NOTES ON THE TREATMENT OF PUERPERAL FEVER.*

By A. KNYVETT GORDON, B.A., M.B.CANTAB,
MEDICAL SUPERINTENDENT, MONSALL FEVER HOSPITAL, MANCHESTER.

THE remarks I am about to make are based on a clinical and bacteriological study of 210 consecutive cases which have come under my care at Monsall Hospital.

Etiology and Pathology.

Puerperal fever is wound fever. There is always a wound, and there is always infection of this wound, but this infection is certainly not always introduced from without, though it is probably necessary that the infecting agent shall be always directly applied to the raw surface. We do not nowadays believe in the production of puerperal sepsis by obscure atmospheric agencies, such as sewer gas.

First, where is the wound? Well, it is present after every labour at the placental site, and there may also be some laceration of the cervix which may be due to natural effort or instrumental interference; also there may be perineal tears. Other things being equal, the seriousness of the wound depends upon its proximity to the fundus of the uterus. Thus, infection of the placental site is more likely to give rise to serious consequences than a septic laceration of the cervix (apart, that is to say, from the mechanical effects of such a lesion, which may be considerable); while perineal tears, even if sloughing, do not usually appear to be of very serious import; in fact, I may say that by themselves they seem seldom to give rise to systemic infection.

In normal labour, where there is no interference whatever, there is no reason why infection should be carried to the inside of the uterus at all, and, moreover, the placental site is soon sealed by involution, but directly any external agency comes on the scene puerperal fever is rendered possible. Thus infection may be carried from without by hands or instruments that are not sterile, or, being sterile, have touched the external genitalia in the process of vaginal examination. When intrauterine manipulations are necessary, the risk is of course very much greater.

The point, however, that I wish to make in this connexion is that it is not necessary that the organisms shall be introduced from without. It has been shown by Döderlein and others that the healthy vagina contains, both before and after delivery, certain organisms, amongst which are almost always streptococci. As long as the vagina is healthy its secretion is acid, and these streptococci are saprophytic only, and non-virulent to the patient herself; in fact, they seem to be beneficial in that they serve to rid the vagina of such organisms as the *B. coli* which may be accidentally introduced. But if by any means these streptococci reach the interior of the uterus, which is faintly alkaline and in health always sterile, they become parasitic and virulent.

The importance of this is that vaginal examinations by sterile hands may carry these harmless vaginal cocci into the uterus, and set up an attack of puerperal sepsis. It is in this direction that we must look, I think, for the explanation of the cases of puerperal sepsis that occasionally occur in the practice of the most careful physicians, and it is a reason for discouraging the making of too frequent examinations by the modern highly-trained obstetric nurse, who is certainly inclined to err in this respect.

Retention of the placenta, by preventing involution, renders the uterus more liable to infection.

Hitherto I have spoken of parturition infection, which takes place, that is to say, at, or immediately after, delivery. During the puerperium, however, infection may occur even though there has been no manual interference at all. For the explanation of this we must look to two factors—first, the use of the vaginal douche, which washes organisms, harmless enough in the vagina, into the danger area in the uterus, or against the surface of a cervical tear; and, secondly, to the neglect on the part of the nurse to treat the vulva as the orifice of a surgical wound, and keep it covered until danger of infection is passed. Of these, the vaginal douche is the more potent factor,

especially when it is given with the quite unsterilizable enema syringe.

When the wound has been infected, we may have, either:

1. Rapid generalized septicaemia from passage of the organisms directly into the veins of the part. This form is usually fatal in from twenty-four hours to three days, and the circulating blood is generally found to contain streptococci.

2. Direct extension through the Fallopian tubes to the peritoneal cavity, and resulting general suppurative peritonitis.

3. Extension as far as the Fallopian tubes only, with formation of adhesions, shutting off the general peritoneal cavity, resulting in the occurrence of pyosalpinx, pelvic peritonitis, or tubo-ovarian abscess.

