In concluding I have pleasure in expressing my thanks to Dr. Leonard Findlay for placing the material for this work at my disposal, and for his helpful criticism and encouragement.

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OVARIAN TUMOURS COMPLICATING PREGNANCY, LABOUR, AND THE PUERPERIUM.

(Additional Cases.)

BY

HERBERT R. SPENCER, M.D., B.S., F.R.C.P.,
OBSTETRIC PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

In the Lettsomian Lectures¹ delivered before the Medical Society of London in 1920 I published the whole of my experience of ovarian tumours complicating pregnancy, labour, and the puerperium. The following cases have occurred since, and I now publish them in order to complete the series up to date.

The first series of cases, 55 in number, was attended by the death of one mother (from intestinal obstruction); the present series, 8 in number, was also attended by one death (from pulmonary embolism on the twenty-fourth day). The mortality for the 63 ovariectomies was 3.1 per cent.

CASE 56.

Mrs. M., aged 27, pregnant for the first time (married on August 27th, 1919), was sent to me by Dr. Faris on February 7th, 1920. She had been last "unwell" three weeks previously, when she only had a pink discharge. She had never gone over her time. The pelvis was large (iliac spines 11 in., iliac crests 11½ in., external conjugate 8½ in.). The breasts resembled those of pregnancy. The uterus could be felt

at a height of 3 inches above the pubes. A tumour larger than a hen's egg could be felt behind and to the left of the cervix, which had the characteristic consistence of pregnancy. On March 19th the uterus had increased to the size of the organ at the fourth month, reaching up 4½ inches above the pubes. On May 19th the pelvic tumour had increased in size, being nearly as large as an orange, and was deep in Douglas's pouch; it felt hard like a fibroid and could not be pushed up.

On August 11th, 1920, I performed Caesarean section through an incision to the right of the middle line. The placenta was in front. The child (a boy weighing 7½ lb.) was delivered by the feet, and cried at once. The uterine wound was sewn up with silk sutures. The tumour was found to be a parovarian cyst of the right side. It measured 4 by 3 by 2½ inches and was removed (without the ovary and tube) by enucleation, after carefully tying all the vessels running in the cut peritoneum with fine silk, as also the small sheaf of vessels running towards its base, and then closing the peritoneum with fine silk. The cyst contained clear fluid of lower specific gravity than 1000, no solid growth or papilloma.

The patient made a simple recovery for a fortnight after the operation, when thrombosis of the right femoral vein occurred, which kept her in bed for a month. She made a good final recovery, and with her child was quite well three years later.

CASE 57.

E. D., aged 39, mother of seven children, was admitted to University College Hospital on December 6th, 1920, complaining of increase in the size of the abdomen since her last childbirth three and a half months before, when the tumour was present but caused no difficulty; she felt a dragging pain in the tumour, and suffered from a winter cough with expectoration in which no tubercle bacilli were found. A multilocular ovarian tumour was felt in the abdomen reaching up to a height of 4½ inches above the pubes. It was removed through a median abdominal incision on December 11th, 1920. The tumour weighed 6 lb. and measured 5 by 6 by

4½ inches. Under the microscope it was a pseudo-mucinous cyst with many microscopic papillae, and some of the smaller cysts were packed with papilloma, the epithelium of which was lowly proliferated. The operation lasted twenty-eight minutes. The bronchitis was aggravated by the operation; the temperature reached 102° on the third day. The patient left the hospital well on January 8th, 1921.

CASE 58.

M. M., aged 34, who had had three children (no miscarriage), was admitted to University College Hospital on February 13th, 1922, complaining of pain in the right side of the abdomen since a week before her last child was born (two years and four months before). She was in the ninth week of pregnancy, having last menstruated on December 20th, 1921. A small cyst could be felt on the right side of the lower abdomen, and bimanually the uterus, nine weeks pregnant, could be felt, pushed over to the left side.

On February 18th, 1922, the tumour was removed through a Pfannenstiel incision. The wound healed by first intention and the recovery was simple, the highest temperature being 99.4° on the second day. The patient was delivered naturally of a living boy, after two hours' labour, on September 26th, 1922. In January, 1925, the abdominal wall was strong and the scar scarcely visible. The tumour measured 2½ by 2½ by 2½ inches; it was a lutein cyst of the right ovary.

CASE 59.

N. A., aged 18, a primigravida, was admitted to University College Hospital on May 15th, 1922, as she had been found (on her previous admission in April) to have a dermoid tumour in the pelvis which could not be pushed up. The pelvic measurements were: iliac spines 10 in., iliac crests 11½ in., external conjugate 8½ in., diagonal conjugate 4½ in.; the outlet was contracted.

