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## SPLENIC RUPTURE DURING PREGNANCY

(Review)

by

MAHENDRA N. PARIKH,\* M.D., D.A.

Splenic rupture during pregnancy, labour or puerperium arouses interest not only because of its extreme rarity, almost amounting to medical curiosity, but also because of the danger of its being confused with obstetric complications. It is so rare indeed that although the first case was described by Saxtorph as long back as 1803 the number of cases reported so far is only 82. There are many excellent reviews on the subject, but cases described by Capecchi (1925) and Chini and Marconi (1939) have escaped the notice of almost all reviewers. Sparkmann's (1958) excellent review contains 44 cases including his 2 cases but overlooks, besides Capecchi's and Chini and Marconi's cases, a case by Fultz and Altemeier (1955) wherein traumatic splenic rupture resulted during aspiration of pleural effusion. In recent years cases are reported by Kuncz *et al* (1957), Bulavint-

seva and Blagodatov (1958), DiGuilio *et al* (1958), Stevens (1959), Kruger and Kruyer (1959), Slunsky (1960), Mollegaard (1960), Molventi *et al* (1960), Huikes (1960), Campbell (1962), Umbricht (1962), Embrey and Painter (1962), O'Brien (1963), Ogier and Massi (1963), Cairns *et al* (1964), Bertolazzo (1964), Koskela (1965), Colombetti (1965), Avksent'eva (1965), Bookstaver (1965), Jewett (1965), Bankole (1966), Buchsbaum (1967), Galezynski *et al* (1967), Gudgeon (1967), Klevetenko and Polishchuk (1968), Traub (1968), Grzymek (1968), and McCammon (1971). Besides Gilbert *et al* (1964) reported 6 cases. Thus, the total number of cases reported so far appears to be 82. Three more cases are being brought to light in this paper. Surprisingly, no case has yet been reported from Asia.

### CASE REPORTS

#### Case 1

Mrs. H.M., a Hindu female aged 32 years was admitted to the Bai Motlibai Hospital attached to Grant Medical College, Bombay, on 14th November 1940 in the morning for pain in abdomen following a trauma-

\*Honorary Asst. Visiting Obstetrician and Gynaecologist, Nowrosjee Wadia Maternity Hospital, Bombay, India. Formerly Assistant Professor of Obstetrics & Gynaecology, Grant Medical College, Bombay, India.

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tic fall. She was 28 weeks pregnant and was diagnosed as a case of abruptio placentae. After initial resuscitative measures artificial rupture of membranes was done. During the next few hours her general condition worsened. Besides labour failed to set in. An exploratory laparotomy under spinal anaesthesia revealed haemoperitoneum due to rupture of a grossly enlarged spleen. Splenectomy was performed. Lower segment caesarean section was also carried out to spare the patient a labour in the immediate postoperative period. The foetus was stillborn. The mother was discharged in good condition on 3rd December 1940.

#### Case 2

Mrs. K.M., a Muslim female aged 25 years was admitted to N.W. Maternity Hospital on 17-4-1958 at 8-30 p.m. for breathlessness. This was her 4th pregnancy and she was near term. Prenatal examination on 21-3-1958 had revealed nothing abnormal and her haemoglobin was found to be 12 gms. per cent. On admission, she gave a history of feeling giddy off and on for the last 4 days and having fainted about 4½ hours prior to admission. There was no history of any traumatic injury. She was markedly pale and breathless with respirations 80/min. pulse 160/min., and B.P. 90/70 mm. Hg. Abdomen was lax and uterus was of 36 weeks' size. Vertex was presenting but not engaged. Foetal heart sounds were absent. Abdominal paracentesis revealed hemoperitoneum. In spite of resuscitative measures she expired at 9-30 p.m. before a laparotomy could be undertaken. Post-mortem examination revealed 1000 ml. of fresh blood in the peritoneal cavity and a large fresh blood clot stretching horizontally along the upper border of the pregnant uterus. The spleen was enlarged, weighed 1020 gms. and measured 18 cm. × 13 cm. × 4 cm. On its lateral surface at the upper pole there were two small lacerations covered by blood clot and flimsy adhesions. At the hilum there was an unruptured aneurysm of the splenic artery, 2 cm. in diameter and a splenunculus 1.5 cm. in diameter. On cut surface the spleen was soft, red, defluent and showed four triangular infarcts at the periphery.

