Ovarian Tumours during Pregnancy and the Puerperium with Notes on Seven Cases.

By ARNOLD W. W. LEA, M.D., B.S., (Lon.), B.Sc. (Vict.),
F.R.C.S. (Eng.), Manchester.

THE presence of an ovarian tumour is a serious complication of pregnancy and labour. The dangers, however, arise mainly from failure to diagnose the presence of a tumour until the development of serious symptoms. If the nature of the case is recognised early, and appropriate treatment is adopted, very good results are obtained. This complication is comparatively rare, and the seven cases recorded here comprise my total experience. In each instance the tumour was the cause of symptoms which led to its recognition. In four cases the tumour was removed during pregnancy: in three cases during or after the puerperium; all the patients made good recoveries.

The whole question of ovarian tumours complicating pregnancy, labour, and the puerperium has recently been thoroughly reviewed in a valuable monograph by McKerron,¹ based upon an analysis of no less than 1,290 cases, collected from the literature of the subject.

It is not possible to estimate precisely the frequency of ovarian tumours complicating pregnancy. McKerron as a result of analysis of figures by Flaischlen (5 out of 17,832 cases); Löhlein (2 in 1,300); Tarnier (1 in 1,738), and others, concludes that its frequency is probably about 1 in 2,500 cases. Harrison Cripps,² in a series of 182 consecutive ovarian tumours at St. Bartholomew's Hospital had 2 cases in which pregnancy complicated the operation.

Nature of Tumour. In four cases out of seven the tumour was a dermoid cyst. There appears to be little doubt that dermoid tumours are proportionately more frequent during pregnancy than the other forms of ovarian tumour. This is clearly due to the comparatively small size of these tumours, and their slow rate of growth, which causes them frequently to escape notice until pregnancy or some accident occurs. In 862 cases of tumours complicating pregnancy, 204 were ovarian dermoids, these giving a frequency of 25 per cent. These tumours also lie frequently in the pelvis. In five out of the seven cases the tumour was in the pelvis, and of medium size. Four of these were dermoid cysts.

Although pregnancy has no influence on the origin or rate of growth of ovarian tumours, it much increases the liability to changes

in the tumour. Of these torsion of the pedicle is the most important, and occurs much oftener during pregnancy than in cases apart from pregnancy. Sir J. Williams,³ in 375 cases, found torsion in 21, or 6 per cent. McKerron, out of a larger number, finds torsion to occur in 12 per cent. during pregnancy, and during the puerperium in no less than 22·7 per cent. of cases.

Rupture of the cyst also occurs in 3 and 4 per cent. of cases during pregnancy; often, however, this is secondary to acute torsion. Suppuration during pregnancy is rare.

In the 4 cases here related, some complication was present in each instance.

In Case 1 acute torsion occurred during the third month of gestation. This was followed by rupture of the cyst, and produced symptoms closely simulating tubal gestation with rupture of the sac. At the operation the abdominal cavity contained a considerable quantity of fluid blood, which was seen to be escaping from a rupture of the intensely congested ovarian cyst.

In Case 2 the tumour (a dermoid cyst) was impacted in the pelvis below the enlarging uterus, and produced severe pressure symptoms, leading to retention of urine and great pain.

In Case 3 a slight degree of torsion (one turn) was present.

In Case 4 necrosis of the cyst, followed by rupture and peritonitis, occurred during the last month of pregnancy.

There is a certain tendency to spontaneous interruption of pregnancy in these cases. Sir J. Williams found that abortion or premature labour took place in 58 out of 461 pregnancies—that is, in 12·5 per cent. of cases.

The *prognosis* of ovarian tumours during pregnancy largely depends upon the presence or absence of serious complications. A fatal termination during pregnancy is rare. Sir J. Williams, in 461 cases, found only 1 case of sudden death from rupture of the cyst, and 6 in which the tumour ruptured during pregnancy, and the patients died after delivery. During labour and the puerperium the danger much increases. Complications occur in at least one-third of the cases, and small tumours occupying the pelvis are quite as dangerous as the larger tumours, especially after delivery. A few years ago Sir J. Williams estimated that the mortality of all cases, before, during and after delivery, amounted to the “appalling” total of 25 per cent. It is to be hoped that more recent results would show a great advance. If the ovarian tumour is recognised and operated upon during pregnancy, the risk is little greater than in ovariectomy apart from pregnancy.

Treatment. It is now generally admitted that an ovarian tumour should be removed at any period of gestation at which it is recognised. This view applies equally to small tumours which, owing to their liability to injury during labour, are particularly dangerous. There is ample material to enable us to ascertain the results of expectant treatment. Of 720 cases collected by McKerron, in which pregnancy was allowed to run its course without interference, 152 died, *i.e.*, 21 per cent. Some others were only saved by operation during labour or the puerperium. The method of operation must be usually by abdominal section. If, however, the tumour is impacted in the pelvis, and is cystic, vaginal ovariectomy may be performed.