Caesarean section was performed on May 20th, 1922, two days before term. The child was delivered in fifty-three seconds; it weighed 7 lb. 6 oz., and cried at once. The ovarian tumour (of the right side) was then removed and the pedicle tied with silk, the tube being left behind. The operation lasted fifty-eight minutes. The patient made a good recovery, the highest temperature being 100° on the seventh day, afterwards normal. The tumour was a dermoid weighing 6½ oz., and measured 4 by 2-3/5 by 2 in. It contained cartilage, fat, muscle, spaces lined with epithelium, sebaceous glands, and hair follicles, and was lined with a thin squamous epithelium.

CASE 60.

R. B., aged 34, mother of seven children (no miscarriage), was admitted to University College Hospital on May 25th, 1922. Her doctor had found a tumour in the abdomen during her last pregnancy, and while she was being prepared for admission to the hospital labour came on and she was delivered of a living child, which presented by the breech, on January 29th, 1921. She had steadily increased in size, and was again about five and a half months pregnant, having last menstruated on November 22nd. There was very extensive pigmentation of the arms and face. The uterus reached up to the umbilicus, and above it was a flaccid cyst extending up to the ensiform cartilage.

Ovariectomy was performed on May 27th, and a multilocular cyst of the right ovary containing blood-stained fluid was removed.

It was mainly unilocular with a few daughter cysts, and contained no solid growth except one or two small masses of papilloma showing under the microscope no tendency to malignancy. After the operation the pigmentation became less intense. A good recovery ensued; the highest

temperature during her stay in hospital was 99.4°. She left the hospital on June 6th. The pregnancy continued, and the patient was delivered of a living girl on September 12th, 1922, and of a living boy in October, 1924.

CASE 61.

L. T., aged 30, mother of two children, was admitted on June 2nd, 1922, complaining of dragging pain in the left iliac fossa and of a yellow discharge since her last confinement five months before. She had had a flooding nine weeks before admission and had "seen nothing" since. The uterus was felt at a height of 2½ inches above the pubes, of the size, shape, and consistence of the pregnant organ at the ninth week. Behind the uterus could be felt a cystic swelling larger than a hen's egg; it could be moved but not easily pushed out of the pelvis.

Ovariectomy was performed by a median abdominal incision on June 4th, 1922. A good recovery was made; the highest temperature was 100°, on the seventh day. The tumour consisted of a cyst measuring 2½ by 2½ in., with two small cysts in its wall, and of a more solid part containing a few small cysts and a corpus luteum of pregnancy. The patient went to term and was delivered of a living boy at the end of January, 1923.

CASE 62.

M. K., aged 33, who had had two children and one miscarriage, was admitted on July 29th, 1922, complaining of flooding for nine days. The patient was two months pregnant. An ovarian tumour was found reaching up to within 1½ inches of the umbilicus. Next day the temperature reached 102.2°, and the patient passed a two-months ovum; the temperature then fell to normal. On August 1st the uterus was felt at a height of

CASE 56.—A=Operation. B=Deep stitches removed. C=Superficial stitches removed. D=Vomited. E=Death from pulmonary embolism, 7 p.m.

OVARIO-TOMY FOR TUMOURS COMPLICATING PREGNANCY, LABOUR, AND THE PUERPERIUM (EIGHT ADDITIONAL CASES).