4. Lymphatic extension causing parametritis, which may go on to suppuration.

The infecting agent is usually a streptococcus, but in the varieties of infection which occur later on in the puerperium I have more frequently found the *B. coli communis*. Occasionally the whole system becomes invaded with this bacillus as a terminal infection only, and if the case is then seen for the first time, it may be erroneously thought to be the cause of the attack.

Treatment.

I do not intend dwelling on the prevention of puerperal fever, but it is evident from what we know of the pathology of puerperal infection, that the points to which attention should be directed are:

1. The avoidance of anything that may interfere with the closing of the placental site, such as the retention of placental tissue in utero.

2. Care should be taken that no other wound be made; here I cannot but think (from what I have seen) that the harm that may result from the application of forceps before the os is dilated is not, as a rule, sufficiently well recognized. I have seen, *inter alia*, lacerations of the vagina so extensive that the periosteum was stripped from the pubic bone below, while the upper part of the tear had laid open the peritoneal cavity, so that the intestine protruded into the vagina. Apart from such an extreme case as this, I may say that of the cases under my care in which infection took place at the confinement and forceps had been used, no less than 80 per cent. had diagonal laceration of the cervix, which appeared to be the source of the infection for which they were admitted.

3. We should endeavour to avoid the infection of the wound by abstention from too frequent vaginal examinations and by the wearing of rubber gloves when any manipulations are necessary.

4. There can, I think, be little doubt that douching the vagina is seldom necessary and always risky, and that it should never be performed with a rubber syringe.

5. The vulva should be kept covered with an antiseptic pad of sublimated wood wool or similar material.

Now that we have cleared the ground a little by these preliminary considerations, we come to the actual treatment of puerperal infection when it has occurred. Here we are brought face to face with the fact that the practice on this point differs widely in different countries, and even in different clinics in the same country. It is difficult to reconcile the utterances of the various authorities, and no *via media* seems to be possible.

It is important in any case not to lose sight of the fact that each patient must be treated on the information obtained from careful examination, and I do not know of any disease in which a thorough physical exploration of every accessible organ is so important as it is in puerperal fever. I do not think it is possible to use the term "routine treatment" at all in so complex and so fatal a disease as puerperal fever.

However, we may say that there are two main schools of teaching—the active and the passive. Those who counsel the minimum of interference do so in the belief that between the organisms and the host lies a barrier of leucocytes which it is important to leave intact, and not destroy by any active local disinfection. This barrier is stated to exist either in the uterine muscle and, according to later teaching, in the inflammatory thickenings round the uterus also. In the latter case it is difficult to see how disinfection of the uterus can have any mechanical action on it.

*Read before the Altrincham Division of the British Medical Association.

Those who prefer active local treatment, however, hold that when puerperal fever is established, the barrier of leucocytes is proved, *ipso facto*, to be ineffective, and that the best course is to remove the micro-organisms in so far as they are accessible, even if it involves the removal of part of the barrier wall as well.

For both of these views there is a good deal to be said, especially in theory, but it is an unfortunate fact that the literature of puerperal fever abounds in statements that have been made about purely clinical features by authors whose experience of the disease has been limited to the examination of cultures and histological sections. Perhaps it is in consequence of this that many clinicians of ripe experience have looked with undue disfavour on the emanations from the pathological laboratories.

The treatment of puerperal fever has also suffered, like many other departments of medicine, from the spirit of compromise which has shown itself in the common practice of attempting to combine both the active and the passive methods in the individual case, with the result that the uterus is neither left alone nor adequately disinfected. Concessions to the passive school are made by the administration of small doses of quinine internally, while a surgical aspect is added by the use of the intra-uterine douche, and possibly by the removal of any large masses of retained placenta by the finger or the blunt curette. I do not, myself, believe that the uterine wall can be disinfected, or its contained organisms hindered in their growth by playing upon it with any chemical whatsoever that it is safe to use in the quantity required, and I have seen, not once only but again and again, general peritonitis set up by the practice of intrauterine douching. I think we may say definitely that whatever chemical be used for the uterine wall should be supplied with a swab, and not with the douche. If a Higginson's syringe be used for the latter the practice becomes indefensible.

