

# Primary abdominal pregnancy:

## Review of the literature and a report of three cases

### Introduction:

THE ABILITY OF a fertilised human ovum to achieve primary nidation on any peritoneal surface was generally thought to be impossible until Studdiford (1942) established this concept. He reported a case where the implantation was on the serosa of the posterior aspect of the uterus and labelled it a primary implantation. He further laid down three criteria for making such a diagnosis which are generally accepted:

- (1) Both tubes and ovaries must be normal, with no evidence of recent or remote injury.
- (2) The absence of any utero-peritoneal fistulae.
- (3) The presence of a pregnancy related exclusively to the peritoneal surface and young enough to eliminate the possibility of secondary implantation following a primary nidation in the tube.

Even Novak, who was at first dubious about the possibility of a primary peritoneal implantation, has accepted this concept after Studdiford's report. Moreover, he has also accepted several other cases from the older literature (Hirst and Knipe, 1908). The credit for reporting the earliest case must go to Gallabin who published his paper in the year 1896.

by *R.K. Sinha*

MBBS, MRCOG

Dept. of Obstetrics and Gynaecology,  
University of Singapore,  
Singapore.

### Theories on the mechanism of primary implantation

Studdiford believes that the ovum is expelled from the Graafian follicle and then becomes fertilised. The fertilised ovum develops over a period of eight to nine days without being captured by the fimbriated end of the Fallopian tube, and subsequently implants itself on either the parietal or the visceral peritoneum.

Regarding the mechanism of this phenomenon, it is thought that the basic defect is in the fimbrial or tubal function. Westman (1937) reviewed the normal mechanism by which the ovum is transferred to the tube, and mentioned the original work of Rouget (1858) who demonstrated muscle fibres in the tubo-ovarian ligament. On the basis of experimental work on rabbits and *Macacus rhesus*, Westman showed that these fibres are responsible for approximating the tube and ovary at the time of ovulation. The tube itself was found to undergo rhythmic motions with the fimbria sweeping over the ovary. A fluid current in the tube, which caused a sucking movement

## PRIMARY ABDOMINAL PREGNANCY

towards the ostium, was also demonstrated. Westman maintained that the combined rhythmic action of the tube and ciliary motion were responsible for this.

It is also suggested that chemotaxis plays a part in the guidance of the ovum into the tube. The nature of this chemotaxis is unknown, but it may be simply the favourable pH of the tubal secretions. Therefore theoretically any defect in these normal mechanisms can result in the phenomenon of primary peritoneal implantation. Iffy (1961) suggested that ectopic implantation follows coitus and conception at or about the time of menstruation. At this time, in the absence of normal sweeping movements of the fimbria and forward peristalsis of the Fallopian tube, it is possible that there is very little fluid current in the direction of the uterus, as a result of which the ovum is fertilised outside the tube.

### Review of the literature

In reviewing the literature on primary abdominal pregnancy, only the early cases representing gestation periods of not more than eight to ten weeks have been included. This is done for the simple reason that only the early cases can satisfy Studdiford's criteria. The exact site of implantation in a moderately or well-advanced case of abdominal pregnancy is difficult or even impossible to determine due to extensive placental attachments. Also included in this review are cases reported before Studdiford laid down his criteria for primary abdominal pregnancy in 1942, since these are generally accepted as true instances of early primary nidation (Table 1).

Figures for the incidence of primary abdominal pregnancy are not available, though the incidence of abdominal pregnancy making no distinction between

**TABLE I REVIEW OF THE LITERATURE**

YEAR	AUTHORS	SITE OF IMPLANTATION
1896	Gallabin, A.D.	Pouch of Douglas
1908	Hirst, B.C. and Knipe, N.	Left broad ligament
1910	Hammacher, J.F.	Serosa of right Fallopian tube
1921	Ray, H.M.	Serosa anterior wall of uterus
1925	Meyer, J.	Serosa of uterus
1927	Maxwell, J.P. et al.	Serosa of left Fallopian tube
1942	Studdiford, W.E.	Serosa of uterus
1949	Burgeois, G.A.	Broad ligament
1950	Steptoe, P.	Left broad ligament
1954	Myles, J.J.M.	Serosa of uterus
1955	Ahnquist, G. and Lund, P.	Serosa of left Fallopian tube
1957	Martini, A.P.	Pouch of Douglas
1960	Iffy, L.	Pouch of Douglas
1961	Baccarini	Pelvic cavity
1961	Millar, W.G.	Pouch of Douglas
1961	Miller, A.P.	Pouch of Douglas
1964	Kemp, J.	Left lateral pelvic wall
		<b>SITES OTHER THAN THE PELVIC CAVITY</b>
1903	Witthauer, K.	Omentum
1912	Czyzewicz, A.	
1912	Richter, H.	
1918	Koehler, H.	
1919	Walker, J.	
1922	Jacquin, P.	
1924	Poten, W.	
1935	Nagel, V.	Spleen
1935	Longley, E.G.	Retroperitoneal space
1935	Lee, C.M.	
1937	Tomasi, L.	
1941	Williams, C.	
1945	Greene, G.G.	Lumbar gutter
1948	Elzey, N.D.	Lesser sac
1953	Van de Loo	Lower border of liver
1961	Tow, S.H.	Ileum. (Case referred to in text)