#### Case 3

Mrs. L.C.K., a 32 year old Hindu female, 10th gravida with 9 F.T.N.D. was admitted to N.W. Maternity Hospital on 15-10-1966 at 2-10 p.m. She was near term and her prenatal examinations had revealed no abnormality. She had a fall while alighting from a train 14 hours prior to admission and complained of pain in the abdomen since then. She was very pale and in shock with B.P. 80/60 mm. Hg. and pulse 140/min. Uterus was of 36 weeks' size, vertex was presenting but not engaged and foetal heart sounds were absent. She was not in labour. There was fullness in the flanks and dullness, tenderness and guarding in the left hypochondrium. Her haemoglobin was 6 gm. per cent. Resuscitative measures including blood transfusion were started and at 3-30 p.m. artificial rupture of membranes was done under a presumptive diagnosis of abruptio placentae. Clear liquor was drained out. Since the diagnosis was not obvious a surgical opinion was sought. The surgeon suspected splenic injury and wanted to reassess after a few hours. The patient delivered a macerated stillborn female baby at 11-05 p.m. and was transferred 1½ hours later, to the Surgical Unit at K.E.M. Hospital, with B.P. 90/60 mm. Hg. and pulse 130/min. A peritoneal tap yielded blood. The patient could not be operated till 7-30 p.m. on 16-10-66 since she refused surgery initially.

Laparotomy under general anaesthesia revealed about 2500 ml. of free blood in the peritoneal cavity and a ruptured spleen. Splenectomy was performed. The patient received 1500 ml. of blood at the time of the operation besides the 1200 ml. given prior to her delivery the previous day. The postoperative course was uneventful and she was discharged in good condition on 24th October 1966. The spleen was slightly enlarged and measured 10.5 × 5.5 cm. There was a 2 cm. × 1.5 cm. tear on the medial surface covered by blood clot. Histological studies of the spleen revealed no abnormality.

#### Discussion

The dynamic of splenic rupture is not always clear and its etiology is often



obscure. Splenic rupture may be traumatic, pathological or spontaneous. Sparkman (1968) adds a fourth group viz. 'rupture associated with pregnancy toxæmia', whose claims to separate entity appear dubious. Apart from external trauma, internal trauma caused by coughing, vomiting, sneezing, sudden bending or turning, and straining at stool is known to result in splenic rupture. Mahmood (1970) has reported a case of total rupture of the spleen. Trauma may cause laceration of the pulp as well as the capsule resulting in immediate and severe haemorrhage as happened in our first and third cases. It may, however, produce laceration of the pulp alone, leading to the formation of a subcapsular haematoma, which would secondarily rupture at a later date giving rise to delayed haemorrhage. Delayed haemorrhage can also be produced by the eventual detachment of a perisplenic haematoma covering a frank rupture of the parenchyma and capsule. McIndoe (1932) has laid down that an asymptomatic latent period of at least 48 hours must elapse after trauma for a case to be designated as a one of delayed haemorrhage.

A pathological spleen may rupture with the most trivial trauma or even in the absence of it. In fact, we are cautioned to be gentle in palpating spleen in patients with infectious mononucleosis or malaria for fear of lacerating it. Pathologies making the spleen vulnerable to rupture range from infections like infectious mononucleosis, malaria, typhoid, kala-azar, schistosomiasis, relapsing fever, typhus, tuberculosis, syphilis, etc. to blood dyscrasias like leukaemia, haemophilia, Hodgkin's disease, etc. and to degenerative processes like Banti's disease, infarctions, amyloid disease, cystic degeneration, etc. Vergez (1971) has reported a case of splenic rupture caused

by an apparently primary splenic chorioepithelioma. Our second case had a markedly enlarged autolytic spleen. Spontaneous rupture of a normal spleen, as an entity, is doubted or denied by many writers like Wright and Prigot (1939), Baillie (1952), Roettig *et al* (1943) and Terry *et al* (1956). Ever since Atkinson described the first case in 1874, many cases of spontaneous splenic rupture are reported both in the pregnant and in the non-pregnant. Some of these might be cases of delayed haemorrhage with the initial trauma too trivial to be remembered by the patient, while in some cases splenic pathology might have remained undetected in the damaged tissues. But the possibility of human memory habitually failing or the pathology consistently remaining obscure appears unlikely. Orloff and Peskin (1958) in their masterly review concede the possibility of spontaneous rupture of a normal spleen. If a normal spleen can rupture spontaneously does pregnancy make it more prone to do so? Not enough is known about the spleen during pregnancy but hypervolaemia, mechanical crowding of abdominal organs, trauma of parturition, bearing down efforts, changes associated with pregnancy toxæmia (Sparkman), fibrinoid vasculosis in pregnancy toxæmia (Govan), hypothetical assumptions of intrasplenic microarterial disease, and trauma due to the kicking movements of the unborn child (Steven's case) are all postulated as possible causes of spontaneous rupture during pregnancy, labour and puerperium. Yet, the role of pregnancy in a spontaneous splenic rupture is as enigmatic as spontaneous rupture itself.