In three of my cases operated upon during pregnancy, abdominal section was performed. In Case 4 vaginal ovariectomy was thought to be advisable, and as the case is one of great interest, it may be well to relate it shortly.

CASE IV. Mrs. E., æt. 42, 6-para, the youngest living child 11 years of age. She was seen May 2nd, 1903, and at this time was 8½ months pregnant. For 6 weeks she had been confined to bed, suffering from severe abdominal pain and almost constant sickness. For a week she had been fed by nutrient enemata. The patient looked extremely ill. There was slight jaundice. The temperature was 100–101°; the pulse 120, and weak. She was quite unable to retain any food by the stomach. The uterus was the size of full term pregnancy. The head lay above the brim of the pelvis and the fetal heart sounds were heard.

Vaginal examination showed that the pelvis was occupied by a rounded fixed tumour, preventing engagement of the head. The cervix was pushed forward against the symphysis. The tumour was cystic, but gave a definite "boggy" sensation to the finger. A diagnosis of ruptured ovarian cyst with peritonitis was made, and immediate removal of the tumour advised. An abdominal section would certainly have been fatal. It was, therefore, decided to remove the tumour *per vaginam*. Twenty-four hours later posterior vaginal section was performed. Hæmorrhage was free, but readily controlled by forceps. The tumour was necrotic, and adherent to the anterior wall of the rectum. Rupture had taken place with the escape of dermoid contents into the peritoneum. The cyst was removed in fragments. The pedicle was recognised and ligatured. The pelvis was irrigated with saline fluid and gauze drainage was placed in the wound.

A few minutes after the operation and when the patient had been

lifted into bed, the pulse suddenly failed and could not be felt at the wrist. There was no sign of hæmorrhage. Thirty ounces of saline fluid were immediately transfused into the median basilic vein. Brandy and saline solution was also transfused under the skin. The patient gradually improved, and an hour later was in fairly good condition.

Labour came on spontaneously in 24 hours. A living child was born naturally. The gauze packing was removed on the third day. The toxæmic symptoms rapidly subsided. There was no vomiting after the operation and the patient made a good recovery.

A few months later this patient developed myelitis. The disease rapidly progressed, and she died six months after the operation. It is probable that myelitis may have been present during pregnancy, but accurate observations were not made. It was not apparently connected in any way with the operation.

The case has a personal interest as I had considered the advisability of using medullary anæsthesia by cocaine since it was doubtful if the patient could bear a general anæsthetic. Chloroform, however, was given, otherwise the myelitis would certainly have been attributed to the spinal injection of cocaine—and quite wrongly.

Ovarian Tumours during Labour. I have no personal experience of cases in which an ovarian tumour in the pelvis has caused obstruction to delivery. In one case (No. 6) the tumour was first recognised during labour by Dr. Healey, of Preston. The tumour was obviously cystic, and filled the pelvis, preventing the descent of the child's head which was above the brim. After consultation, it was decided to puncture the tumour *per rectum*. This was performed: the cyst immediately collapsed, and delivery was easily effected. The patient made a good recovery, but a few weeks later the tumour had refilled, and was removed by abdominal section. It was a single parovarian cyst of the right broad ligament.

The dangers of puncture of the cyst during labour are now generally recognised. There is a grave risk of infection of the peritoneum by the contents of the cyst, and it is only efficient if the cyst is mainly unilocular. Reposition may be attempted and has often succeeded, but the patient is still exposed to various dangers during the puerperium.

Ovariectomy during labour has now been performed successfully many times, and although this would seem to be somewhat heroic, it is probably, in the majority of cases, the best method of treatment. The whole question has been thoroughly investigated by Dr.

McKerron in his monograph, and has also been discussed at the Obstetrical Society of London.⁴

The figures given by Dr. McKerron are shortly as follows:—

1. Reposition has been carried out in 41 cases, and of these six mothers died, but in only three could death be attributed to the treatment; in two of these, rupture of the cyst had occurred.

2. Puncture of the cyst was carried out in 43 cases, with a maternal mortality of 7, *i.e.*, 18·6 per cent., and in many of those who recovered, convalescence was tedious and unsatisfactory.

3. In some cases incision of the cyst wall and drainage *per vaginam* have been carried out successfully, but in these cases ovariectomy should be performed as soon as possible. All attempts at delivery by forceps, version or craniotomy, until the obstruction caused by the tumour is removed, are to be absolutely condemned. The mortality of 49 cases treated in this way amounted to nearly 50 per cent.; version appears to be especially dangerous. Ovariectomy during labour has now been performed 15 times (eight by the abdomen, seven by the vagina), in all these cases with successful results. During the last few years also Cæsarean section has been performed in 12 cases in which it was not possible to raise the tumour from behind the uterus. This was, of course, immediately followed by removal of the tumour. One patient only died from peritonitis.

