

RUPTURE OF THE UTERUS

(A Study of 60 Cases)

by

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Rupture of the uterus, first described by Bandl, is a grave complication of pregnancy and labour and an important cause of maternal mortality. Our cases were mainly due to lack of antenatal care and inefficient intrapartum management among the rural population, due to poverty and ignorance of the medical facilities available. Many of them were brought to the hospital after prolonged obstructed labour with clinical features of marked sepsis, shock and haemorrhage.

Kurnool being 8327.

Table I shows the incidence of rupture of uterus in some of the places in India. Our incidence is high, comparable to that of Baroda and Nagpur, where cases referred from villages, are also admitted. The incidence in Calcutta and Bombay is much lower due to better ante-natal care among the urban population. The incidence of rupture of uterus reported from Africa by Rendle Short (1 in 63), by Lavery (1 in 340) and Posner (1 in 137) is similar to ours.

TABLE I

Author	Place	No. of ruptures	Incidence against deliveries	Caesarean scar rupture
M. K. Menon	Madras	164	1-415	38
Patel & Parikh	Bombay	41	1-1257	9
N. Swamy & Patel	Baroda	80	1-200	6
Sastriakar	Nagpur	55	1-256	9
K. Das Gupta	Calcutta	16	1-1800	7
Subhadradevi	Vizagapatam	75	1-336	8
Author	Kurnool	60	1-139	2

Incidence

During the period 1958 to 1963 the number of ruptured uteri is 60, giving an incidence of 1 in 139 deliveries, the total number of deliveries at Government General Hospital,

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Age & Gravida

Table II shows the incidence of rupture of uterus according to age and gravidity. There were 5 primigravidae and 6 cases below 20 years of age. Sastriakar from Nagpur, reported 9 cases between 16 and 20 years of age and 9 among primigravidae. In our series 2/3 of the cases occurred between 21-30 years,

TABLE II
Gravida and Age

Gravida	1	2-4	5-8	Over 8
No. of cases	5	29	19	7
Age (years)	below 20	21-25	26-30	31 and over
No. of cases	6	9	30	15

whereas Sastrakar reported maximum number between 21-35 years of age. The number of ruptured uterus in the primigravidae in other reported series is 2 (Menon), 3 (Subhadradevi), 1 (Patel and Parikh), 2 (Swamy and Patel), 7 (Rendle Short) and 2 (Golden & Betson). The four cases of spontaneous rupture occurred outside the hospital and of these one was diagnosed after exploration following craniotomy. There were two elderly primigravidae. The aetiology in other reported cases was pitocin injection (Swamy and Patel), internal podalic version (Subhadradevi), accident (Patel and Parikh) and traumatic forceps delivery (Golden and Betson). In Eastman's series no case of rupture in primigravidae was noted and the explanation of the rarity of rupture was the "wise uterus" which responds to obstruction of labour by inertia.

Aetiological Factors

Table III shows the aetiological factors in some of the reported series in India. In our series the aetiological factors of spontaneous rupture were: contracted pelvis — 8 cases, malpresentation — 17, grand multiparity — 12, vertex presentation — 9, hydrocephalus — 2, cervical dystocia — 1, no obvious cause — 5 cases. In 9 cases of spontaneous rupture with vertex presentation, no apparent cause was found but the possibility of mild pelvic contraction and malposition of the occiput was not ruled out. In five cases the rupture occurred during an apparently normal labour of short duration of second stage and vertex presentation, similar to the cases described by Menon in his series. The high incidence of rupture in grand multiparae (20%) demonstrates the risk of rupture in labour without other obvious causes. Prolonged labour due to contracted pelvis

TABLE III
Spontaneous Rupture

AETIOLOGY

Author	Mal-presentation	Contracted pelvis	Grand multipara	Vertex presentation	Total
Menon	19	35	8	31	95
Subhadradevi	18	6	12	8	48
Swamy & Patel	19	14	—	4	74
Sastrakar	12	16	2	—	30
Patel & Parikh	9	11	—	—	—
Author	18	8	12	12	54

and malpresentation in about 45% of cases, points to the lack of ante-natal and intra-partum care. In one case, obstructed labour due to acquired atresia of cervix and vagina following difficult labour previously, was the cause of rupture. The types of malpresentation were: 11 transverse lie, 3 brow, 1 face, 1 breech and 2 compound presentations. The aetiology

during labour in a 4th para and in a case of hydrocephalus, was responsible. In the other 2 cases internal podalic version was the cause, in a case of constriction ring dystocia in an elderly primigravida and in a case of shoulder presentation in the hospital, rupture having been diagnosed on exploration in the third stage. Table IV shows the aetiological factors of