primary and secondary has been given variously quoted figures. Quilliam puts the incidence at 1:12,500 pregnancies of all types, and Dixon and Stewart (1960) state it as 1:930 during a period of six years in the University College Hospital in Jamaica. The deficiency of authoritative figures on the incidence of primary abdominal pregnancy may be attributed to the difficulty in determining the exact site of implantation, especially in the moderately advanced cases.

From the accompanying table, it will be noted that the sites of implantation of the fertilised ovum cannot be predicted with any certainty. Cases of primary implantation on the serosal surface of the pelvic organs, i.e. the uterus, tubes, broad ligaments, and on the peritoneal surfaces of the pouch of Douglas, uterovesical pouch and the lateral pelvic walls have been reported. Similarly, others have reported instances of primary nidation on the spleen, liver, omentum, lesser sac, etc. As would be expected, the pelvic peritoneal surfaces are most often the site of primary implantation by virtue of its physical proximity. Implantation in the more distant sites may be explained by the following:

- (a) Late fertilisation of an ovum during which time it has had a chance to wander out of the pelvis.
- (b) A fertilised ovum, which has not had a chance to implant on the pelvic peritoneum possibly because it got entrapped by the omentum or carried to the more distant sites by peristaltic movements of the gut.

#### Case Reports:

Three cases of early primary abdominal pregnancy were seen and treated in the University unit at the Kandang Kerbau Hospital in Singapore between September 1959 and July 1969. All three cases satisfy Studdiford's criteria, with gestation periods ranging from four to six weeks, the diagnosis being confirmed by histological examination.

#### Case No. 1

A Chinese woman, aged 35 years, para 4, was admitted on September 26th 1959 with severe abdominal pain of three hours' duration. The pain had started in the epigastrium and rapidly spread to the flanks. She fainted once at home and again on arrival at hospital. The last menses began on August 16th, 41 days before admission. Her periods were always regular three to four days every 28 to 30 days. Her last confinement was two years previously.

On examination, the patient was in a state of collapse. The blood pressure was 85/50 mm.Hg. and the pulse rate 120/min. The abdomen was very tender on palpation, and marked shifting dullness was present. The uterus was normal in size and position. The cervix, lateral and posterior fornices were tender. There were no adnexal masses. A diagnosis of ruptured ectopic pregnancy was made, and an immediate laparotomy, via a subumbilical mid-line incision, revealed the presence of three pints of blood and clots in the peritoneal cavity. The uterus, tubes and ovaries appeared healthy and there was a corpus luteum in the left ovary. As much blood as possible was removed, but more fresh blood seemed to be issuing from within the abdomen. The abdominal incision was extended upwards and a thorough search for the source of bleeding was carried out. The liver, spleen, and kidneys were intact. On examining the bowels, a haemorrhagic nodule 1.5 cm. in diameter on the ileum near its mesenteric border was found four feet from the ileo-caecal junction. A pulsating mesenteric artery was spurting blood from a small rupture in the nodule.

On close scrutiny, the nodule contained what appeared to be a small piece of placental tissue. The bleeding point was controlled and the raw area on the ileum repaired with an atraumatic suture. The patient was given three pints of blood. She made an uneventful recovery and returned home on the 8th day.

#### Histological Report:

Tissue on section showed area of blood clot and chorionic villi, Tow (1961).

#### Case No. 2

A 22-year-old Chinese woman, para 1, was admitted on 28th March 1965 with a history of slight 'cramp-like' lower abdominal pains and occasional giddiness on sitting up from the previous night. She also complained of pain on micturition for the same duration of time. Her last menses began on 1st March 1965.