It would seem, therefore, that ovariectomy during labour is very successful, and should be carried out if the surroundings of the patient and her general condition render it feasible. If this is not possible reposition of the tumour or puncture *per vaginam* must be relied upon, followed by removal of the tumour as soon as possible after delivery.

Ovarian Tumours during the Puerperium. It is computed that some disturbance of the puerperium may be anticipated in nearly 50 per cent. of cases. The tumour is exposed to many risks during labour and after delivery. The most common complication is torsion of the pedicle. This is favoured by the sudden diminution of abdominal pressure, the lax abdominal wall, and the altered relations and size of the uterus. McKerron's figures show that torsion occurs in 22·7 per cent. of cases. In 10 cases of ovariectomy after labour, recorded by Aust. Lawrence,⁵ torsion was found in every instance. The pressure to which the tumour is exposed during labour, and the resulting bruising and impairment of nutrition, is extremely liable to set up an infective process in the cyst. Suppuration is found to occur in nine per cent. of cases during the puerperium. Infection of an ovarian cyst after delivery, especially if the tumour is of small

size and in the pelvis, produces symptoms which closely resemble those of acute puerperal infection. In other cases infection of the tumour results in the development of a more insidious type of peritonitis, which may, however, speedily be fatal. Attention was called to this some years ago by Dr. Grigg, who recorded several cases of puerperal septicæmia ending fatally, and due to the presence of an unrecognised ovarian tumour.

The following case, No. 7, illustrates very well the danger of overlooking a small ovarian tumour during the puerperium.

CASE VII. Mrs. C., æt. 32, was delivered naturally of a living child in March, 1899. Four days later she was seized with acute abdominal pain, pyrexia, and all the phenomena of puerperal infection. I saw her in consultation with Dr. Ballachey fifteen days after delivery. She was extremely ill. The temperature varied from 101—103°. The tongue was dry, the abdomen distended and tender. *Per vaginam* a hard mass of exudation filled up the pouch of Douglas pushing the uterus forward. Posterior vaginal section was performed, and a large intra-peritoneal collection of pus evacuated. A drainage tube was inserted. The patient made a rapid and complete recovery.

Five years later in March, 1904, she was again delivered of a living child. The labour was perfectly natural. On the third day after delivery she again developed all the symptoms of acute puerperal infection. I saw her on the eighth day. The temperature rose to 102—103° each night. The pulse was 110—120 per minute, she complained of severe abdominal pain, there was no distension or evidence of general peritonitis. *Per vaginam* a rounded tumour was felt in Douglas's pouch, partially fixed, very tender, the size of a large orange. The uterus was small and well involuted. Posterior vaginal section was again performed. The tumour was readily exposed and the adhesions separated. The pedicle was ligatured with silk, and the tumour removed. It was a dermoid cyst of the left ovary. The pelvic cavity was flushed and packed with gauze. The patient made a rapid recovery. The tumour had evidently become infected after delivery. Cultures and cover glass preparations were made of the puriform fluid, but no organisms were discovered.

The immediate cessation of pyrexia and all severe symptoms after removal of the tumour show conclusively that this was the focus of infection. It is also almost certain that this tumour was the cause of the attack of peritonitis five years previously. It was, however, not discovered at the first operation owing to the large collection of pus in the pelvis.

The presence of an ovarian tumour during the puerperium must be a source of grave anxiety. It is probable that the post-partum mortality without operation is about 28 per cent. (McKerron). Small intra-pelvic tumours are quite as dangerous as the larger tumours, owing to the fact that they frequently escape notice, unless a careful examination is made.

If a tumour is known to exist and no complication ensues, it has generally been considered advisable to wait for two or three weeks at least before operation is undertaken. It is, however, probably wiser to remove the tumour as early as possible, even in the absence of any complication. There is little additional risk in doing this, but if we wait until some change has occurred in the tumour, demanding immediate operation, the danger to life is much increased.

If acute symptoms appear, no time should be lost. The tumour must be removed either by the abdomen or vagina, according to the situation of the tumour.

Some interesting figures illustrating post-partum ovariectomy are given by Dr. McKerron. He has collected 92 cases in which operation was undertaken during the puerperium, usually after the advent of some grave complication. In 79 cases the patients recovered, thus giving a mortality of 14 per cent. only. The conditions found at operation were as follows:—Acute torsion, 28 cases; suppuration, 16 cases; rupture of cyst, 8 cases; acute peritonitis, 12 cases. In two the tumour was gangrenous, and in two it was malignant.

