

The Treatment of Pyosalpinx.

BY

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DURING the last decade the literature relating to pyosalpinx has been rather meagre compared with that on other gynaecological conditions. Yet it would seem to be a subject that requires discussion, especially in regard to the acute and tuberculous conditions. The question of tuberculous pyosalpinx has been more thoroughly considered by various authors such as Jamieson,¹ Rondon and Daniel,² Keller,³ Rochat,⁴ Greenhill,⁵ Bickenbach,⁶ and others, but their conclusions seem to be very much at variance and, up to the present time, there would not appear to be any definitely agreed upon line of treatment for this condition. During the last 7 years, since gaining charge of a ward at the Royal Infirmary, Edinburgh, I have had the fortune—or should it be misfortune?—to have had 84 cases of pyosalpinx under my care there and in private practice; of these, 54 were acute cases and 30 chronic, and include 22 cases of tuberculous pyosalpinx. It was thought that a review of the treatment employed for these various cases might prove of value, especially as some points of interest, not stressed by previous authors, have been encountered. All were cases of true pyosalpinx, the Fallopian tubes being found on vaginal examination to be enlarged and apparently swollen with pus in the patients treated conservatively, and to be distended with pus in those dealt with by operation. *Cases of acute salpingitis are not included in the series, nor are cases of salpingo-oöphoritis or matted appendages.* As three different entities seem to appear in my 84 cases I have divided my paper into three sections, namely (1) acute pyosalpinx, (2) chronic pyosalpinx (operation cases), and (3) tuberculous pyosalpinx.

ACUTE PYOSALPINX.

Of the 54 patients suffering from acute pyosalpinx, 34 received a full course of conservative treatment, but such treatment failed in 10 patients and operation had to be undertaken. In 20 patients the operation was performed for various reasons, as shown in the details of cases in Group II, without a preliminary full course of conservative treatment having been tried. The conservative measures employed consisted of sedative treatment with morphia and either hot fomentations or cold ice-bags to the abdomen in the first instance, these being continued until the temperature became normal. The sedimentation rate of red blood-corpuscles was estimated on admission and the further treatment was gauged by the increase in time taken for the sedimentation of the red blood-corpuscles. Usually, however, about 3 days after admission hot vaginal douches were instituted and were given twice daily for 15 to 20 minutes at a time, the temperature being from 108° to 112° F., depending on the maximal amount of heat that the patient could endure. This was continued for about a week, when the sedimentation time was again taken, and, if it was over 45 minutes by the Linzermeier technique,* treatment by pelvic diathermy or short-wave therapy was carried out for 3 to 4 weeks. For the first few years diathermy was used with vaginal and external poles, but for the last 2½ years it has been superseded by short-wave therapy without, as a rule, any vaginal poles, since it was reckoned to be more efficient.† I, personally, have found little difference in the results between the two methods, but there is no doubt that the absence of a vaginal pole is desirable in nervous or nulliparous patients, and the short-wave treatment does not produce any discomfort to the patient, such as the diathermy sometimes did owing to its vaginal applicator. While diathermy or short-

* Sedimentation tubes, 6.5 centimetres in length and 5 millimetres in diameter, with a capacity of a little over 1 cubic centimetre. Two marks on tube (a) at 1 cubic centimetre level, and (b) 18 millimetres below 1 cubic centimetre level; 0.8 cubic centimetre blood, and 0.2 cubic centimetre 5 per cent sodium citrate mixed in tube and the time taken for the red blood-corpuscles to reach the lower mark.¹⁶

† Patients treated by pelvic diathermy had 1½ amperes for 20 minutes' treatment daily whereas the short-wave therapy (6-metre wave) was given by a Schliephaki electrode for 10 minutes daily when the condition was subacute, increasing the time up to 30 minutes as the condition became more chronic.

wave therapy was being carried out the patients were kept as much in the fresh air as possible and tonics were also given. After a month's treatment all patients were examined with a view to allowing them to go home, and they were again examined a month later, when further diathermy or short-wave therapy was given to those still complaining of any pain or when the Fallopian tubes were still found to be markedly distended or fixed: usually this second course of treatment was given to the patients who attended as out-patients. I append short particulars with the results of the 34 patients treated conservatively in Group I.

(Patients, who for some reason or other could not receive this full conservative treatment, are not included in this Group: thus in Group II (operative cases) there are included 6 patients who had conservative treatment but whose condition deteriorated so much that full conservative treatment was deemed inadvisable.)

It will be seen by perusal of Group I that a cure, or clinical cure, was obtained in 20 cases, a cure being said to have been obtained when all signs of the pyosalpinx had disappeared, and a clinical cure when some thickening was still to be felt, but all symptoms had disappeared and the patient seemed to be in good health. One case was found to be only improved, but a final follow-up of this case was impossible, as the patient left the district. Conservative treatment failed in 11 patients, and in 10 of these an operation was required. (These 10 cases are included in both Groups I and II.) Two patients, who had conservative treatment alone, died, but both of these were tuberculous cases and had pulmonary lesions as well. Case A 30 was admitted twice; the patient was markedly improved by her first course of conservative treatment, but was admitted 7 months later with a further acute attack, which this time did not subside, and a general miliary infection supervened, the patient dying in a sanatorium about 6 weeks later. Case A 31 was not acutely ill when she was admitted, but showed very marked emaciation. Large pus tubes were found on examination, but it was not thought that she was fit for operation. She was, therefore, sent to a sanatorium to try to improve her general condition and also because there were signs of tuberculous infection at the apex of one lung. Instead of improving, the patient's condition became worse, and tubercle bacilli were found in her sputum: the pelvic condition, however, seemed to be improving a little, or, at any rate, was not becoming worse. She died very unexpectedly after

developing a spontaneous pneumo-thorax. Post-mortem examination showed a marked tuberculosis of all the organs in her pelvis associated with very dense matting of bowel, which could be dissected out only with great difficulty: a large pyosalpinx on the left side was found. Two of the patients, who required operation after conservative treatment had failed, also died, and it is just possible that had an operation been performed at an earlier date both lives might have been saved: especially is this probable in A 24, for whom operation seems to have been definitely too long delayed.

Patient A 2 would seem to call for special mention in so far as she apparently had an acute double pyosalpinx and yet after prolonged treatment, lasting on and off for 7 months, she became pregnant 3 months after the last treatment. This patient is the only acute case in my series to my knowledge who, being treated conservatively, has become pregnant later, but it shows that pregnancy is a remote possibility even after the patient has suffered from acute double pyosalpinx. One patient, B 2, who had been operated upon for an acute unilateral pyosalpinx, which was removed, also became pregnant at a later date, and another C 4, who had been operated upon for a unilateral chronic pyosalpinx, became pregnant 4 years later. This again would seem to show that inflammation of the Fallopian tubes is not always bilateral and that a pyosalpinx may be found acute or chronic in one tube and yet the other tube be sufficiently unaffected to allow of a pregnancy at a later date, an important point for conservatism at operation in such cases.

The question of operation in cases of acute pyosalpinx is still a subject of controversy, Young and MacGregor⁷ definitely stating in their paper that acute pyosalpinx should never be operated upon, but, as differentiation was not apparently made between cases of acute salpingitis and acute pyosalpinx, their paper loses its value when considering acute pyosalpinx alone: I think all gynaecologists are agreed that cases of acute salpingitis should be treated conservatively, as the great majority resolve or do not give rise to any further symptoms and only a few go on to pyosalpinx formation, but with acute pyosalpinx the question of operation is an entirely different proposition. Baldwin⁸ advises that operative interference should be undertaken if the function of the Fallopian tubes is lost and when further retention will cause discomfort or may even give rise to serious consequences: he states that removal of the tubes and uterus is the best and safest treatment for the patient, but he

recommends retention of the ovaries if possible. I am almost in entire agreement with this statement, as there is little doubt that retention of such tubes not only gives rise to persistent pain and very often menorrhagia, but exacerbations of acute attacks may frequently occur, all of which may not only be dangerous to the patient's life but will always lower her general vitality and well-being with each successive attack. Also such tubes must act as a septic focus in the body and lower the patient's general resistance to other diseases. I would, therefore, urge that operation should be undertaken on all patients in whom conservative treatment fails and the patient has continual ill-health, is made constantly miserable with persistent pain or menorrhagia, or is unable to work, look after her household, or even enjoy herself on account of the ill-effects caused by the pyosalpinx. There would also seem to be a definite risk, as is shown in my series, in leaving such tubes as I record four cases, B 1, B 2, B 3, and B 6, among my series of patients operated upon who suffered from a leak or rupture of the pyosalpinx and became extremely ill from the resulting acute peritonitis, and also two other patients, B 4 and B 5, in whom the Fallopian tubes were found at operation to be on the point of rupturing. It would seem also probable that had acute symptoms developed in C 12 at any time rupture would have soon occurred. Of these, 3 patients died and the others would probably also have died had not operation been quickly performed. My only disagreement with Baldwin is in regard to the retention of the ovaries, as I strongly recommend that if both tubes and uterus have to be removed the ovaries should also be removed, but I shall discuss this more fully later.

