly related to the neglect and late diagnosis of our cases who rarely have antenatal care, and only come in or are sent to hospital when it is too late to save the baby or even both mother and babe.

In conclusion he said he would like to make the following statements:—

1. Prevention is the watch word in uterine rupture, for once this catastrophe has occurred, the baby is usually lost—often the mother as well. In order to do this, the public should be educated to send pregnant women for antenatal care in order to eliminate cases of disproportion, contracted pelvis, and abnormalities that will cause obstruction in labour, e.g. hydrocephalus, transverse lie, etc.

   All cases of previous Caesarean sections and those with bad obstetric histories should be delivered in hospital.

2. Internal version and other intrauterine manipulations are definitely dangerous procedures, and should be undertaken only by the experts; in every case, the best possible uterine relaxation must be ensured.

   It is far safer for the mother to deliver the child by the abdominal route, even if the foetus is no longer alive, rather than to attempt delivery per vias naturales. Uterine exploration is imperative after any obstetric operation.

3. Women who have borne many children are decided poor obstetrical risks. Solomons spoke of the "dangerous multipara" because at Rotunda Hospital more multiparas died than primigravidas. Eastman gave statistics of Johns Hopkins Hospital to prove that women who have had 9 or more children face a mortality in childbearing three times as high as that for women having one to five children. The stillbirth rate for such "grande multiparae" is more than twice that in the lower parity bracket. The high perinatal mortality is due to an increased number of congenital abnormalities and to foetal damage from the greatly increased number of pregnancy complications.

Finally, I agree with Eastman that "youth is the mother's best ally."

Doctor M. Manion carried the discussion further

At the onset he raised a query about the frequency of Uterine Rupture with its varying incidence adequately illustrated by Doctor Goon's statistical analysis. He wondered if perhaps lesser degrees of rupture were not uncommonly missed (citing) as an example the patient whose general condition after difficult forceps delivery or breech manipulation was not profoundly depressed but was occasionally observed to be somewhat worse than the extent of the manipulation would ordinarily account for. Did some of these cases have in fact a lesser degree of Uterine Rupture?

For discussion purposes he considered uterine scars under three hypothetical groups—the physiological—the occult traumatic and the intentional man-made scar.

In the first group he mentioned the theoretical concept of replacement fibrosis of the myometrium associated with increasing parity as a possible cause of the spontaneous ruptures, which constitute some 40% of intrapartum ruptures (Delfs & Eastman). The paucity of any histological confirmation of this concept was pointed out.

The developmental abnormality that was reputedly productive of the otherwise inexplicable spontaneous intrapartum rupture in a primigravida was likened to an embryological scar. The relative constancy of its position on the posterior wall of the fundus towards the uterine cornua or in the mid-line was mentioned. A case was described to illustrate this type of rupture.

The next group of scar ruptures included the Dehiscence of weak spots resulting from previous, often unsuspected, trauma of manual removal, (particularly in a difficult case—placenta accreta etc.), of over zealous curettage and of uterine perforation with sound or dilator. The commonly anterior or fundal situation of these injuries was noted and their tendency to give at or about 36th week of pregnancy particularly if eroded by an under-lying placenta was stressed.

In the third group of intentionally made uterine scars Doctor Manion expressed his difficulty in finding an adequately comprehensive explanation for the rarity of rupture in a myomectomy scar. Recalling Bonney's practice of extensive myomectomy, usually coupled with transcavity exploration, and his high incidence of subsequent pregnancy, it seemed almost inexplicable that he claimed never in his life time to have seen rupture of myomectomy scar.

Doctor Salmon's remarks on the difference in incidence of rupture in classical and lower segment caesarean scars were alluded to and the figures recalled.

It was occasionally said that the ruptured classical scar was a product of the bad old days and that now with modern techniques and antibiotics the classical scar was as safe as that in the lower segment. Doctor Manion stated that this was not so, and referred to the series of Breston (1950) and others which still showed a rupture incidence of 3.5% not far removed from Hollands 4% in 1920.

The factors inclining towards impaired healing and subsequent rupture were briefly summarised — the necessity of crossing the placental site in 40% of classical sections with its consequent more difficult union and repair, the subsequent sub-scar implantation of the placenta in 40% of subsequent pregnancies, and the theory of the contractile activity of the upper segment impairing healing as compared to that occurring in the relatively inert lower segment, were points discussed. An additional etiological factor in subsequent dehiscence was alluded to, the mode and direction of stretch tension in subsequent favouring the integrity of the transverse lower segment scar.

The question of the mode of healing of section scars and the controversy about fibrous tissue or muscle union was discussed. Sepsis, suture material, and suture technique was discussed. For the sake of provocative argument, Doctor Manion questioned what re referred to as "the unnecessary use of too much catgut, always productive of foreign body reaction and increased fibrosis," and queried the advisability of the current practice of suturing the scar with extremely large numbers of interrupted sutures.

The weakening effect of repeated vaginal delivery after section was compared with that of repeated section and the danger of accepting unguardedly the multipara who had successfully been delivered vaginally of two or even more infants after a section was stressed.

In conclusion Doctor Manion referred to the recent change in the mortality associated with ruptured section scars particularly those in the lower uterine segment. When the transverse lower section scar did on occasion rupture, this was almost invariably in labour in hospital and was accompanied by an extremely low maternal mortality and a correspondingly low foetal mortality. He pointed out that the majority of lower segment ruptures following the use, particularly in the U.S.A., of the vertical incision in the lower segment. He claimed that in properly selected and supervised cases without a recurrent indication for section, vaginal delivery was safe and in fact, preferable to repeat section.