TABLE IV
Traumatic Rupture

Author	Pitocin	I.P. version	Forceps	Embryo- tomy	Accident	Total
Menon	3	7	11	10	—	31
Subhadradevi	1	8	2	5	—	16
Swamy & Patel	20	2	—	—	1	23
Sastrakar	2	3	1	7	—	13
Patel & Parikh	1	1	2	—	1	5
Author	2	2	—	4	—	8
Total	29	23	16	26	2	96

of rupture of uterus in the primigravida in our series is, compound presentation — 1, contracted pelvis 3 and internal podalic version in a case of constriction ring dystocia.

Excessive size of foetus is probably responsible for rupture of uterus in our series in 15 cases, the foetus weighing more than 7½ lbs, compared to 6 cases of the same size in Menon's series, 13 cases at Visakhapatnam and over 7 lbs. weight in 13 cases of Patel and Parikh. The past obstetric history was abnormal in 10 cases, caesarean section in 2, prolonged labour in 3, repeated stillbirths in 3, manual removal of placenta in 1 and abortion in 1 case.

Traumatic Rupture

There were four cases of traumatic rupture, in 2 cases pitocin injection

traumatic rupture in some of the reported series. It is observed that pitocin was responsible in 29 cases, internal podalic version in 23 cases, forceps delivery in 16 cases, and embryotomy in 26 cases. Pitocin injection was the main cause in Baroda, internal podalic version and forceps delivery and embryotomy in all centres, whereas accidental trauma accounted for only 2 cases. The incidence of traumatic rupture was 14% (Rendle Short) and 19% (Menon) and in our series about 7%.

Scar Rupture

There were 2 cases of rupture of caesarean scar, 1 each in the upper and lower segment. The rupture of classical caesarean scar occurred during pregnancy at 36 weeks with shoulder presentation and the

placenta situated over the scar. The caesarean section was done five years ago in the second pregnancy for placenta praevia and normal vaginal delivery occurred in the third pregnancy. The rupture of lower segment caesarean scar in a sixth para was diagnosed following exploration of the lower segment in the third stage for post-partum haemorrhage. She had a natural delivery of a live foetus weighing 8 lbs. 2 ozs. after a second stage of 1 hour 40 minutes. The incidence of scar rupture is 22% (Rendle Short) and 17% (Menon). In the advanced countries the tendency for increased incidence of scar ruptures in post-caesarean pregnancy and labour is a complex problem, with a tendency to decrease of traumatic rupture.

Fifty-five cases of rupture of uterus were brought from outside as emergency admissions into the hospital and in 5 cases the rupture occurred in the hospital. Of these latter, 1 was due to rupture of lower segment caesarean scar, 2 due to internal podalic version and 2 due to malpresentation (deflexion of head, and shoulder presentation) which was missed before rupture of uterus. In other reported series rupture of uterus occurred in the hospital in 25% (Menon), 13 cases (Subhadra-devi), 66% (Lavery and Driscoll).

The causes of rupture in grand multiparae are: malpresentation in 9 cases, contracted pelvis 4, caesarean scar 1 and no abnormality, with vertex presentation, in 12 cases. The uterine wall was suspected to be abnormally weak in one case each of breech delivery with intact amniotic sac, twin pregnancy, of deflexed head,

vertex presentation with baby over 8 lbs. and 2 cases of vertex presentation. There was one case of spontaneous rupture of uterus during pregnancy of 7 months' duration, with history of manual removal of placenta during previous pregnancy, 6 years ago.

Case Report

A 3rd gravida, aged about 20 years, with two full-term normal deliveries and live infants. In the present pregnancy the complaint was acute pain in the abdomen since 12 hours before admission. She showed signs of shock and internal haemorrhage, pallor with haemoglobin 6.5G%, pulse 120 p.m. and blood pressure 90/60 mm Hg. There was free fluid in the peritoneal cavity and the abdomen was distended, with guarding. On 25-10-1962 an emergency laparotomy revealed 90 oz. of free blood in the peritoneal cavity and an oblique tear at the fundus of uterus, 3" long in the anterior wall at the right cornual region. The foetus weighing 2 lbs. 2 oz., was lying free in the peritoneal cavity and the placenta was found to be adherent in the region of the rupture. As the placenta was accreta a subtotal hysterectomy was done and the patient was cured.