Group II gives a short record of all the cases of acute pyosalpinx operated upon, 30 in number, the reason for operation, the condition found and the nature of the operative treatment performed being given in each case. The great majority of the operations were performed by myself but some were done by my colleague Dr. Sturrock. Among the 30 patients there were 5 deaths, 3 from rupture or necrosis of the wall of the tube causing peritonitis, and 2 in patients in whom there is little doubt that conservative treatment had been carried on too long; one of these, A 24, died from infection of the myocardium following 7 weeks' conservative treatment, and the other, A 25, from peritonitis, operation having been undertaken on account of the persistent growth of the abscess and deterioration in general health despite 6 months' conservative treatment. I think

there is little doubt that the total mortality would have been much higher had conservative treatment been persisted in for a number of the other cases, e.g., B 4 in whom the tube was just on the point of rupture. The number of cases of rupture or leak through the tubal wall would appear to be abnormally high in such a small series of cases, as there are relatively few such catastrophes quoted in the literature: the fact, however, that there are 6 such cases in this series would seem to show that rupture or leakage is a definite complication, which must be considered as a possibility in dealing with all cases of acute pyosalpinx, no matter how long has been the duration of the illness. It is true that two of these cases, B 1 and B 2, were puerperal in origin but there was no such history in the other 4, though one, B 6, was due to the haemolytic streptococcus, and another, B 4, to *B. coli*; in the latter case the patient had a history of many previous attacks of left-sided pain, and this was apparently only one of her frequent exacerbations and yet, though apparently of long standing, the Fallopian tube was just about to rupture. In the other two, definite organisms could not be identified as the causal factor, but again in one of those, B 5, the condition seemed to have been going on with acute exacerbations similar to the attack for which she was admitted for at least 9 months, and an earlier operation might have saved her life. Premonitory warning of rupture was not elicited in any of the cases.

Operation was postponed, if possible, until the sedimentation time was over 60 minutes, except in cases in which operation was performed for some other diagnosis, such as acute torsion of the pedicle of an ovarian cyst and an acute pyosalpinx found instead or when the condition of the patient was deteriorating despite the initial conservative treatment of rest, morphia and hot or cold applications to the abdomen. I have found the sedimentation-rate to be of value not only in estimating the optimal time for operation but also for the application of more intensive and drastic conservative treatment. The Clinic of the University of Tennessee advises waiting until the sedimentation time is over 90 minutes before operation is undertaken and Gordon¹⁰ agrees with this finding, considering the sedimentation time to be an almost specific test in determining the virulence of infection and time to operate: Baer and Reis¹⁷ also agree and consider it a more delicate diagnostic test than a leucocyte count, or temperature chart, and that the time is directly proportionate to the virulence of the infection: other

authorities, such as Black,⁹ think that to postpone operating for such a length of time is unnecessary. I would suggest that if possible one should not operate until the sedimentation time is over an hour, when it is fairly certain that the pus in the tube will be sterile and, therefore, rupture during removal will be of less serious import than when organisms are present, but I consider from my experience in the patients, who had to be operated upon when the sedimentation time was less than 60 minutes, that the danger of operating on such cases has been greatly magnified and the prognosis does not seem to be any worse than in the cases in which the time was over one hour. B 10, B 14 and B 18 are good examples of this.

The operation performed was in most cases supra-vaginal hysterectomy with removal of both Fallopian tubes and both ovaries: in some cases, however, when only one Fallopian tube was involved only one set of appendages was removed. Posterior colpotomy was never performed in this series, and it is interesting to note that Black, among many others, advises against such a procedure, and Cooke¹¹ states that in his experience subsequent operation following a previous colpotomy often had to be abandoned owing to the impossibility of separating the dense adhesions found: on the other hand, he favours a posterior colpotomy in some cases of pyosalpinx, but no further operation must be considered later. It would seem from these suggestions that many women, if they had a posterior colpotomy performed, would suffer later from persistent pain and menorrhagia and the operation for the removal of the offending tubes might be well nigh impossible and be associated with very great risk. In all cases of hysterectomy, I removed the ovaries as well as the tubes, as they were, in the majority of cases, involved in the abscess and could hardly have been left had I wanted to do so: in other cases they were definitely cystic or had suffered from chronic inflammation. In my opinion the retention of ovaries, even should they appear to be fairly healthy, would, in all probability, give rise to future pain and the final result would not be nearly so satisfactory as when they had been removed. I have never noted any marked or even moderate disturbance, either endocrinal or general, following the removal of both ovaries in such patients and any post-menopausal symptoms were very few and mild, and could always be easily checked with small doses of oestrin.

Cooke¹¹ advises drainage in all groups of cases as he thinks

it definitely lowers the mortality, and he considers that drainage by means of a folded rubber dam seems to be followed by fewer immediate or remote ill effects. Personally, I drained the pelvis in case (1) in which rupture of the tube occurred either before or during removal, (2) cases in which the sedimentation time was under 60 minutes and, therefore, the pyosalpinx was likely to contain virulent organisms, and (3) cases in which the adhesions had been so great that a large raw area was left in the pelvis which could not be adequately covered by peritoneum or from which there was a certain amount of blood oozing: in (1) and (2) I used a folded rubber dam as Cooke¹¹ recommends, but in (3) I packed the raw area with a gauze pack, bringing the free end through the abdominal incision. This is a method which I learnt from my old chief, Dr. Fordyce, and I can emphatically state that it not only acts as a haemostatic and a drain, but it definitely prevents adhesion of bowel to this raw area, so much so that in patients, in whom laparotomy was required for some other condition at a later date, adhesions were not to be found at all in the pelvis and any further operation that was required at that time could be performed with ease and without having to break through dense adhesions of bowel. The pack is removed in 48 hours, usually a whiff of gas being required on account of the discomfort, and a rubber tube is inserted through the drainage hole in its place. In cases requiring a drain I usually pour ether $\frac{1}{2}$ to 1 dr. into the pelvis and then swab dry before closing the abdomen. This was a procedure learnt from the late Dr. Haig Ferguson and I think that it is of definite benefit in disinfecting the pelvic peritoneum.

It is of interest to note in Group II that apparently in two patients, A 26 and A 28, conservative treatment had caused a pyosalpinx to become a hydrosalpinx, which greatly benefited the future operative prognosis. Also the value of removing the pyosalpinx on one side alone, provided the other appendages are apparently healthy, is shown in B 2 who had a ruptured pyosalpinx and acute peritonitis and yet 2 years later became pregnant, but unfortunately aborted. Such a case compares with A 2 (Group I) in which, although the patient had a double pyosalpinx she became pregnant 10 months after her acute attack.

THE TREATMENT OF PYOSALPINX

GROUP I.

ACUTE PYOSALPINX—CONSERVATIVE TREATMENT.

A1, aged 26, 1-para. G.C. found. Double pyosalpinx. Temperature 100° for three days. Diathermy for 3 weeks. No pain. Still enlargement right side and 3 weeks later swelling still present. Lost trace of thereafter. Treatment failed.

A2, aged 22, nullipara. No cause found. Double pyosalpinx. Temperature 100°. Pulse 104 for 3 days. S.T. 20 minutes. Diathermy for 2 months and later for 1 month. Both tubes palpable and slightly tender. Four months later, following further diathermy, appendages still enlarged and tender on the left side. Menorrhagia. Became pregnant 3 months after last diathermy. Clinical cure.

A3, aged 32, nullipara. No cause found. Double pyosalpinx. Temperature 100.8°. Pulse 104. Six weeks irregular temperature. Diathermy 10 weeks. Both tubes thickened, but no tenderness. Menstruation regular, 7/28; loss rather excessive. Clinical cure.