Diagnosis of splenic rupture is usually difficult, partly because the enlarged uterus may obscure the evidences of intraperitoneal haemorrhage and partly



because the obstetrician is apt to concentrate on uterine and adnexal pathologies. In fact a correct pre-operative diagnosis is rarely made. Ruptured ectopic pregnancy, rupture of corpus luteum, torsion or rupture of ovarian cyst, perforation of a viscus, abruptio placentae, ruptured uterus, ruptured broad ligament varices, fulminating pyelonephritis with septicaemic shock, myocardial infarction, mesenteric thrombosis, acute pancreatitis and pulmonary embolism are some of the conditions that would enter the arena of differential diagnosis depending upon the stage of pregnancy, labour or puerperium. Traub's (1968) and Klevetenko's (1968) cases were associated with ectopic pregnancy, while Grzimek's (1968) case was associated with accidental haemorrhage. Epigastric pain, made worse on coughing, deep breathing and moving is the commonest symptom, while circulatory collapse with shock and tenderness over splenic region are consistent features. Kehr's sign, referred pain in the left shoulder, is said to be almost pathognomonic but is not often present. Ballance's sign, dullness over the left upper quadrant and shifting dullness, is often interfered with by the enlarged uterus. Saegesser's sign, tenderness over the posterior edge of the left sterno-cleido-mastoid muscle, two-finger breadths above the clavicle, is rarely noted. Cullen's sign, an "umbilical black eye," is also rarely met with. Muscle spasm may be absent. Many have observed a confusing hypertonicity of the uterus. It may be noted that 2 of our cases were initially diagnosed as abruptio placentae. Rising pulse, falling blood pressure and dropping haematocrit levels indicate internal haemorrhage. Marked leucocytosis is often noted following splenic injury. Abdominal paracentesis in 4 quadrants is a valuable aid in diagnosing haemoperi-

toneum. It must, however, be emphasized that false taps lead to dangerous delay and Maughan *et al* (1961) lost a patient because the diagnosis was missed due to negative tapplings. A negative tap should not be much trusted and taps be repeated after an interval, if necessary. Radiology is not of much real help although elevation of left dome of the diaphragm, subphrenic opacity on the left side, displacement of the stomach to the right and of the transverse colon downwards, indentation of the greater curvature of the stomach, free fluid between loops of intestines and a few other signs are described in the literature.

Diagnosis of splenic rupture makes splenectomy mandatory. Although an occasional mention of spontaneous cure after splenic rupture is made in the literature (Gordon-Watson 1923, Hunter 1935) mother Nature almost always fails and there should be no hesitation in removing this dispensable organ. In Sparkman's series all unoperated patients died and so did all the 4 in whom the source of bleeding was not detected even at laparotomy. Splenectomy should not prove difficult even for an obstetric surgeon. The incision should be extended, if necessary, to give adequate exposure. Due care, however, must be taken to avoid injuring the stomach wall and the tail of the pancreas. During early pregnancy the uterus should be left alone and the pregnancy would eventually be carried to term. During late pregnancy caesarean section has generally to be undertaken in order to enable the detection of the source of bleeding, or to facilitate the splenectomy or to salvage the foetus from anoxia or to spare the patient the prospects of labour in the immediate postoperative period, as in our first case.

With timely splenectomy maternal prognosis is good. In Sparkman's series



when splenectomy was performed maternal mortality was only 8%. Outlook for the foetus is not so bright and the chances of foetal salvage are less than 50%. As is to be expected splenectomy does not affect subsequent childbearing and normal reproduction after splenectomy is reported by Stevens (1958), Buchbinder and Lipkoff (1939) and Moore (1956). In the end, Buchbinder and Lipkoff report an interesting case of autotransplantation of splenic tissue throughout the abdominal cavity following splenectomy for splenic trauma in whom splenosis was mistaken for endometriosis at subsequent laparotomy.

#### Summary

(1) Splenic rupture during pregnancy, labour or puerperium is an extreme rarity, almost amounting to medical curiosity. Only 82 cases are reported so far in the world literature.

(2) Three new cases are reported in this paper.

(3) Etiology of splenic rupture is discussed and the role of pregnancy, if any, is considered.

(4) Diagnosis of splenic rupture during pregnancy is difficult, the pregnant uterus partly masking the clinical picture and the obstetrician tending to consider obstetrical complications only.

(5) Splenectomy is mandatory. Maternal prognosis is good with timely splenectomy, though foetal loss exceeds 50 per cent. Future childbearing is unaffected.

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