Lloyd Jones and Winterton reported a case of rupture of uterus due to placenta accreta and they quoted Katriender who reviewed 73 cases of rupture in a normal uterus and 1 case of rupture reported by him due to placenta accreta. The basic lesion in placenta accreta is absence of basal layer of decidua, originally suggested by Millar. Cuthbert stresses the importance of sepsis more than trauma in the previous delivery with manual removal of the placenta. Patel and Parikh and Das Gupta each reported one case of rupture of uterus following manual removal of placenta, also 1 case is reported from Visakhapat-

nam. Pedowitz and Felmus collected 116 cases of rupture of apparently normal uterus and reported 5 cases of their own. Subhadradevi reported a case of spontaneous rupture of lower segment of uterus during pregnancy with the foetus entering the bladder.

Clinical Features

Many of the cases came for admission into hospital with rupture of uterus, in a state of shock and collapse, with thready pulse and very low blood pressure, almost dying. The incidence of the clinical features is shown in Table V. The common

TABLE V
Clinical Features

Clinical features	No.
Superficial foetal parts	36
Cessation of pains	30
Shock	22
Moribund state	14
Bleeding per vaginam	23
Post-partum haemorrhage	3
Distended abdomen	20
Fluid in peritoneal cavity	5
Haematuria	6
Jaundice	1

features are, cessation of pains, palpation of foetal parts very superficially, bleeding per vaginam, and distension of abdomen. Fourteen patients were in a moribund state on admission, and profound shock was present in 22 cases. Haematuria was present in six cases, a symptom which was emphasised by Eastman. Postpartum haemorrhage was noticed in three cases, 1 after rupture of caesarean scar in the lower uterine segment, one after internal podalic version and in the third case after delivery of foetus by low forceps application. The duration

of labour was more than 24 hours in 33 of our series whereas it was so in 35 cases of Shastrakar, 43 cases of Subhadradevi and 13 cases of Menon. The duration of labour over 48 hours in 13 cases indicates neglect and delay by the patient's attendants before attending the hospital. In 7 cases the duration of labour was less than 12 hours in multiparae.

The clinical picture of our patients with rupture of uterus can be divided into 3 groups. The common group is associated with prolonged labour and the classical features of shock, dehydration and varying degree of intrapartum sepsis and peritonitis. The second group is characterised by prolonged labour, overdistension of the lower segment with tenderness, and incomplete rupture of the uterus. The third group is preceded by clinical features of threatened rupture of uterus, and exploration of the uterus revealed rupture following destructive operation. Thirty-six cases belong to the first group with obvious diagnosis, 11 cases to the second group and 9 cases to the third group: 2 cases of rupture were not diagnosed with resulting delay in treatment. One case was a 9th gravida with a duration of labour of 6 days with vertex presentation and delivery of a macerated foetus weighing 3.48 Kg. spontaneously. Postpartum collapse set in 10 hours later, after manual removal of placenta, and the patient died on the fourth day with paralytic ileus. A postmortem examination revealed a transverse rupture in the posterior wall of the lower segment. The second case was a fifth para with 9 hours of labour pains, vertex presentation and floating head. Foetal

distress was noticed in the first stage with the cervix 4 cm. dilated and 15 hours later shock and bleeding per vaginam set in; uterine inertia was present along with absent foetal heart sounds. Laparotomy revealed rupture of lower segment extending to

rupture in the lower segment of uterus. It is probable that the rupture was present at the time of the operation and was revealed only after delivery of the foetus, as Sastrakar pointed out, and these cases cannot be grouped as traumatic.

TABLE VI

Type of rupture	Anterior wall	Posterior wall	Upper segment	Lower segment	Complete
Spontaneous	51	3	2	52	45
Traumatic	4	—	—	4	3
Scar rupture	2	—	1	1	1

TABLE VII

Type of rupture	Menon	Subhadradevi	Author	Patel & Parikh	Sastrakar
Complete	95	28	49	52	34
Incomplete	31	5	11	9	21
Lower segment anterior wall	94	26	25	—	42
Broad ligament extension	30	5	19	—	—
Posterior colporrhexis	12	4	13	6	6
Anterior colporrhexis	8	1	—	—	1

the vaginal fornix on the left side. Here the incomplete rupture in the first stage was missed as the uterus was acting in spite of foetal distress, the significance of which was not appreciated.