A4, aged 21, nullipara. G.C. found. Double pyosalpinx. Temperature 102°. Pulse 96. Temperature continued for 10 days. Menorrhagia. Diathermy for 5 weeks. Left side clear, but right side still swollen and fixed. Three months later right appendages still slightly enlarged and slightly tender, but condition very satisfactory. Eighteen months later still a little matting of right appendages. No tenderness. Regular periods, 4/28. Clinical cure.

A5, aged 26, 1-para. No cause found. Left pyosalpinx. Temperature 100°. Pulse 108; took 7 days to subside. Diathermy for 6 weeks. Left appendages still slightly enlarged. No tenderness. Two months later no pain, slight enlargement. Two years later, slightly matted left appendages. Very satisfactory. Clinical cure.

A6, aged 20, nullipara. G.C. found. Double pyosalpinx. Temperature 104°. Pulse 84. Diathermy for one month. Right tube still enlarged; left side clear. Periods normal. No pain. Clinical cure.

A7, aged 24, nullipara. No cause found. Double pyosalpinx. Temperature 99.4°. Pulse 102. Temperature took 10 days to fall. S.T. 23 minutes; in 6 weeks S.T. 110 minutes. Diathermy for 5 weeks. Slight thickening in pouch of Douglas. Two months later left appendages still enlarged. Three months later slight tenderness in both fornices. No appendages palpable. One year later menstruation normal. No tenderness or swelling elicited. Cure.

A8, aged 41, 3-para. No cause found. Double pyosalpinx. Temperature 99.8°. Pulse 84. S.T. 25 minutes; in 8 days S.T. 35 minutes; in 16 days S.T. 65 minutes. Diathermy for one month. Ten months later pyosalpinx gone. Cure.

A9, aged 26, 1-para. No cause found. Double pyosalpinx. Temperature 100°. Pulse 100. S.T. 45 minutes; in 3 weeks S.T. 102 minutes. Diathermy for one month. Right pyosalpinx resolved but left still present. Failed to report. Condition improved.

A10, aged 23, nullipara. Post-inflational condition. Left pyosalpinx.

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Post-operative: dilatation and inflation for sterility: air passed at 180 mm.Hg. One week later severe pain and mass on left side. Temperature 100°. Pulse 112. S.T. 120 minutes. Previous to admission premenstrual dysmenorrhoea and leucorrhoea. Diathermy for 1 month. In 3 months much improved; swelling on left side, but not tender. Four months later still swelling on left side, but no tenderness. Periods regular. No pain. Clinical cure.

A11, aged 26, nullipara. No cause found. Bilateral pyosalpinx. Temperature 101°. Pulse 100. Diathermy for 1 month, and later for 1½ months. One month later acute recurrence. Three months later pyosalpinx still present; more mobile. Seven months later uterus anteverted; quite mobile. Right appendages very slightly thickened. Clinical cure.

A12, aged 32, 1-para. Puerperal, 5 weeks. Right pyosalpinx. Temperature 100.4°. Pulse 96. Diathermy for 14 days. Slight thickening only 3 weeks later. Lost trace of. ? Cure.

A13, aged 45, 5-para. Post-radiation, 2 weeks. Left pyosalpinx. Temperature 101.2°. Pulse 94. S.T. 30 minutes; in 8 days S.T. 60 minutes. Diathermy for 1 month. Left tube thickened. No tenderness or pain. Fourteen months later uterus freely mobile. No tenderness. Slight matting left appendages. Amenorrhoea. Clinical cure.

A14, aged 42, 3-para. No cause found. Left pyosalpinx. Temperature 99°. Pulse 86. S.T. 25 minutes; in 7 days 35 minutes; in 15 days 85 minutes. Diathermy for 1 month. Ten weeks later pyosalpinx gone. Cure.

A15, aged 17, 1-para. Puerperal condition. Right pyosalpinx. Temperature 101°. Pulse 104. S.T. 15 minutes; in 7 days 20 minutes; in 1 month over 2 hours. Diathermy for 1 month. Four weeks later pelvis clear. Failed to report. Cure.

A16, aged 48, 1-para. No cause found. Double pyosalpinx. Uterosacral cellulitis. Large mass in pouch of Douglas. Temperature 99°. Pulse 112 for 9 days. S.T. 32 minutes; in 1 month 120 minutes. Diathermy for 1 month. Six months later very well. Appendages completely resolved. Cure.

A17, aged 30, 5-para. No cause found. Double pyosalpinx. Temperature 101.4°. Pulse 108. S.T. 15 minutes. Diathermy for 2½ months. Three months later right side clear, but slight matting left side. No symptoms. Clinical cure.

A18, aged 27, 3-para. G.C. found. Double pyosalpinx. Menorrhagia. Temperature 99.8°. Pulse 104. Diathermy for 3 weeks. Apparently complete resolution of inflammatory products in 5 weeks. Two months later recurred in left side. Lost trace of during treatment. Clinical cure.

A19, aged 39, 2-para. No cause found. Left pyosalpinx. Temperature 99°. Pulse 100. Temperature down day after admission. S.T. 15 minutes; in 5 days 20 minutes. Diathermy for 2 months. After diathermy swelling in pouch of Douglas still present. No tender-

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ness. One year later slight pain right side before periods, otherwise very well. Menstrual periods, 1/28. Uterus lying to left side. Left appendages thickened, but not tender. Clinical cure.

A20, aged 17, nullipara. No cause found. Large bilateral pyosalpinx. Diathermy for 1 month. Two months later right appendages slightly thickened. No tenderness. Left appendages healthy. General health good. Clinical cure.

A21, aged 31, 3-para. No cause found. Double pyosalpinx. Menorrhagia 7/14 for 6 weeks. Temperature 99°. Pulse 92. Diathermy for 6 weeks. Pain recurring in right side, getting worse. Swellings enlarging despite conservative treatment. Failed; operation required.

A22, aged 23, 1-para. G.C. found. Double pyosalpinx. Temperature 102°. Pulse 120. S.T. 60 minutes. Diathermy for 6 months. Slow, persistent pain. Six months later right appendages slightly enlarged. Left, nil. Two months later very much improved. Six months later recurrence. Evidence of local peritonitis. Allowed 4 months to settle, then operated on. Failed; operation required.

A23, aged 27, nullipara. T.B. Sudden severe pain around umbilicus; had previous attacks. Right pus-tube. S.T. 42 minutes. Diathermy for 1 month. Temperature rose to 102° and remained raised for 2 weeks. S.T. went up to 2 hours 52 minutes, but right sided swelling got larger and more tender. Failed; operation required.

A24, aged 35, nullipara. T.B. and G.C. Ill 10 days before admission. Temperature 101—103° for 7 weeks. Pulse 116—120. S.T. 23 minutes. Diathermy. Going rapidly downhill in spite of 7 weeks' conservative treatment. Failed; operation required.

A25, aged 42, 6-para. Puerperal condition. Temperature 101°. Pulse 116. Diathermy for 1 month and later for 3 weeks. Watched for 6 months with conservative treatment. Abscess growing. Condition deteriorating. Failed; operation required.

A26, aged 32, nullipara. Double pyosalpinx. Temperature 101.4°. Pulse 108, dropped after 5 days. Diathermy for 3 weeks. Persistent menorrhagia 5—6/14. Five months later recurrent pain. Left tube growing. Failed; operation required.

A27, aged 31, 2-para. No cause found. Double pyosalpinx. Temperature 103°. Pulse 96; subsided in 9 days. Diathermy for 2 months, and later for 1 month. Following diathermy only slight enlargement of right appendages and no pain. Periods, 4/28. Three months later recurrence on right side; further diathermy for 1 month. Absence of pain. Twenty months later recurrence on left side. Persistent vaginal haemorrhage and abdominal pain. Failed; operation required.

A28, aged 29, nullipara. No cause found. Right matted appendages. Left pus-tube. Temperature 100°. Pulse 96. Diathermy for 1 month. No improvement. Constant pain. General deterioration of health. Failed; operation required.

A29, aged 34, 16-para. Puerperal. Double pyosalpinx with cystic ovaries. Puerperal salpingitis 2 years previously. Temperature 101.2°.

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Pulse 114. S.T. 35 minutes; in 7 weeks 67 minutes. Normal temperature for 6 weeks. Diathermy for 1 month. Intermittent acute attacks despite treatment. Menorrhagia severe. Failed; operation required.