For the passive method pure and simple there is something to be said, and I quite admit that many cases recover well on antistreptococcal serum and various drugs and stimulants internally without any local interference at all. But this method is not, I submit, universally applicable. It is, I think, very largely a matter of the severity of the case and the time that has elapsed before the patient is first seen or the diagnosis of puerperal infection made.

My own experience has been almost confined to very severe cases. I do not see the early cases at all, the average day of disease on admission to Monsall Fever Hospital being between the fifth and the sixth.

When I first began to see these I was impressed by what I had learnt from textbooks and so on, and, moreover, had been taught that any active interference with the puerperal uterus when once it had become infected was tantamount to signing the death certificate, but I had been accustomed to use the intrauterine douche. Out of 79 cases treated in this way, with or without serum, 37 died, a mortality of 46 per cent. I am unfortunately not able to say in what proportion of these intrauterine douching was employed, but it was at least 70 per cent.

These results were not encouraging, and I accordingly began to doubt the protective capacity of the granulation wall. What remnants of faith I still possessed were dissipated by the failure to discover the existence of the wall at all in a large number of sections taken from severe cases of puerperal sepsis that had not received active local treatment. So I commenced the use of the sharp curette, followed by swabbing of the raw surface with strongly bactericidal chemicals. After some trials, I fixed on undiluted izal fluid as the most suitable application, in that it had for streptococci a very high germicidal coefficient as compared with the phenol standard, and I had found it to be non-toxic. I have used this now for about five years.

The details of the method are as follows. A general anaesthetic is not given, but one hour previous to the operation a dose of brandy (usually 2 oz.) disguised with liquid extract of liquorice and hot water is administered, and half an hour later a hypodermic injection of morphine—usually $\frac{1}{4}$ grain. The vagina is cleansed and packed with a swab soaked in 5 per cent. solution of cocaine. When the patient is somnolent, she is placed in the lithotomy position and the cervix exposed and steadied with volsellae. Cultures are then taken (with a sterile swab) for bacteriological examination. After digital

exploration of as much of the interior of the uterus as may be accessible, the endometrium is removed completely down to the muscle with a light sharp curette, having its extremity shaped like a hoop, with a broad flattened end. Perforation of even a friable uterus with this instrument is practically impossible.

The curette is then laid aside and the raw surface gone over very thoroughly and firmly with swabs soaked in the undiluted izal fluid. The uterine cavity is then packed with izal gauze and a tampon inserted in the posterior cul-de-sac. These plugs are withdrawn in twenty-four hours and are usually not replaced. No douching of any kind is given at the operation or subsequently. If the uterine discharge again becomes foul the swabbing with izal is repeated, and the uterus again plugged.

In a further series of 129 cases treated in this way, the mortality has been 24 per cent. only, though the type of case admitted to Monsall has not changed, nor have any alterations occurred in the methods of general medication or of nursing.

Now this reduction in mortality is somewhat striking, and it does not at all events support the opinion that active local interference must be entirely condemned, as so many would have us believe.

I should add (though there is nothing special in this) that all collections of pus, wherever they may be in the pelvis, have been opened either vaginally or by abdominal section whenever they have been diagnosed with certainty, and sometimes by a purely exploratory incision. Patients admitted with general peritonitis have been treated by laparotomy and drainage. Of these I have now had 13 consecutive cases with 8 recoveries. Flushing was resorted to in one case only, the others being treated (apart from free drainage) by propping up in the sitting position, combined with copious rectal or subcutaneous infusions of normal saline solution.

But there is another side to the question. I have seen the severe cases only, and perhaps I am not in a position to say very much about the mild or early cases. But inasmuch as almost all my own patients had been treated by intrauterine douches and quinine only until they were very nearly moribund, it is reasonable to infer that these methods are not the best, even if used early, especially as the statement was very frequently made by the practitioner that he did not regard the case as a severe one at first. We must, I repeat, condemn the douche.