Silent rupture of the uterus during pregnancy in an apparently normal uterus or of the caesarean scar was not found in our series. Pedowitz, in his series, reported 16 cases in whom labour progressed in spite of the incomplete rupture of uterus and ended in spontaneous delivery, and the diagnosis was missed in 11 cases with later manifestation of relaxed uterus and postpartum haemorrhage. In 7 of our cases pelvic exploration, done after destructive operation, revealed the

Morbid Anatomy

Tables VI and VII show the site of rupture and the types of rupture of uterus. There were 37 cases of rupture in the lower segment with the following sub-types; 15 transverse, 15 oblique, and 7 were vertical (lateral) in direction. In 14 cases the rupture in the lower segment extended to the vaginal fornix, in 19 cases it had extended to the broad ligament with haematoma formation, and in 2 cases it was situated in the posterior wall. There were 3 cases of rupture in the upper segment; 1 rupture of classical caesarean scar, 1 following prolonged labour with rupture of the posterior wall vertically and 1 case of spontaneous rupture in pregnancy, oblique of

the fundus on the right side. There were 13 cases of anterior colporrhexis which were preceded usually by short labour. In the seven inoperable cases it is presumed that the rupture was in the lower segment following prolonged labour.

Complete ruptures of the uterus are commoner than the incomplete (49 and 11) as in other series. Rupture of the posterior wall is quite rare, 5 cases occurring at Vishakhapatnam, 10 at Nagpur and 7 cases at Baroda. Rendle Short had 9 cases in his series and 3 cases were noted by Chowdhary. Colporrhexis anteriorly is due to pressure on the anterior vaginal fornix by the presenting part after the cervix is fully dilated. But Menon's explanation of posterior colporrhexis by pressure of the pre-

Treatment

Fifty cases were treated surgically and 10 cases were not fit for surgery, dying within a few hours after admission. Table VIII shows the treatment in some of the reported series. The operation of choice was hysterectomy whenever the condition of the patient permitted. In other cases, suture of the rupture in the uterus was done because of poor risk but this could not be done in some cases due to the extent, situation, the ragged edges and infection of the rent. Sub-total hysterectomy was done in 22, total hysterectomy in 17 and suture of the tear in 11 cases. Suture of the tear was preferred by Lavery, Swamy and Patel, Lawson, Rendle Short and Patel and Parikh. In Table VIII the mortality rate of treated

TABLE VIII
Treatment and Prognosis

Author	Total	Not treated	Suture of tear	Hysterectomy		Mortality %
				Sub-total	Total	
Menon	164	12	29	49	74	10.6
Subhadradevi	75	12	8	17	32	17.3
Swamy & Patel	80	20	70	8	—	35
Sastrakar	55	14	8	92	—	34
Patel & Parikh	41	1	25	14	1	25.5
Rendle Short	171	29	62	80	—	25.4
Author	60	10	11	17	—	26

senting part is likely in cases of the pendulous abdomen where the uterine force is directed posteriorly. In our 13 cases of anterior colporrhexis the aetiology was brow in 2 cases, transverse lie in 2 cases, twin pregnancy, compound presentation, hydrocephalus, stenosis of cervix and vagina in 1 each, and vertex presentation in 5 cases.

cases was lowest in Menon's series (10.6%) and it was almost the same in other series.

In our series mortality rate of cases treated by suture of the tear was 27% and of the cases treated by sub-total hysterectomy was 18%. This higher rate of mortality in suture cases was probably due to the selection of poor risk cases.

Prognosis

This depends on a number of factors like the general condition of the patient on admission, the duration of labour and rupture, the facilities available for resuscitation, like blood transfusion and intravenous fluids and for emergency operations. Pedowitz emphasises the site of rupture as an important factor as well as the extension to the fornix and rupture of uterine vessels in the broad ligament. Table IX shows the mortality rate in

the opinion that duration of symptoms is not so important as site of the tear and Pedowitz takes into consideration the influence of age, parity, general condition and associated pathology in the prognosis.