A30, aged 16, nullipara. T.B. Tuberculous pyosalpinx. S.T. 20 minutes; in 14 days 60 minutes. First admission for degree of bowel obstruction. Seven months later, second admission. Temperature 103°. Pulse 116. S.T. 20 minutes; in 8 days 55 minutes. Temperature rose again and remained swinging for 6 weeks. General tuberculosis with double pyosalpinx. Transferred to sanatorium. Diathermy for 1 month. Pain improved. No regression of mass. Died.

A31, aged 19, nullipara. T.B. Uterus anteverted. Large cystic swelling to the left and behind uterus; tubo-ovarian abscess. S.T. 32 minutes. Definite crepitations at the apices of both lungs. Patient thin and emaciated. Weight, 4 stones 8 pounds. Temperature 98.4°. Pulse 124. Later temperature 101°. Pulse 112. Afterwards occasional slight evening rises of temperature. Transferred to sanatorium. Died three months later of acute pneumothorax. Great matting of pelvic organs found with double pyosalpinx at post-mortem.

A32, aged 26, nullipara. G.C. found. Admitted with acute pain, most marked in R.I.F. Laparotomy on surgical side for appendicitis. Pyosalpinx found: right side ++, left +. Diathermy for 1 month. Bleeding for 6 weeks. Milk injection up to 9 cubic centimetres. Small painless period during injections. Six weeks later regression of tubes but still present though not painful. Periods normal and painless. Three weeks later sub-acute symptoms with great right-sided pain and severe bleeding. Right tube much enlarged and tender. Left appendages matted. S.T. 75 minutes. Failed; operation required.

A33, aged 33, nullipara. No cause found. Sudden acute pain. Previous history of severe dysmenorrhoea since marriage 3 months previously. Temperature 102°. Pulse 124. Large mass right side, smaller mass left. S.T. 20 minutes; in 7 days 70 minutes. Two weeks later slight recurrence. Diathermy for 1 month and later 3 weeks. Three months later no symptoms; periods painless, but swelling still present on right side, but no tenderness. Clinical cure.

A34, aged 27, 2-para. No cause found. Tonsillitis 10 days previously. Severe lower abdominal pain. Temperature 104°. Pulse 110. Double pyosalpinx. Diathermy for 5 weeks. Matting right appendages; left side clear. One month later very slight thickening right side; not tender. Clinical cure.

GROUP II.

ACUTE PYOSALPINX: OPERATIVE TREATMENT.

A21, aged 31, 3-para. No cause found. For clinical features see Group I. Swellings enlarging despite conservative treatment. Exacerbation of right-sided pain. Double pyosalpinx found. Supra-vaginal hysterectomy with appendages. Drain. Good convalescence and recovery.

A22, aged 23, nullipara. G.C. found. For clinical features see Group 1.

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Recurrences of acute symptoms with continuous pain. Unfit for work. Conservative treatment failed. Double pyosalpinx, with considerable matting on left side, found. Pelvic peritonitis. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

A23, aged 27, nullipara. T.B. For clinical features see Group I. Continued rise of temperature for 2 weeks after conservative treatment. Right-sided swelling increasing. Conservative treatment failed. Right tubo-ovarian abscess with dense adhesions. T.B. pyosalpinx and T.B. abscess in centre of ovary. Removal of right appendages. Drain. Wound infected, but otherwise good convalescence and recovery. Nine months later periods normal and no pain.

A24, aged 35, nullipara. T.B. and G.C. For clinical features see Group I. Going rapidly downhill despite 7 weeks' conservative treatment. Double tubo-ovarian abscess. Supra-vaginal hysterectomy with appendages. Died in 36 hours from myocarditis.

A25, aged 42, nullipara. Puerperal. For clinical features see Group I. Abscess started to grow rapidly despite conservative treatment. Condition deteriorating quickly. Right tubo-ovarian abscess and left ovarian cyst. Supra-vaginal hysterectomy with appendages. Drain. Died in 48 hours from peritonitis.

A26, aged 32, nullipara. No cause found. For clinical features see Group I. Persistent menorrhagia 5—6/14, recurrent pain, and left tube growing after 5 months' conservative treatment. Left tubo-ovarian cyst and right hydrosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

A27, aged 31, 2-para. No cause found. For clinical features see Group I. Persistent vaginal bleeding and abdominal pain despite conservative treatment 20 months after first seen. Double pyosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

A28, aged 29, nullipara. No cause found. For clinical features see Group I. No improvement with conservative treatment. Constant pain. Health deteriorating. Right matted appendages and left hydrosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

A29, aged 34, 16-para (9 abortions). Puerperal. For clinical features see Group I. Recurrent attacks of acute pyosalpinx. Double pyosalpinx with cystic ovaries. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

A32, aged 26, nullipara. G.C. found. For clinical features see Group I. Recurrent attacks of acute pyosalpinx with menorrhagia. Double pyosalpinx with cystic ovaries. No healthy tissue. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

B1, aged 29, 12-para. Haemolytic streptococci following abortion. Scarlet fever in house. Temperature 100°. Pulse 80. Very ill. Pus-tube ruptured 24 hours after admission. Acute peritonitis. Double pyo-

salpinx with peritonitis due to rupture. Laparotomy with drainage. Died in 2 hours from peritonitis.

B2, aged 28, 2-para. Post-abortion (4 days). Non-haemolytic streptococci and diphtheroids. Temperature 101.8°. Pulse 92. S.T. 15 minutes. Temperature became normal with pulse 86 in 48 hours. Tube ruptured 50 hours after admission. Acute peritonitis. Left pyosalpinx with peritonitis due to rupture. Removal left appendages. Drainage. Stormy convalescence, but complete recovery in 2½ months. Two years later incomplete abortion.

B3, aged 30, 5-para. No cause found. Temperature 99°. Pulse 120. S.T. 30 minutes. Profuse bleeding. Signs of acute peritonitis. Double pyosalpinx, both of which had ruptured. Removal both appendages. Drain. Good convalescence and recovery.

B4, aged 33, 1-para (abortion). *B. coli* found. History of previous attacks of left-sided pains similar to that on admission. Temperature 101.8°. Pulse 134. S.T. 15 minutes. Severe pain persisted, and symptoms of peritonitis developed in 48 hours despite treatment. Acute peritonitis developing. Left tubo-ovarian abscess, size of grapefruit. Very thin walled, and on point of rupture. Right tube not involved. Removal left appendages. Gauze-pack drain for oozing. Good convalescence and recovery.

B5, aged 23, nullipara. No cause found. Persistent pain in right side for 9 months with acute exacerbations and sickness. Menorrhagia. Temperature 100°. Pulse 100; normal in 12 hours. Persistent pain and recurrent attacks. Right tubo-ovarian abscess and left pyosalpinx. Walls of both necrotic and near rupture. Removal both appendages. Drain. Died 4 days after operation from peritonitis.

B6, aged 30, nullipara. Haemolytic streptococci found. Temperature 102°. Pulse 120. No improvement in 3 days. Peritonitis developing. Acute peritonitis. Right pyosalpinx with peritonitis due to leak in tube wall. Sloughing submucous fibroid. Removal right appendages. Drain. Died 6 hours after operation from peritonitis.

B7, aged 24, nullipara. T.B. Intermittent acute abdominal pain for 3 weeks, and obstruction. Temperature 100°. Pulse 116. S.T. 27 minutes. Sub-acute obstruction. Large double pyosalpinx with dense adhesions to pelvic colon and rectum causing obstruction. Supra-vaginal hysterectomy with appendages. Colostomy. Drain. Very stormy convalescence for many months, but later made complete recovery, and colostomy was able to be closed. Two years later very well indeed.

B8, aged 31, 1-para. Pneumococcus, group iv. Long history of left-sided pain with dyspareunia. Temperature 101°. Pulse 96. Fell to 98.4° and pulse 84 in 48 hours. Diagnosed as infected ovarian cyst. Left tubo-ovarian abscess and right pyosalpinx. Supra-vaginal hysterectomy with appendages. Drain. Good convalescence and recovery.

B9, aged 46, 5-para. No cause found. Pre-menstrual dysmenorrhoea and menorrhagia for years. Persistent pain. Temperature 101°. Pulse 106. Normal in 6 days. S.T. 70 minutes. Persistent pain and

THE TREATMENT OF PYOSALPINX

menorrhagia at 46 years. Double pyosalpinx (old standing) with dense adhesions. Supra-vaginal hysterectomy with appendages. Slight temperature for several days, otherwise convalescence uneventful and good recovery.