On examination, her general condition was satisfactory. She had a blood pressure of 96/50 mm.Hg. and a pulse rate of 80/minute. There was some tenderness over the lower abdomen but no guarding, rebound tenderness, or presence of free fluid. Pelvic examination revealed a slightly bulky retroverted uterus with minimal tenderness in both lateral fornices.

She was observed closely in the ward and on the following day, her blood pressure was recorded as

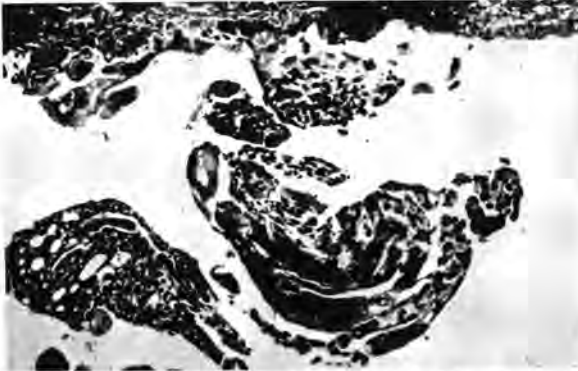


Fig. 1: Section shows masses of blood clot with chorionic villi.

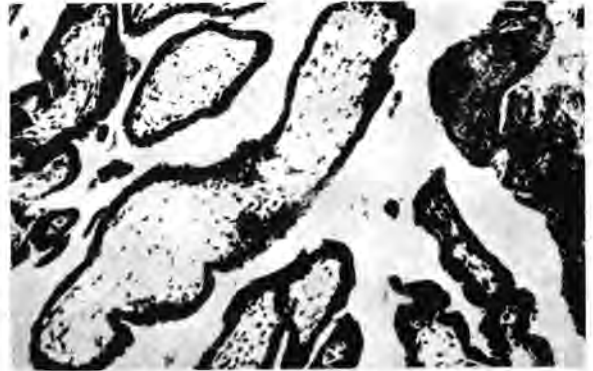


Fig. 2: Section shows presence of chorionic villi.

80/60 mm.Hg. and the pulse rate 112/minute. She also appeared pale, developed rebound tenderness over the abdomen and had signs of free fluid. Pelvic examination revealed a fulness in the pouch of Douglas.

A diagnosis of ruptured ectopic pregnancy was made and a laparotomy carried out. A massive haemoperitoneum of 2½ pints of blood and clot was found. The uterus, tubes and ovaries appeared normal. On evacuating the blood, a haemorrhagic mass 3 cm. x 2½ cm. x 1 cm. was detected, situated on the anterior leaf of the left-broad ligament just below the medial end of the round ligament. This mass was peeled off and the raw area repaired with atraumatic catgut. The abdomen was closed, and she was transfused with three pints of blood. She made an uneventful recovery.

#### Histological report:

'Microscopic examination of this haemorrhagic mass showed presence of blood clot and chorionic villi'. (Fig. 1)

#### Case No. 3

A 26-year-old Chinese woman, married for four months, was admitted on 30th April 1966 with a history of sudden onset of 'cramp-like' lower abdominal pains from the previous day. The pain originated in the left iliac fossa and spread to involve the entire lower abdomen. She fainted once at home. Her last menses began on 23rd March 1966. She had regular monthly periods.

On examination, she appeared pale, had a blood pressure of 110/70 mm.Hg. and a pulse of 88/minute. There was tenderness in the left iliac fossa and in the suprapubic region. Rebound tenderness was also present. Vaginal examination revealed a slightly en-

larged uterus with tenderness in both fornices.

She was diagnosed as having a ruptured ectopic pregnancy and a laparotomy was carried out. One pint of blood was removed from the peritoneal cavity. The tubes, ovaries and uterus were normal. A haemorrhagic nodule attached to the peritoneum in the uterovesical pouch and bleeding was removed. This measured 1½ cm. in diameter. Haemostasis was secured with sutures, the abdomen closed, and a pint of blood transfused. She made a satisfactory recovery.

#### Histological report:

'Microscopic examination showed the presence of chorionic villi'. (Fig. 2).

#### Summary

Studdiford in 1942 established the concept of primary abdominal pregnancy, and his criteria for making such a diagnosis have been elaborated upon. Failure in tubal peristalsis, poor ciliary action, and an unfavourable pH in the tubal secretions have all been incriminated in an attempt to explain this phenomenon.