No.	Initial.	Age.	Children.	Abortion.	Time of Discovery of Tumour.	Seat of Tumour.	Nature of Tumour.	Result of Labour to—		Growth of Tumour during Pregnancy.	Date of Ovariectomy.	Adhesions.	Result.
								Mother.	Child.				
56	M.	27	0	0	During this pregnancy	R. parovarium	Unilocular cyst—4 by 3 by 2½ in.	Lived	Lived	Some	Aug. 10, 1920 (immediately after Caesarean section near term)	No (a few filmy shreds on fundus uteri)	Recovered.
57	E.D.	39	7	0	Tumour present during last pregnancy (confined 3½ months before)	L. ovary	Multilocular pseudo-mucinous cyst with papilloma in some of the cysts; weight 6 lb.	Lived	Lived	Not known	Dec. 11, 1920	No	Recovered.
58	M.M.	34	3	0	At ninth week of pregnancy	R. ovary	Luteal cyst—2½ by 2½ by 2½ in.	Lived (labour normal, Sept. 6, 1922)	Li-ed (boy)	Not observed	Feb. 18, 1922 (at ninth week of pregnancy)	No	Recovered.
59	N.A.	18	0	0	At 7½ month of pregnancy	R. ovary	Dermoid, 6½ oz. (measured 4 by 2½ by 3 in.)	Lived	Lived (boy, 6 oz.)	Not known	Mar. 20, 1922 (immediately after Caesarean section)	A tag of omentum adherent to wall near top of wound	Recovered.
60	R.B.	34	7	0	During last pregnancy (child born Jan. 28, 1921; breech presentation)	R. ovary	Multilocular cyst size of adult head, with few patches of low papilloma	Lived (labour normal, Sept. 12, 1921)	Lived (girl)	Slow increase	May 27, 1922 (in sixth month of pregnancy)	No	Recovered.
61	L.T.	30	2	—	During this pregnancy	R. ovary	Unilocular cyst—2½ by 2½ in. in pelvis	Lived (labour normal, Jan., 1923)	Lived (boy)	Not known	June 4, 1922 (a 15th week of pregnancy)	No	Recovered.
62	M.K.	33	2	1	During pregnancy (aborted at second month, six days before ovariectomy)	R. ovary	Multilocular cyst size of infant's head with septa broken down; some papillomata, one small cyst stuffed with papilloma branched epithelium, not proliferated	Lived	—	Not known	Aug. 6, 1922	A few tortig broad ligament	Recovered.
63	L.A.	31	0	0	During this pregnancy	R. parovarium	Unilocular cyst—3½ by 3½ by 2½ in.	Died	Died (Caesarean section after mother's death)	No	May 19, 1923 (at 31st week of pregnancy)	No	Died.*

* Pulmonary embolism June 12th, twenty-four days after operation.

3 inches above the pubes; it was pushed forwards by a tumour, as big as a child's head, which was thought to be probably a dermoid. Ovariectomy was performed on August 5th. During the separation of an adhesion the tumour burst. It was removed and the pedicle tied with silk. The operation lasted forty-three minutes. The tumour was a multilocular pseudo-mucinous cyst containing unbranched papilloma; one more solid portion contained a loculus filled with branched papilloma. The patient made a good recovery (highest temperature 99.8°), and left the hospital at her own request on August 21st.

CASE 63.

L. A., aged 31, married two years, applied when thirty-one weeks pregnant for a confinement "letter" at University College Hospital. She had suffered a good deal from vomiting in the morning and from headaches during the last few weeks. She had a feeling of weight on walking and was very breathless on exertion. The heart apex beat was in the fifth space 4 inches from the middle line, and, on auscultation, a systolic and a presystolic murmur were heard. The urine, specific gravity 1020, was free from albumin, sugar, or blood. The pelvic measurements were: iliac spines 9½ in., iliac crests 10½ in., external conjugate 7½ in. On May 18th the uterus reached up for 8 inches above the pubes. The child presented by the head. On vaginal examination a firm rounded tumour as big as a flattened orange could be felt in the retrouterine pouch. It was diagnosed as a dermoid.

Ovariectomy was performed on May 19th, 1923. The uterus was withdrawn from the abdomen through a ten-inch incision and the tumour brought up. It was a parovarian cyst, on the right side, measuring 3½ by 3½ by 2½ inches. The pedicle was tied with silk (without enucleating the cyst) and the raw edges sewn over with fine silk. The ovary was not removed. The operation lasted fifty minutes, under ether anaesthesia. The wound healed by first intention. The cyst was unilocular, contained clear watery fluid, no albumin, and no papilloma; it was lined by cubical epithelium. The patient made a normal recovery, the temperature never rising above 99.2° till the fifteenth and sixteenth days, when it rose to 100°, but fell to normal afterwards. On those two days the patient complained of sharp pain in the chest, but no physical signs could be detected, and the pulse was but slightly affected and the respiration not at all. On the twenty-first day the patient got up and lay on a couch, and on the twenty-second day she walked about the ward at intervals for half an hour; but on returning to bed she suddenly collapsed and rapidly lost consciousness and the breathing became stertorous. The pulse at first was full and bounding, then rapid and weak. There was considerable cyanosis and dyspnoea, and the right leg was found to be slightly swollen. The patient died in ten minutes from the onset of the attack. Caesarean section was performed by the obstetric registrar within three minutes after the death of the mother, but though the foetal heart was beating slowly the child never breathed, in spite of prolonged attempts at artificial respiration.