B10, aged 46, 3-para. No cause found. Slight enlargement of left ovary noted 9 months previously when urethral caruncle was cauterized. Ruptured right pregnant tube 2 years previously. Temperature 99°. Pulse 96. S.T. 27 minutes. Swelling in left side very much increased in size and very tender. Diagnosed as twisted ovarian cyst. Left tubo-ovarian abscess. Removal left appendages. Drain. Good convalescence and recovery.

B11, aged 48, nullipara. No cause found. Admitted very collapsed and exsanguine from severe vaginal bleeding. Temperature 96.6°. Pulse 120. Peritonitis. Double pyosalpinx, with pelvic abscess. Removal both appendages. Drain. Stormy convalescence owing to pelvic peritonitis, but ultimate recovery. Developed carcinoma of cervix 5 months later, and died 1 year later.

B12, aged 28, 1-para. ?Appendicitis. Temperature 100.8°. Pulse 108. S.T. 13 minutes; in 10 days S.T. 8 minutes. Condition deteriorating rapidly. Double pyosalpinx with pelvic abscess involving appendix and caecum. Supra-vaginal hysterectomy with appendages. Drain. Good convalescence and recovery.

B13, aged 39, 6-para. No cause found. Slight bleeding after 6 weeks amenorrhoea. Tender left-sided swelling. Temperature 100°. Pulse 100. Diagnosed as ectopic gestation. Left pyosalpinx and right hydro-salpinx. Removal both appendages. Drain. Slightly stormy convalescence, but ultimately good recovery.

B14, aged 36, 1-para. Puerperal; ?appendicitis. Acute attack of pain 7 weeks after confinement. Temperature 102.4°. Pulse 112. S.T. 16 minutes. Very large right-sided swelling. No improvement of condition in 9 days. Very large right tubo-ovarian abscess with appendix in abscess cavity. Left appendages not involved. Removal right appendages. Developed acute pyelitis during convalescence, but ultimate recovery good.

B15, aged 33, nullipara. G.C. found. Persistent menorrhagia for months. Temperature 100.4°. Pulse 128. S.T. 32 minutes; one week later S.T. 120 minutes. Persistent menorrhagia. Double pyosalpinx with cystic ovaries. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

B16, aged 34, 16-para (9 abortions). Puerperal condition. Puerperal salpingitis 2 years previously. Intermittent acute attacks since, despite treatment. Menorrhagia severe. Temperature 101.2°. Pulse 114. S.T. 35 minutes; raised to 67 minutes in 7 weeks. Normal temperature for 6 weeks. Recurrent attacks of acute pyosalpinx. Double pyosalpinx with cystic ovaries. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

B17, aged 24, 1-para. T.B. Very severe left-sided pain for 1 week.

Getting worse and spreading to right side. Temperature 101.8° . Pulse 130. S.T. 70 minutes. Very acutely ill and collapsed. Acute pain and collapse; diagnosed as probable rupture of pyosalpinx. Large double pyosalpinx with cystic ovary. Very dense adhesions. Supra-vaginal hysterectomy with appendages. Stormy convalescence with faecal fistula on fourteenth day, but complete recovery and closure in 4 months.

B18, aged 32, 5-para. Post-abortion. Bleeding for 2 months following 6 weeks amenorrhoea, with severe left-sided pain. Temperature 100° . Pulse 96. S.T. 35 minutes. Diagnosed as infected tubal mole. Left tubo-ovarian abscess and right pyosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

B19, aged 23, 1-para. T.B. Temperature 98.6° . Pulse 88. Lower abdominal pain with swelling for past 3 weeks. Periods $4\frac{1}{2}$ —7 weeks. Last menstrual period 4 weeks ago. Marked ascites. Thought to be malignant peritonitis. Double pyosalpinx, small. Tubes very friable. Bilateral salpingo-oophorectomy. Abdomen closed without drainage. Good convalescence. Transferred to sanatorium.

B20, aged 29, nullipara. T.B. Pain in lower part of back, followed by lower abdominal pain for 2 days; both acute. Periods, $3\frac{1}{2}$ —28. Last menstrual period 14 days ago. Temperature 102° . Pulse 120. Large swelling in left lower quadrant abdomen. Diagnosed as left-sided twisted ovarian cyst. Left-sided tubo-ovarian abscess, 9 inches by 3 inches. Some congestion of right tube and ovary. Left salpingo-oophorectomy. Fair convalescence marred by infected haematoma on the fourteenth day. Drained, with rapid recovery. Refused sanatorium treatment.

CHRONIC PYOSALPINX.

In order to make the consideration of the treatment of pyosalpinx in general more complete and more comprehensive, I have included in Group III 30 cases of chronic pyosalpinx which came under my care during the last 7 years and on which operation has been done. I have included under this heading all patients who, to my knowledge, had not had any rise of temperature or pulse-rate or who did not give any definite history of an acute attack previously and also those who had suffered from symptoms due to the pyosalpinx for years. I have had also many similar cases, in which the patient was treated conservatively but as it is impossible to be certain that such cases were definitely cases of pyosalpinx and not matted appendages, I do not think that a separate table would be of any value in a paper on pyosalpinx. All the patients operated upon, however, were proved to have unilateral or bilateral pyosalpinx. As seen from Group III the majority of the patients had been treated conservatively in the first instance and operation was only carried out when such treatment failed and the patient

was suffering from persistent pain, menorrhagia, and general ill health, making her unfit for work and generally miserable. It has been stated by some authorities that conservative treatment should be continued almost *ad infinitum* as operative treatment is dangerous. I disagree with this point of view entirely and would submit that if conservative treatment has been carried out for a considerable period and the condition does not materially improve or if the symptoms should recur from time to time despite such treatment, operation should be undertaken, and, also, that the risk is no greater than for any other abdominal gynaecological operation. This point of view would seem to be substantiated by the operation results recorded in Group III.

If both Fallopian tubes were affected, as was most common, then hysterectomy was usually performed as well as removal of the appendages because the uterus was considered to be infected as well. Also the pelvic peritoneal toilet could be completed more satisfactorily after the radical operation as raw areas could be more accurately covered over and there would be less chance of any pain occurring later from adhesions: this was carried out in 16 cases. Group III is self-explanatory, but it might be noted that 12 of the cases were tuberculous in origin and they are to be discussed more fully later. With regard to the risk of the operation, only 1 patient died; and she died on the 23rd day after operation from a pulmonary embolus following an excellent convalescence, the death occurring after the patient had left the ward. This, however, gives a primary mortality rate of nil and a later mortality rate of approximately 3.3 per cent. Convalescence was uneventful in 24 cases, and in only one, C 4, was there any anxiety. The reason for undertaking an operation in each case can be seen from the table, but it is interesting to note that two patients, C 21 and C 22, were admitted for intestinal obstruction and at the operation it was found that in each case the pyosalpinx had involved the pelvic colon to such an extent as to cause complete obstruction. Unfortunately one of these patients, C 21, died from embolus, the infecting organism causing the pyosalpinx being of the pneumococcal group ii. The other patient, C 22, was interesting, as she was the oldest case of pyosalpinx operated upon, her age being 54 years. In another case, C 23, the only symptom caused by the pyosalpinx was retention of urine, which had occurred twice in 3 weeks, and in this case a large tubo-ovarian abscess was found in the pouch of Douglas, the pus being found to be sterile.

GROUP III.

CHRONIC PYOSALPINX: OPERATIVE TREATMENT.

C1, aged 34, 5-para. Puerperal. Chronic abdominal pain and back-ache. Fixed retroversion. Double pyosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C2, aged 34, 6-para. No cause found. Irregular bleeding and pain for 2 months. Pain very severe for last 12 days. Thought to be tubal mole. Left pyosalpinx. Left salpingo-oöphorectomy. Drain. Good convalescence and recovery.

C3, aged 29, 3-para. Puerperal, old-standing. Left-sided pain since second confinement 27 months before. Pain very much worse following third confinement 3 months previously. Persistent bleeding since confinement. Progressive, severe pain. Inter-menstrual bleeding. Pyosalpinx on right side. Both tubes and ovaries matted and adherent. Neither tube patent. Subtotal hysterectomy and bilateral salpingo-oöphorectomy. Drainage. Good convalescence and recovery.

C4, aged 27, 1-para. Puerperal. B. coli. Pain began 8 days after childbirth 3 months previously, getting worse despite conservative treatment. Left pyosalpinx and cellulitis. Left salpingo-oöphorectomy. Stormy convalescence. Ureteric fistula 7 days after, which closed spontaneously in 4 months. Pregnant again 4 years later.