General Discussion

Professor Sheares opened the discussion with a comment on the method of closure of the uterus following caesarean sections. He said that he was most impressed with RANDAL'S (of the Mayo Clinic) method of suturing lower segment incisions and since visiting him, he had adhered to his method of closure which in essence consisted of:—

(a) The use of interrupted catgut for both layers—

First Layer - - 0

Second Layer - - 00

(b) The importance of careful closure and good opposition especially around the region of the edges of the incision.

A continuous stitch was inferred as being likely responsible for diminishing or cutting off the blood supply to the areas of incision and resultant healing by greater degree of scar tissue formation.

Doctor Manion raised a few comments on the case under discussion. He queried the attitude of the Ante-Natal Officer in allowing the case to proceed on to about 41 weeks when in practice, the case should have been hospitalised around the 37th week.

To this Doctor Salmon replied that the dates had not been truly verified. She also emphasised the importance of blood in the urine as a part of the clinical picture in rupture or threatened rupture of the uterus especially in cases that are undergoing Trial of Labour. The occurrence of coincident tears into the bladder extending from the site of uterine rupture is a possible mechanism in the production of haematuria.

In choosing a method of treatment, Doctor Manion suggested that the operator must be guided by two principles—

(a) The amount of bleeding.

(b) The general condition of the patient.

Whether hysterectomy—total or subtotal — is necessary or advisable — must surely depend on these conditions. In most cases a simple repair together with sterilisation would seem to be preferable to hysterectomy. When repair alone was contemplated, it ought only be carried out on selected cases of low parity and the operator must be constantly mindful of the subsequent risks to the patient.

Professor Sheares carried the discussion further by saying that in most cases it was difficult to predict the nature and the behaviour of the uterine scar. This was a definite problem facing the Kandang Kerbau Hospital currently.

It was his opinion that some definite rules should be adhered to in deciding whether the case should be treated by repeat caesarean section. He mooted these rules as acceptable:—

(1) Repeat caesarean section should be the rule:—

(a) In cases with a history of two or more previous caesarean sections

(b) Cases that have had a previous classical caesarean section.

(c) Cases with the slighest degree of pelvic contraction.

(d) Twin Pregnancy going more than 32 weeks.

(2) Possible repeat caesarean section must be considered in the following:—

(a) Cases where the credentials of the previous surgeon is not known.

(b) Cases with a history of puerperal pyrexia following a previous caesarean section. A temperature of 102°F. sustained over 48 hours was considered significant

(c) Cases of post-maturity, Large baby or unduly distended uterus and abnormal presentation e.g. breech.

If a short test of labour was contemplated upon in cases with a history of a previous caesarean section, the test should not be to go beyond a critical duration of 10 hours

The belief that the scar is weakened due to the placenta being implanted over it has now gone by the board.

Doctor Manion introduced the interesting subject of another type of "Man-Made Scar," cases that had had uterotubal implantations done on them. He said that he had seen three cases of Mr. Green-Armytage one of which at elective section was "all but" ruptured and this must surely be another indication for a caesarean section.

Professor Sheares referring to uterine rupture following upon previous myomectomy said that statistics have proved that rupture is commoner in cases where the incision had extended into the uterine cavity.

To this Doctor Manion replied that Victor Bonney always opened into the uterine cavity in his myomectomy operations and he had seen no case of uterine rupture in pregnancy or labour.

Doctor Sinha had a few comments. He said that cases of ruptured uteri had occurred following manual removal of the placenta. There were also cases of silent, asymptomatic spontaneous ruptures. A ruptured uterus may be a result of an extension of a tear from the cervix especially from scarred cervices.

He remarked that from the tables presented, it appeared that internal version and breech extraction were major causes of ruptured uteri. He asked what conditions were safe for internal version.

It was his opinion that if the membranes had been ruptured—about 3-4 hours and if there was no constriction ring, it was safe to carry out an internal version. In any case, all obstetric manipulations had to be followed by an exploration of the uterus for possible rupture. As far as treatment was concerned, he opined that conservative treatment had no place today. Conservative measures like packing the uterus may be of use as emergency measures only.

He concluded that one should not lose sight of the fact that nutritional deficiencies might be a factor in the aetiology of rupture of the uterus.

Doctor T. K. Chong quoted 22 cases he investigated during the years 1951-52-53 and of these, 7 cases could not be classified. The minor factors which had a part to play in these cases included:—

(a) Multiparity.

(b) Fibrosis Uteri.

(c) Nutrition Factors — including those deficiency disease like osteomalacia.

Doctor Manion commented further on other aetiological aspects of ruptured uteri. Maldevelopment, obstruction by the non-pregnant horn of a double corpus, and interstitial or cornual pregnancies were possible causes.

In general 40 per cent of cases were due to traumatic rupture. Although internal version was commonly incriminated, traumatic rupture did cover other obstetric operations as well, e.g., breech extractions and manual rotation and forceps deliveries.

He concluded by saying that it was important to remember the reaction of the multiparous uterus to minor cephalopelvic disproportion when conducting trials of labour.

The final comment raised was by Doctor Y. Salmon who asked whether it would be a wise plan to explore the uterus of all cases that are delivered per vaginam following previous caesarean section.

Doctor Lumsden was of the opinion that it was always necessary to explore the uterus in such cases. Doctor Manion doubted that universal exploration was necessary or practicable.

The meeting adjourned at 4.30 p.m.