At the post-mortem examination the heart weighed 10½ oz.; there was slight excess of pericardial fluid. The right ventricle and conus were distended. The pulmonary artery and its two main branches were completely blocked by a cylindrical embolus 14 inches long. The embolus was coiled up in itself and extended through the pulmonary orifice for a short distance into the right ventricle; at one end it measured three-eighths of an inch in thickness and gradually tapered off towards the other end; it had a considerable branch from 2 to 3 inches from its thick end. The edge of the mitral valve was thickened; there was no fusion of the flaps and no shortening or thickening of the chordae. The stenosis was slight.

The lungs were congested and oedematous.

The pelvis and calyces of the kidneys and the ureters were moderately dilated. There was no pyelitis. In the cortex of both kidneys were scattered nodules of caseous material.

The inferior vena cava, the external and internal iliac veins, and the uterine and ovarian veins were normal and free from clot. Unfortunately the femoral veins were not slit up.

Of the eight cases now recorded one (Case 58) was operated on through a Pfannenstiel incision, the wound being closed with silk for the fascia and silkworm gut for the skin; the remaining seven cases were operated on through a longitudinal incision, and the wound was closed by through-and-through stitches of silkworm gut (tied over gauze), silk (continuous for the peritoneum and interrupted for the fascia), and silkworm gut for the skin. All the eight wounds healed by first intention.

In three of the cases there was a departure from the rules given in my Lettsomian Lectures.¹ Thus in Cases 56 and 59 Caesarean section was performed before the tumour was removed, and in Case 63 the tumour (a parovarian cyst) was removed at the thirty-first week of gestation. An improved technique in closing the uterine wound with silk, by which the formation of adhesions of any importance is avoided, inclines me to think that it may be employed more frequently in these cases than was formerly thought advisable. On the other hand, the tragic death of Case 63 causes me to regret having departed from the rule not to operate in the latter half of pregnancy until near term, or during or after labour.

Parovarian Cysts Complicating Pregnancy, etc.

Cases 56 and 63 were small parovarian cysts, in the pelvis. Of the former series, Cases 2, 46, 47, 48, 50, and 51 were also parovarian cysts; of these, Cases 48 and 50 were in the pelvis, and were delivered with difficulty by forceps, one child (Case 50) being born dead.

The recorded cases of parovarian cysts complicating pregnancy, etc., are few in number. Thus, in McKerron's classical work,² out of 1,290 cases only 9 were parovarian cysts; of these, six were removed in the third month and the patients went to term; two were removed in the fourth month and one (at least) went to term, although the pedicle was twisted; the ninth of McKerron's collected cases was removed in the sixth month and the patient was delivered prematurely. In Dsirne's³ collection of cases there were only four parovarian cysts, and the tumours were removed in the fifth, third, fifth, and second months; three of the patients went to term, and one was delivered prematurely at the seventh month. Three out of his four cases had a pelvic abscess in the puerperium.

Of my own eight cases of parovarian cyst only four were seen during pregnancy. Of these, Case 2 was delivered of a living child by forceps, and the cyst was removed eight weeks later. Case 47 had a parovarian cyst of the size of an emu's egg; the pedicle had undergone torsion. It was removed two hours after the occurrence of the torsion at the thirteenth week of pregnancy, together with the ovary, which was infiltrated with blood. The patient aborted twelve days later, but has since had four children (two boys and two girls). This was the only case in which the ovary was removed. In Case 56 the cyst was removed immediately after Caesarean section at term, and thrombosis of the femoral vein occurred. In Case 63 the cyst was removed at the thirty-first week, and death occurred from pulmonary embolism on the twenty-fourth day.

A consideration of McKerron's (9), Dsirne's (4), and my own (8) cases leads to the conclusion that parovarian cysts, intrinsically so benign, have special dangers as a complication of pregnancy. From such a small number of cases it is impossible to establish rules of treatment, and it is greatly to be desired that those gynaecologists who have had a considerable experience will publish all their cases.

My present feeling is strong against the advisability of operating on these cases in the second half of pregnancy, except at term or during or after labour, and for parovarian cysts in the pelvis Caesarean section may be advisable, though rarely necessary for benign non-adherent ovarian cysts.

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² McKerron: *Pregnancy, Labour, and Child-bed with Ovarian Tumour*, 1903. ³ Dsirne: *Arch. f. Gynäk.*, Bd. 42, Heft 3, S. 415.

TIME-SAVING METHODS IN DIABETIC URINALYSIS.

BY

FRANCIS TEMPLE GREY, B.A. OXON.,
M.B. SYDNEY,

CHEMICAL PATHOLOGIST TO THE MINISTRY OF PENSIONS.