C5, aged 31, nullipara. No cause found. Right-sided pain due to pyosalpinx. Diathermy for 1 month. Resolved in 6 months' time. Recurrence 2 years later. Conservative treatment of no avail. Recurrence of pyosalpinx, despite conservative treatment. Right hydro-salpinx and left matted appendages. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C6, aged 24, nullipara. T.B. Ill health and pain in lower abdomen for 2 years; constant. Diathermy. Right-sided swelling continued to grow. Persistent pain and ill health. Growth of swelling despite conservative treatment. Bilateral pyosalpinx. Right large. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C7, aged 25, 1-para. T.B. Confinement 3 years previously followed by dysmenorrhoea and menorrhagia. Treated for 2 years by conservative treatment. Large right-sided mass growing, and no improvement in symptoms. Bleeding, continuous pain and enlarging right pyosalpinx. Right pyosalpinx and left salpingitis isthmica nodosa. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C8, aged 26, 2-para. No cause found. Menorrhagia + +. Recurrent attacks of severe pain for months. Double pyosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Slight pelvic cellulitis developed 2 months after operation, but later completely resolved.

C9, aged 54, 5-para. B. coli. Left-sided pain on and off for years. Acute attack just before admission. Very tender swelling on left side. Diagnosed as twisted ovarian cyst. Left tubo-ovarian abscess. Left

THE TREATMENT OF PYOSALPINX

salpingo-oöphorectomy. Drain. Slow convalescence due to white leg, but good recovery.

C10, aged 36, 1-para. Post-abortion. Bleeding continuous for 4 weeks after short period amenorrhoea. Rather profuse. Tender swelling postero-lateral to uterus. Diagnosed as ectopic gestation. Left tubo-ovarian abscess. Left salpingo-oöphorectomy. Good convalescence and recovery.

C11, aged 26, 1-para. No cause found. Severe right-sided pain and menorrhagia, 6—10/14 for 6 weeks. Menorrhagia and pain. Right tubo-ovarian cyst and left pyosalpinx. Right salpingo-oöphorectomy and left salpingostomy. Good convalescence and recovery. Left ovary gave rise to constant pain 8 months later.

C12, aged 31, nullipara. T.B. Severe pain for 10 days. Nil previously. No menorrhagia. Had been in sanatorium 11 years previously for T.B. chest. Large swelling, size of coconut, on left side. Severe pain associated with large, tender swelling. Double pyosalpinx, left large. Both very thin walled. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C13, aged 19, nullipara. T.B. Fairly severe pain in R.I.F. Started 2 days previous to admission, at beginning of period, and continued since. Occasional irregular bleeding. Periods 7/31. Palliative treatment not successful. Both tubes considerably thickened and enlarged with adhesions to descending colon. Left salpingo-oöphorectomy and right salpingectomy. Good convalescence and recovery.

C14, aged 28, nullipara. T.B. Persistent pain and menorrhagia for 13 years. Large swelling anterior to uterus. Large right pyosalpinx anterior to uterus. Appendix adherent to it. Left smaller pyosalpinx. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C15, aged 16, nullipara. T.B. Intractable bleeding. Very profuse indeed. Not improved at all by curettage. Scrapings showed T.B. endometritis. Double pyosalpinx with marked matting. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C16, aged 22, nullipara. No cause found. Two months' persistent bleeding. Right-sided pain for 2 weeks. Tender swelling on right side. Diagnosed as ectopic gestation. Right tubo-ovarian abscess. Left appendages matted. Right salpingo-oöphorectomy. Adhesions freed. Good convalescence and recovery.

C17, aged 22, nullipara. T.B. Irregular bleeding for 2 months with left-sided pain. Double pyosalpinx felt. Bleeding and pain. Double pyosalpinx. Left salpingo-oöphorectomy. Partial right salpingectomy and salpingostomy. Good convalescence and recovery. Right tube found to be patent 8 weeks later by lipiodol investigation.

C18, aged 32, nullipara. T.B. Left-sided pain for 14 years. Persistent despite treatment. Scanty periods. Swelling on left side. Persistent pain. Left pyosalpinx. Chronic right salpingitis. Left salpingo-oöphorectomy. Good convalescence and recovery.

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C19, aged 41, 4-para. T.B. Menorrhagia for 6 months followed scanty periods for 3 months, and then 3 weeks continuous bleeding. Excessive weakness and debility. Cervix definitely precancerous. Double pyosalpinx, small. Panhysterectomy with appendages. Good convalescence and recovery.

C20, aged 44, 2-para. No cause found. Abdominal pain for 5 weeks with irregular bleeding. Multiple fibroids present. Left pyosalpinx associated with fibroids. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery.

C21, aged 37, 6-para. Pneumococcus, group ii. No motion for 2 weeks. Passing mucus only *per rectum*. No pain. No irregularity of periods. Obstruction. Double pyosalpinx and ovarian abscess with multiple adhesions to the portions of terminal ileum. Pelvic colon also kinked, causing obstruction. Supra-vaginal hysterectomy with appendages. Good convalescence, but very unexpectedly died on the twenty-third day from pulmonary embolism.

C22, aged 54, 2-para. No cause found. No motion for 2 weeks following years of obstinate constipation. Right-sided pain for 3 weeks. Vomiting. Obstruction. Large right tubo-ovarian abscess and left pyosalpinx. Pelvic colon kinked under abscess and densely adherent. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Constipation cured.

C23, aged 27, nullipara. No cause found. Complete retention of urine on 2 occasions in 3 weeks. Two scanty periods in 4 weeks. Large cystic mass in pouch of Douglas. Large left tubo-ovarian abscess and right salpingectomy. Drain. Good convalescence and recovery.

C24, aged 25, nullipara. T.B. Abdominal swelling. Growing slowly larger. Two retort-shaped swellings felt in front of uterus, reaching almost to umbilicus. Increasing size of abdomen and tumour. Huge double pyosalpinx, the swellings being each as big as a good-sized cucumber. Right salpingo-oöphorectomy and left salpingectomy. Good convalescence and recovery. Patient reported 2 years later with constant left-sided pain. Left ovary found to be enlarged and very tender. No improvement with conservative treatment. Removal of ovary; found to be tuberculous; 2 years later very well.

C25, aged 44, nullipara. T.B. Abdominal discomfort for 10 days, followed by severe vaginal bleeding. Periods usually 4/28. Large fibroid. Fibroids of uterus with adhesions posteriorly. Bilateral T.B. pyosalpinx. Healed T.B. of abdomen and pelvis. Subtotal hysterectomy. Bilateral salpingo-oöphorectomy. Very satisfactory convalescence.

C26, aged 44, 3-para. No cause found. Lower abdominal pain. Periods very irregular since age of 40. Frequency of micturition. The Aschheim-Zondek reaction negative. Increasing pain. Large mass extending half-way to umbilicus. Left pyosalpinx. Bilateral salpingo-oöphorectomy. Drainage. Developed faecal fistula which closed in 2 weeks, otherwise satisfactory.

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C27, aged 31, nullipara. Lower abdominal pain for 5 years; always present. Periods 4/28 till 2 months before admission, then every 14 days. Severe loss and severe dysmenorrhoea. Dilatation and curettage. Recurrence of bleeding and constant pain. T.B. uterus and tubes. Adhesive T.B. peritonitis. Nine months later subtotal hysterectomy, bilateral salpingo-oophorectomy and appendicectomy. Satisfactory convalescence.

C28, aged 33, nullipara. T.B. Inflation and lipiodol for sterility 3 years previously. Tubes found to be blocked. Slight abdominal pain and distension of lower abdomen 3 years later. Large cystic swelling in pouch of Douglas causing abdominal distension. Cystic right ovary and calcareous tube (salpingitis isthmica nodosa). Large cystic swelling on left side almost up to umbilicus, part of which extended into mesentery of pedis colon. Right salpingo-oophorectomy and partial removal of left-sided cyst. Convalescence satisfactory. Small sinus in abdominal wound treated satisfactorily. Given 2 doses of X-ray therapy to prevent further secretion from remains of cyst: 6 months later very well.

C29, aged 25, 2-para. ?G.C. Pain in R.I.F. Irregular periods with profuse loss followed by periods of amenorrhoea. ?Ectopic gestation. Right pyosalpinx adherent to uterus. Left appendages previously removed. Subtotal hysterectomy and right salpingo-oophorectomy. Convalescence satisfactory and good recovery.