A review of the literature has shown the site of implantation to be very variable. Three cases of primary abdominal implantation, presenting as ruptured ectopic pregnancies, are reported. All three cases satisfied Studdiford's criteria, final proof being obtained by histological examination of the conceptus.

#### Acknowledgement:

I wish to thank Dr. S.H. Tow, former Head of the Department of Obstetrics and Gynaecology, University of Singapore, and Dr. L.K.C. Chan, lecturer at the University of Singapore, Department of Obste-

trics and Gynaecology, for permission to report on their cases No. 1 and 2 respectively.

REFERENCES

1. AHNQUIST, G. and LUND, P.R. *Am. J. Obstet. Gynec.*, 69: 1268, (1955).
2. BURGEOSIS, G.A. *Mil. Surgeon.*, 105: 243, (1949).
3. BACCARINI, A. *Med. J. Aust.*, 48: 898, (1961).
4. CZYZEWICZ, A. *Arch. Gynak.*, 97: 161, (1912).
5. DIXON, H.G. and STEWART, D.B. *Brit. Med. J.*, 21: 1103, (1960).
6. ELZEY, N.D. *West. J. Surg.*, 56: 410, (1948).
7. GALLABIN, A.L. (*Trans. Lond. Obst. Soc.* Vol. 5: 38) (1896). *Brit. Med. J.*, 1: 664, (1903).
8. GREENE, G.G. *South. M.J.*, 38: 747, (1945).
9. HIRST, B.C. and KNIPE, N. *Surg. Gynec. and Obst.*, 7: 456, (1908).
10. HAMMACHER, J.F. *Arch. Gynak.*, 92: 595, (1910).
11. IFFY, L.J. *Obst. Gynec. Brit. Emp.*, 67: 997 (1960).
12. IFFY, L.J. *Obst. Gynec. Brit. Cwlth.*, 68: 441 (1961).
13. JACQUIN, P. *Gynec. et Obst.*, p. 492, (1922).
14. KOEHLER, H. *Monatsschr. Geburtsh. U. Gynak.*, 48: 83, (1918).
15. KEMP, J. *Med. J. Aust.*, 1: 120, (1964).
16. LONGLEY, E.G. *Am. J. Surg.*, 27: 349, (1935).
17. LEE, C.M. *Chinese M.J.*, 49: 789, (1935).
18. MEYER, J. *Zentralbl. Gynak.*, 49: 118, (1925).
19. MAXWELL, J.P., EASTMAN, N.J. and SMETANA, H. *Surg. Gynec. and Obst.*, 45: 802, (1927).
20. MYLES, J.J.M. *J. Obstet. Gynec. Brit. Emp.*, 61: 387 (1954).
21. MARTINI, A.P. *Am. J. Obstet. Gynec.*, 73: 1139, (1957).
22. MILLAR, W.G. *J. Obstet. Gynec. Brit. Cwlth.*, 68: 634, (1961).
23. MILLER, A.P. *Canad. Med. Ass. J.*, 85: 755, (1961).
24. NAGEL, V. *Monatsschr. Geburtsh. U. Gynak.*, 101: 23, (1935).
25. NOVAK, E. *Gynaecological and Obstetrical Pathology*, ed. 3., Philadelphia, W.B. Saunders Co. p. 473, (1952).
26. POTEN, W. *Arch. Gynak.*, 122: 134, (1924).
27. QUILLIAM, T.A. *Post. Grad. M.J.*, 24: 482, (1948).
28. RICHTER, H. *Arch. Gynak.*, 96: 461, (1921).
29. RAY, H.M. *Surg. Gynec. and Obstet.*, 32: 437, (1921).
30. STUDDIFORD, W.E. *Am. J. Obstet. Gynec.*, 44: 487, (1942).
31. STEPTOE, P.J. *Obstet. Gynec. Brit. Emp.*, 57: 949, (1950).
32. TOMASI, L. *Abstract in Am. J. Obst. Gynec.*, 33: 306, (1937).
33. TOW, S.H. *Brit. Med. J.*, 2: 432, (1961).
34. VAN DE LOO, G. *Ztschr. Laryng. Rhin. Otol.*, 32: 514, (1953).
35. WITTHAUER, K. *Zentralbl. Gynak.*, 27: 136, (1903).
36. WALKER, J. *Arch. Gynak.*, 111: 342, (1919).
37. WESTMAN, A.J. *Obstet. Gynec. Brit. Emp.*, 44: 821, (1937).
38. WILLIAMS, C. *Med. J. Aust.*, 2: 326, (1941).