For the detection of reducing substances in the urine there exists no better test than Fehling's, provided care is taken to see that the amounts of urine and mixed Fehling solutions are equal and the whole raised just to the boil. The presence of glucose will, of course, in a new case showing a low percentage, be confirmed by fermentation with yeast in the Einhorn saccharimeter.

To determine the daily (twenty-four hours) output of glucose a fairly accurate saccharimetry is required, and if dealing with a large number of specimens it becomes necessary to do this quickly and economically. The following procedure has been found of use in the saccharimetry of some 2,000 specimens.

In the case of urine with from 0.1 to 0.5 per cent. glucose,

take 2 c.cm. 1 in 10 mixed Fehling's solution in a test tube and about 15 drops of Gerrard's reagent; heat, and as the mixture comes to the boil deliver the urine from a Dreyer pipette a drop at a time. (The advantage of the Dreyer pipette is that, held vertically, it drops very consistently—various pipettes differing very little—22 to 24, say 23, drops to the cubic centimetre, enabling the following simple table to be prepared.)

TABLE I.

Drops of Urine.	Glucose per cent.		Drops of Urine.	Glucose per cent.	
	Calc.	Approx.		Calc.	Approx.
5 ...	0.460	0.5	16 ...	0.144	0.2
6 ...	0.384	0.4	17 ...	0.135	
7 ...	0.328		18 ...	0.127	
8 ...	0.288	0.3	19 ...	0.121	
9 ...	0.256		20 ...	0.115	
10 ...	0.230		21 ...	0.109	
11 ...	0.209	0.2	22 ...	0.105	
12 ...	0.191		23 ...	0.100	
13 ...	0.177				
14 ...	0.165				
15 ...	0.154				

Where less than five drops suffice to decolorize dilute the urine 1 in 5 and read as follows:

TABLE II.

Drops of Urine.	Glucose per cent.		Drops of Urine.	Glucose per cent.	
	Calc.	Approx.		Calc.	Approx.
5 ...	2.30	2.3	15 ...	0.77	0.8
6 ...	1.92	1.9	16 ...	0.72	0.7
7 ...	1.64	1.6	17 ...	0.67	0.7
8 ...	1.44	1.4	18 ...	0.63	0.6
9 ...	1.28	1.3	19 ...	0.60	0.6
10 ...	1.25	1.3	20 ...	0.57	0.6
11 ...	1.04	1.0	21 ...	0.54	0.5
12 ...	0.95	1.0	22 ...	0.52	0.5
13 ...	0.88	0.9	23 ...	0.50	0.5
14 ...	0.82	0.8			

If less than five drops of 1 in 5 urine decolorize, dilute 1 in 10, or (where the specific gravity exceeds, say, 1032) 1 in 20, and read as follows:

TABLE III.

Drops of Urine.	1 in 10 Urine. Rough percentage Glucose.		Drops of Urine.	1 in 20 Urine. Rough percentage Glucose.	
5 ...	...	...	5 ...	...	10
6 ...	...	...	4 ...	...	8½
7 ...	...	...	3½ ...	...	7
8 ...	...	...	3 ...	...	6
9 ...	...	...	3 ...	...	5½
10 ...	...	...	2½ ...	...	5

At these percentages many will prefer to do a formal titration or to use the polarimeter. (Gerrard's reagent is prepared by decolorizing boiling mixed Fehling's solution by means of a 5 per cent. solution of potassium cyanide delivered from a burette.) The polarimeter will nearly always give a lower reading than titration, owing to laevorotatory substances. If it is desired to express this as laevulose, multiply the difference by 0.284. On more than one occasion I have found dextro- and laevo-rotatory substances present in such proportions (that is, as 28:72) as to give a zero reading in the polarimeter, as against 1 per cent. total reducing substance.

To arrive at the glucose output for the day, look up in Table IV the number of litres corresponding to the number of ounces reported by nurse or patient, and multiply by ten times the glucose percentage. Glucose having been found, ketone bodies are to be looked for. Rothera's test may be done as follows: Make up a batch of 2-gram packets of ammonium sulphate. For the test, empty a packet into a small porcelain dish—say, the bowl of a crucible—add about 2 c.cm. of urine, a few drops of 5 per cent. sodium nitroprusside, and then some strong ammonia. The sodium nitroprusside need not be made up fresh each time; keep in a brown well stoppered dropping bottle, shutting off after use. You will know if the solution goes off by its changing colour—first paling, and then turning green (owing to sulphur compounds in the air).

If Gerhardt's test is positive, the ammonia coefficient ought to be done. Gerhardt's test, it will be remembered, detects relatively considerable quantities of aceto-acetic acid by the cautious addition to the urine of a solution of