C30, aged 35, nullipara. T.B. Chronic pelvic pain for years; getting worse. Making life a misery. Periods regular and normal. Very tender swelling in pouch of Douglas. Left pyosalpinx filled with caseating material; left ovary matted and cystic. Right tube salpingitis isthmica nodosa with ampullary end enlarged to size of plum and full of caseating material; prolapsed in pouch of Douglas. Right ovary healthy. Left salpingo-oophorectomy. Right partial salpingectomy and salpingostomy. Good convalescence and recovery.

TUBERCULOUS PYOSALPINX.

The treatment of tuberculous pyosalpinx is still a very vexed question and is the subject of much controversy. Operative treatment has been advocated by Van Franque, Fehling, Donay, Faure, Albertin, Daniel, and Peterson, and conservative treatment by Labhardt, Weibel, Burn, Doederlein, Schauta, Venwerts and Pestalozza. The conservative procedures consist of injection of oxygen intraperitoneally (Stein¹²), X-rays as advocated by Bickenbach, Jamieson,¹ Gilbert,¹³ among others* and

* A daily dosage of 50 to 100 r. is recommended in chronic cases until a dosage of 2,500 to 3,000 r. is reached, whereas in acute cases smaller doses are given twice weekly, the total dosage arrived at being the same as in chronic cases. Usually two fields, front and back, are subjected to therapy.

heliotherapy by Rochat⁴ and others: Rochat⁴ especially recommends this treatment as a pre-operative or post-operative adjuvant and as the sole method if the peritoneum is extensively involved, whereas if involvement is slight and lesions are localized to the genital organs he recommends surgical treatment. Jamieson showed in a series of 961 radical operations the primary mortality was 9.2 per cent and the total mortality was 22.6 per cent, the results being far better with the radical operation than with the conservative, whereas X-rays gave a mortality of 9 per cent, but a further 17.2 per cent were not improved by such treatment.

With regard to operative treatment, the radical treatment is mainly advised, Jamieson¹ stating that only 8 cases could be found in the literature in which pregnancy had followed conservative treatment. The opinions regarding the retention or ablation of the ovaries are divided. Stein¹⁴ states that ovaries are relatively infrequently affected and also states that operative treatment offers the best chance of cure (66 per cent of his cases), whereas Greenhill¹⁵ recommends removal of the ovaries as they are frequently affected and Keller³ states that they are affected in 33.3 per cent of cases, the uterus being involved in 70 per cent. Rondon and Daniel² do not state the incidence of ovarian tuberculosis but deem to have proved that the danger of producing menopausal symptoms in tuberculous cases is less than in other cases as the internal secretions of the ovary have been suppressed by toxæmia for so long that their removal in such cases gives rise to few symptoms. In my series ovaries were only found to be affected by tuberculosis in 4 cases, approximately 18 per cent.

In my series of 22 cases (Group IV) 8 were acute and 14 chronic. The radical operation was carried out in 13 of the 20 patients operated upon: in the 7 patients in whom some form of conservative treatment, such as retention of an ovary, was practised in all but one, C 30, it was not recognized that the condition was tuberculous until a pathological report on the Fallopian tube had been received; in C 30 the patient was anxious to have a child, and, as the right ovary and a small portion of the right tube seemed healthy, a partial salpingectomy and salpingostomy were done: otherwise my routine has invariably been to carry out the radical operation with removal of both ovaries if the condition was thought to be tuberculous and this was followed whenever possible by at least 3 months', and preferably 6 months' sanatorium treatment. In one patient, C 24, in

whom an ovary had been left at the operation, persistent pain resulted and the ovary had to be removed $2\frac{1}{2}$ years later which, on examination, was found to be tuberculous. Two of my patients were treated conservatively and sent for sanatorium treatment as they were not fit for any operative interference and it was hoped that such treatment might improve their general and local condition. Unfortunately both of these patients died after about 6 to 10 weeks in sanatoria. One of these patients, A 30, might possibly have been saved had operation been performed after her first apparent recovery under conservative treatment, but at the second acute attack 7 months later her tuberculous condition had become general and an operation was out of the question. Of the 20 patients operated upon the pyosalpinx was acute when first seen in 6 and in 2 of these conservative treatment had been tried and failed, while in the other 4, for some reason or other as seen from the details of the cases, operation was performed in the acute stage without conservative treatment being given an extended trial. There is only one death in the operative series, and this case, A 24, was complicated by a gonococcal infection and has already been commented upon, in so far as it is considered that conservative treatment had been continued for too long and operation performed too late as a last resort to try to save the patient's life when her condition was at a very low ebb. In only 2 cases did the convalescence cause any anxiety, both being acute cases, B 7 and B 17. Both patients, however, made eventually an excellent recovery, and were found to be in excellent health 4 years and 14 months later respectively. I have tried to include in Group IV the result of a late follow-up on all the patients operated upon: some unfortunately cannot be traced by the post office, but I think from the number whom I have seen and examined there can be little doubt that operative treatment, radical in 13 cases, has been eminently satisfactory and none have shown any spread of the tuberculous infection elsewhere. Menopausal symptoms were conspicuous by their absence but this, as I have already stated, is not a feature confined to tuberculous cases, and, therefore, I cannot subscribe to the already quoted theory of Rondon and Daniel.² In 3 of the 7 patients, for whom a more conservative operation was performed, 2 reported later suffering from pain and in one, C 24, a further operation had to be performed 2 years later to remove the offending ovary which was found to be tuberculous.

One smaller matter of interest which emerges from Group IV

is that 4 patients, B 17, B 19, C 7, and C 19, were parous, C 19 having had 4 children. The interval between the pregnancies and the tuberculous infection being discovered ranged from 2 to 17 years. Did the tuberculous infection occur in these cases after the pregnancies or is it possible that the Fallopian tubes were previously tuberculous and had become closed only during the puerperium, possibly due to a super-added infection? In none of the patients was any secondary infection found and in each the pyosalpinx was definitely tuberculous.

Although my number of tuberculous cases is small I would submit that a paper on pyosalpinx would not be complete without their inclusion and discussion; the result of the operative treatment would appear to show that operation is eminently satisfactory, not only as regards immediate results but also, which is even more important, as regards the late results both in connexion with the general and local well-being of the patient and the absence of any further manifestations of tuberculosis elsewhere. A primary operative mortality rate of about 4.5 per cent and a secondary mortality rate of nil would seem to compare very favourably with the available statistics of both operative and conservative treatments: and it must again be noted that the one death was complicated by a super-added gonococcal infection and the pyosalpinx was not entirely tuberculous, thus, if purely tuberculous infection of the Fallopian tubes is considered, the operative mortality both primary and secondary is nil.

GROUP IV.

CASES OF TUBERCULOUS PYOSALPINX.

A23, aged 27, nullipara. Acute. Right tubo-ovarian abscess. Pyosalpinx and T.B. abscess in ovary. Removal right appendages. Drain. Wound infection, otherwise good convalescence and recovery. Nine months later very well. Periods 4/28. Slight bearing down on first day of period, otherwise no pain.

A24, aged 35, nullipara. Acute with G.C. Double tubo-ovarian abscess. Supra-vaginal hysterectomy with appendages. Died in 36 hours from myocarditis.

A30, aged 16, nullipara. Acute. Double pyosalpinx. Conservative treatment. Died 9 months later.

A31, aged 19, nullipara. Double pyosalpinx. Conservative treatment. Died 3 months later of acute pneumothorax.

B7, aged 24, nullipara. Acute. Large double pyosalpinx. Supra-vaginal hysterectomy with appendages. Colostomy. Drain. Very stormy convalescence for many months. Two years later colostomy was closed. Four years later patient in excellent health.

THE TREATMENT OF PYOSALPINX

B17, aged 24, 1-para. (8 years ago, ChCl_3 and instruments, Misc. o). Acute. Large double pyosalpinx. Supra-vaginal hysterectomy with appendages. Stormy convalescence with faecal fistula. Closed in 4 months. Fourteen months later very well indeed. No menopausal symptoms. Pelvis apparently clear.

B20, aged 24, 1-para. (5 years ago, breech, Misc. o). Acute. Double pyosalpinx. T.B. ascites + +. Bilateral salpingo-oöphorectomy. Good convalescence. Gained 7 pounds in weight in 3 weeks. Five months later convalescence progressing satisfactorily, but slowly. No further ascites.