The causes of death in 23 cases were, shock with haemorrhage in 12 cases, sepsis in 7 cases, general anaesthesia in 1 case (during induction) 3 cases were moribund on admission. Nineteen deaths occurred within 24 hours of admission and four deaths

TABLE IX

Type of operation	No. of cases treated	Deaths	Mortality%
Sub-total hysterectomy	22	4	18
Total hysterectomy	17	6	35
Suture of tear	11	3	27
Nil	10	10	
Site of Tear			
Lower segment of uterus	22	7	32
Lower with tear of fornix	15	3	20
Ant. calporrhexis	13	3	23
Upper segment	3	Nil	

relation to the treatment and situation of rupture. The mortality rate in cases of rupture in the lower segment was 32%, in cases of anterior calporrhexis it was 23% and in cases with tear extending to vaginal fornix it was 20%. This shows that the site of rupture is not the main factor in the incidence of the mortality. None of the cases of rupture occurring in the hospital died, which emphasises the safety of operation following early diagnosis and prompt resuscitation. Many of our cases were poor surgical risks due to anaemia, dehydration, shock and collapse with sepsis. Blood transfusion was given whenever possible and usually a smaller volume than required. Rendle Short is of

after two days. Of the 13 deaths following treatment 7 cases had prolonged labour over 24 hours. Paralytic ileus with peritonitis was present in 4 cases of death after 2 days. In one case burst abdomen, in the second case intestinal obstruction due to post-operative adhesions led to death on the 15th and 16th days post-operatively. Of the other 2 cases 1 died on the 4th day and the other on 3rd day. The gross maternal mortality was 38% and in the treated cases 26%. The fetal mortality is very high (96%) due to prolonged labour, shock and sepsis; only two babies survived, who were delivered in the hospital.

TABLE X
Vesico-Vaginal Fistula—Rupture of Uterus

S. No.	Gravida	Duration of labour	Presentation	Site of tear	Treatment
1.	4	2 days	Hydrocephalus	Ant. colporrhexis	Total hysterectomy
2.	9	3 days	R.O.P.	L.S. transverse	Suture
3.	5	2 days	Twins	Ant. colporrhexis	Total hysterectomy
4.	7	3 days	Shoulder	L.S. oblique	Sub-total hysterectomy
5.	1	5 days	Vertex	L.S. oblique	Sub-total hysterectomy
6.	3	12 hours	Brow	L.S. oblique	Total hysterectomy
7.	4	24 hours	Vertex	L. S. vertical	Total hysterectomy
8.	6	3 days	Vertex	L. S. vertical	Sub-total hysterectomy
9.	2	28 hours	Vertex	Ant. colporrhexis	Total hysterectomy
10.	3	48 hours	Shoulder	L.S. vertical	Sub-total hysterectomy

3 Cases of rupture of bladder were successfully sutured.

Complications

Table X shows the cases with vesico-vaginal fistulae following surgical treatment; 10 cases had the fistulae in the post-operative period, usually one week after operation due to the separation of slough of anterior vaginal wall and bladder, following pressure necrosis. Besides, in 3 cases there was injury to bladder which was repaired successfully. On 27th January, 1964, a 7th gravida, aged 30 years, with anterior colporrhexis in a vertex presentation, was found to have extensive tear of the bladder from one side to the other. She expired after hysterectomy and suture of the rent in the bladder, within 24 hours. On 12-4-'64 a second case of extensive tear of bladder from one side to the other was found along with

anterior colporrhexis caused by obstructed labour due to deflexed head. Total hysterectomy with repair of tear in the bladder was done successfully and the patient was cured. It is noteworthy that two cases developed fistulae with transverse lie, which is quite rare, and in 3 cases colporrhexis (anterior) was present. Rendle Short recorded 10 cases of injury to bladder, Subhadradevi 2 and Moir, J. C. 2 cases.

Conclusions

The incidence of rupture of uterus is quite high, similar to that in other places in India. The common cause of rupture is prolonged and obstructed labour due to contracted pelvis and malpresentations. Almost all were emergency admissions with rupture

having occurred outside, only five cases having ruptured in the hospital. The incidence in the primigravida is higher than in other series. The uterine rupture was without premonitory symptoms and signs in 5 cases. Colporrhexis of the anterior wall occurred in 13 cases giving an incidence of 21.7%, much higher than in other series which cannot be explained easily. Also the incidence of bladder injury with formation of fistulae in 10 cases is unusually high, which may be explained by prolonged labour and the situation of the rent in the lower segment extending to the anterior vaginal fornix. It is remarkable that there was no case of posterior colporrhexis. The prognosis for the mother is the same as in other series, and the mortality rate is not much influenced by suture of the rent being preferred, other factors being more important. Prophylaxis by provision of ante-natal care, intrapartum care, health education and better transport facilities for the rural population, is the only hope of reducing the mortality due to rupture of uterus.

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Fig. 1
Shows decidua reaction.



Fig. 2
Shows chorion villi with no decidua reaction.



Fig. 3
Shows hyper view showing trophoblastic cells
in contact with the muscle bundles.