There seems no valid reason why ovariectomy should not be performed 24—48 hours after delivery, and this has already been done successfully in some cases.

Vaginal ovariectomy has been recently strongly recommended by Dr. Haultain,⁶ and in suitable cases gives excellent results.

REFERENCES.

- ¹ MCKERRON. "Pregnancy with Ovarian Tumour." Rebman, 1903.
- ² *St. Bartholomew's Hospital Report*, 1903.
- ³ *British Medical Journal*, 1897. Vol. i., p. 104.
- ⁴ *Trans. Obstet. Soc.*, 1898.
- ⁵ *British Medical Journal*, 1893. Vol. ii.
- ⁶ *Journ. Obstet. and Gynæcol. Brit. Empire*. Vol. i., p. 388.

CASES OF OVARIOTOMY DURING PREGNANCY.

Reference.	Period of Pregnancy.	Symptoms.	Method of Operation.	Type of Tumour.	Result.	Remarks.
1 Mrs. N., Primipara, Aet. 22.	2½ months	Acute abdom. pain 3 days, with vomiting. Tumour to left side of uterus. Very tender. Temp. 100-101°	Abdom. Section.	Multilocular glandular cyst. Acute torsion of pedicle. Rupture of cyst. Peritoneum contained several ounces of blood.	Recovery. Pregnancy went on to term. Child living.	The symptoms closely simulated tubal gestation with rupture of sac.
2 Mrs. F., Primipara, Aet. 29.	2½ months	Severe abdom. pain for one month, great difficulty in micturition. Tumour filled the pelvis, uterus pushed forward and to left side.	Abdom. Section.	Dermoid cyst of right ovary, size of child's head at full term. Long pedicle.	Recovery. Normal labour at term. Child living.	Patient had been treated for retroflexion and prolapse by pessaries.
3 Mrs. M., Aet. 35, Multipara. 6 normal labours. 2 miscarriages.	3½ months	Constant abdom. pain since gestation commenced. Elastic tumour in abdomen to left of uterus. Very tender.	Abdom. Section.	Unilocular cyst of left ovary. Pedicle long; slight torsion, no adhesions.	Recovery. Labour at term. Placenta prævia. Child still born.	The tumour had probably developed since the last pregnancy.
4 Mrs. E., Aet. 42, Multipara, 6 pregnancies the last 11 years previously,	8½ months	Had been in bed for one month with constant abdominal pain and vomiting, for 5 days had signs of peritonitis. Temp. 101° pulse 120, slight jaundice. Uterus size of 8½ months' pregnancy: <i>per vaginam</i> , rounded doughy mass in pouch of Douglas preventing engagement of child's head.	Posterior vaginal Section. Drainage.	Dermoid cyst. The tumour had become necrosed and had ruptured, causing peritonitis.	Recovery. Labour commenced 24 hours after operation. Living child, born naturally.	The patient was much collapsed after operation, and was transfused. This patient developed diffuse Myelitis, and died six months later.

CASES OF OVARIAN TUMOURS CAUSING DIFFICULTY IN LABOUR OR THE PUERPERIUM.

Reference.	Character of Labour.	Symptoms after Delivery.	Method of Operation.	Type of Tumour.	Result.	Remarks.
5 Mrs. H., Aet. 26, 2 para.	Labour very difficult Delivery by forceps.	Slow recovery, with severe abdom. pain. Tumour adherent in floor of pel- vis.	Abdom. section.	Dermoid cyst of right ovary. Numerous adhesions.	Recovery.	
6 Mrs. T., aet. 23, 1 para.	Labour obstructed by cystic swelling below child's head, punctured <i>per rec-</i> <i>tum</i> , followed by collapse of cyst. De- livery by forceps. Good recovery.	3 months later tumour had refilled, reaching the um- bilicus. No pain.	Abdom. section.	Parovarian cyst of right broad liga- ment. No adhesions.	Recovery.	This illustrates the inefficiency of tap- ping in parovarian cysts.
7 Mrs. C., aet. 33, 2 para.	1st labour, forceps. 2nd labour, natural.	4 days after 1st labour severe symptoms of puer- peral infection. Post- erior vaginal section in 2nd week for purulent peritonitis. Complete recovery. After 2nd labour, 5 years later, acute symptoms of infection. Temp. 102-103° Rounded tumour felt in floor of pelvis, fixed by adhesions—cystic.	Posterior vaginal section. Removal of adherent tumour.	Dermoid cyst of left ovary which had suppurated: no organisms found in pus.	Recovery.	There is no doubt that the tumour was the cause of the first attack of peritonitis, but was not discovered at the operation. No symptoms were present till after the 2nd labour.