B21, aged 29, nullipara. Acute. Left tubo-ovarian abscess. Removal left appendages. Fair convalescence marred by infected haematoma. Refused sanatorium treatment. Four months later general health much improved. Tubo-ovarian swelling right side getting larger. Periods regular.

C6, aged 24 years, nullipara. Chronic. Bilateral pyosalpinx; right, large. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Six months later very well. Still some flushings. Controlled by progynon; lost further trace of.

C7, aged 25 years, 1-para. (2 years ago, from which present symptoms arose; Misc. o). Chronic. Right pyosalpinx and left salpingitis isthmica nodosa. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Five months later very well. Menopausal symptoms checked with progynon. Lost further trace of.

C12, aged 31 years, nullipara. Chronic. Double pyosalpinx; left large, very thin walled. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Three years later very well indeed. Only complaint occasional headaches.

C13, aged 19, nullipara. Chronic. Small double pyosalpinx. Left appendages and right tube removed. Good convalescence and recovery. Sent to sanatorium. Lost trace of.

C14, aged 28 years, nullipara. Chronic. Double pyosalpinx; right, very large. Supra-vaginal hysterectomy with appendages. Pack. Good convalescence and recovery. Eighteen months later very well. No menopausal symptoms except slight increase in weight. Pelvis apparently clear.

C15, aged 16, nullipara. Chronic. Double pyosalpinx and T.B. endometritis. Supra-vaginal hysterectomy with appendages. Good convalescence and recovery. Six years later very well indeed. No menopausal symptoms except slight increase in weight. Pelvis apparently clear.

C17, aged 22, nullipara. Chronic. Double pyosalpinx. Removal left appendages and partial salpingectomy and salpingostomy. Good convalescence and recovery. Eight weeks later right tube found to be patent by lipiodol investigation. Six months later periods 5/28. Very well. No pain. Right ovary slightly enlarged but not tender.

C18, aged 32, nullipara. Chronic. Left pyosalpinx. Removal left appendages. Good convalescence and recovery. Eighteen months later occasional pain in right side every 6 to 8 weeks, lasting one or two days. Periods 2/21. Pain not affected by periods. Right tube palpable but not tender or unduly enlarged.

C19, aged 41, 4-para (17 years ago, ChCl₃ and instruments; 15 years ago, sp. delivery; 14 years ago, sp. delivery; 12 years ago, sp. delivery). Chronic. Double pyosalpinx; small. Panhysterectomy with appendages. Good convalescence and recovery. Four months later very well. Slight thickening at vaginal vault laterally. Not tender. Fourteen months later very well.

C24, aged 25, nullipara. Chronic. Double pyosalpinx; huge. Removal right appendages and left tube. Good convalescence and recovery. Two years later persistent pain in left side. No improvement with conservative treatment. Left ovary and uterus removed. Ovary found to be tuberculous. Two years later very well. No pain. No menopausal symptoms. Pelvis apparently clear.

C25, aged 44, nullipara. Chronic. Double pyosalpinx; small, with large fibroid of uterus. Supra-vaginal hysterectomy with appendages. Good convalescence with recovery. Five months later very well. Gaining weight.

C27, aged 31, nullipara. Chronic. T.B. uterus and tubes. Adhesive T.B. of peritoneum and pelvis. Dilatation and curettage followed 9 months later by subtotal hysterectomy, bilateral salpingo-oophorectomy, and appendicectomy. Satisfactory convalescence. Six months later very well.

C28, aged 33, nullipara. Chronic. Cystic right ovary and calcareous tube; salpingitis isthmica nodosa. Large cystic swelling on left side almost up to umbilicus; part of this extended into mesentery of pelvic colon. Right salpingo-oophorectomy and partial removal of left-sided cyst. Convalescence satisfactory. Small sinus in abdominal wound, treated satisfactorily. Given 2 doses of X-ray to prevent further secretion from remaining cyst. Five and a half months later pelvic examination satisfactory. Gaining weight. No evidence of remnants of left-sided cyst.

C30, aged 35, nullipara. Chronic. Left pyosalpinx filled with caseating material. Left ovary matted and cystic. Right tube salpingitis isthmica nodosa with ampullary end enlarged to size of plum, full of caseating material and prolapsed in pouch of Douglas. Right ovary healthy. Left salpingo-oophorectomy. Right partial salpingectomy and salpingostomy. Good convalescence and recovery. Three months later very well except for some right-sided pain, especially pre-menstrually.

SUMMARY

1. This is a review of 84 personal cases of definite pyosalpinx, 54 cases being acute and 30 chronic. Among the 84 cases, 22 were cases of tuberculous pyosalpinx.

2. Of the 54 acute cases, 34 of the patients received conservative treatment; this, however, failed in 10 cases and an operation had to be undertaken. Twenty other acute cases were operated upon for various reasons: 13 of these had not received any previous conservative treatment and 6 were unable to complete a full course of such treatment.

3. In Group I a short clinical *résumé* and the results of full conservative treatment for the 34 acute cases are given. This series of cases shows a clinical cure in 20 cases following conservative treatment alone, while two patients died, both being tuberculous. Two patients, for whom operation was performed after conservative treatment had failed, died.

4. In Group II a similar record is made of the acute cases treated by operation. Such treatment is advised in all cases in which conservative treatment fails or the patient has continued ill-health, is constantly miserable with pain or/and menorrhagia, is unable to work, look after her household or even enjoy herself on account of her pelvic condition: the operation generally indicated is hysterectomy with removal of both appendages.

5. Four cases of rupture or leak of a pyosalpinx were encountered and there were two other cases in which at the operation the Fallopian tubes were found to be on the point of rupture: three of these patients died, and all would probably have done so had not immediate operation been possible.

6. Five deaths are recorded among the 30 patients operated upon—three from rupture or necrosis of the tubal wall, the other two being cases for which conservative treatment had been carried out too long before operation was done.

7. The value of the sedimentation-rate of red blood-corpuscles and the indications for drainage of the abdomen in operative cases are discussed.

8. In Group III detailed results are given of 30 operations for chronic pyosalpinx, one death being recorded from embolism on the twenty-third day of an otherwise excellent convalescence.

9. In Group IV details of the 22 tuberculous cases, including the late results, are given, 8 being acute and 14 chronic.

Twenty cases were operated upon and the radical operation was performed in 13. Only one death is recorded in the operation cases and this occurred in a patient who had mixed infection of gonococci and tubercle bacilli: there was no mortality in the cases which were purely tuberculous. The late results up to 7 years later, were found to be uniformly excellent in those treated radically, there being no apparent spread or exacerbation of tuberculosis elsewhere; whereas when some form of conservative operation was done, the health of 3 out of the 7 so treated was found to be adversely affected at a later date.

10. Four of the tuberculous cases had been pregnant and one was the mother of four children.

REFERENCES.

1. Jameson, E. M. *Amer. Journ. Obstet. and Gynec.*, February 1934.
2. Rondon and C. Daniel. *Gynec. si Obst.* (Bucharest).
3. Keller, R. *Bull. Soc. d'Obst. et de Gyn.*, January, 1934.
4. RoCHAT, R. L. *Gynec. and Obstet.*, August, 1933.
5. Greenhill, J. P. *Amer. Journ. Obstet. and Gynec.*, 1930.
6. Bickenbach, S. *Ergeb. der med. Strahlen Forschung*, 1936.
7. Young, J., and T. N. MacGregor. *Edin. Obstet. Soc. Trans.*, vol. lii. 1931-32.
8. Baldwin, J. F. *Amer. Journ. Obstet. and Gynec.*, February, 1932.
9. Black, W. J. *Amer. Journ. Obstet. and Gynec.*, March, 1936.
10. Gordon, C. A. *Amer. Journ. Surgery*, January, 1931.
11. Cooke, W. R. *Amer. Journ. Obstet. and Gynec.*, December, 1934.
12. Stein, A. *Amer. Journ. Surgery*, November, 1930.
13. Gilbert, P. *Bull. Soc. d'Obst. et de Gyn.*, July 1933.
14. Stein, A. *Amer. Journ. Surgery*, November, 1930.
15. Greenhill, J. P. Discussion on Stein's article in *Amer. Journ. Surgery*. November, 1930.
16. Friedlander, B. *Amer. Journ. Obstet. and Gynec.*, 1927, vii.
17. Baer, J. L., and R. A. Reis. *Amer. Journ. Obstet. and Gynec.*, 1925, x.

[The discussion on this subject at the Congress of Obstetricians and Gynaecologists at Edinburgh is on page 568.]