I would, then, say that I cannot myself see why mild and early cases should not be treated by the sharp curette and the swabbing; but at all events the swabbing alone with the izal or other reliable antiseptic can do no harm even to our friend the granulation wall. It is curious, incidentally, to see how the nature of this structure changes. If it be suggested that the uterus should be disinfected, the wall is said to be delicate and fragile, so that we must take care not to hurt it; but at times it springs up to renewed vitality, and is then described as Nature's strongest line of defence.

I would suggest, then, that when, during the puerperium, a rise of temperature occurs for which there is no extra-genital cause to be found, in addition to the very useful 5 grains of calomel and saline purge which are usually given, the uterus should be mopped out with several swabs wet with the undiluted izal, and that if this is not effectual, then the sharp curette should be used, followed again by careful swabbing. Much of the condemnation with which the curette has been visited has been justly earned, and is due to the fact that the raw surface has not subsequently been adequately disinfected. To curette alone is certainly worse than to do nothing; to curette and douche is worst of all. I have not mentioned either the blunt or the flushing curettes because they are not weapons of precision and their use requires force, and is, therefore, dangerous. It is also a little difficult to see how the much-recommended process of exploration with the finger is carried out in the puerperal uterus. I have almost invariably found the fundus and cornua out of reach—in fact, it is no uncommon thing for the cavity to measure 6, 7, or even 8 in. in length. It is difficult to take the advocates of digital manipulation in puerperal fever seriously.

I have perforce confined myself mainly to the details of local treatment, as I believe this to be the most important point. In the treatment of the septicæmic symptoms

themselves there is, in my opinion, nothing to equal large quantities of sterilized saline solution given per rectum or subcutaneously. With these we may combine calomel and alcohol, both in fairly large doses. Antipyretic drugs are usually harmful. We do not usually need to treat the pyrexia *per se*, and, if we do, cold water is the best and safest remedy, used either in the form of a bath or cold sponging.

Antistreptococcal serum, I would say, is useful in a limited number of cases only, though probably never harmful.

I have given now a fairly large number of different serums, and time will not permit of discussing this question as its importance deserves. Briefly, the serum should be polyvalent—that is to say, prepared from many strains of streptococci, some of which should have been obtained from cases of puerperal fever. At least 50 c.cm. should be given subcutaneously, and 100 c.cm. are preferable. The dose should certainly not be repeated, as from so doing joint pains and pyrexia are apt to result.

The type of case in which these bactericidal serums are of benefit is that in which the streptococci are present in the circulating blood. I have never been able to satisfy myself that they affect the local lesion at all, and their value in checking absorption of toxins from the lesion is at least problematical. They are not supposed to have any antitoxic value. For myself, I now give them only in cases where the septicaemic symptoms are severe and no local lesion can be found to account for the intensity of the illness.

A Clinical Lecture

ON

THE DIAGNOSIS AND TREATMENT OF RENAL MOBILITY.

DELIVERED AT THE MEDICAL GRADUATES' COLLEGE AND POLYCLINIC.

By GILBERT BARLING, M.B., F.R.C.S.,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF BIRMINGHAM,
SURGEON TO THE GENERAL HOSPITAL.

MOVABLE kidney is a condition which has, during the last few years, become the subject of much discussion, and opinion appears still to be divided upon several points in connexion with it. Is it of frequent occurrence? Is it responsible for the symptoms often associated with the mobility, or are these merely coincident? By what means can the mobility best be combated? Is fixation of the organ followed by relief to the symptoms complained of? These and some other points I propose to address myself to this afternoon. In the first place, let me point out that in the healthy living body the kidney is not an absolutely fixed organ; I mention this because in one of the best modern textbooks of medicine I notice it so described. When operating on the abdomen for other conditions I have had many opportunities of handling the kidneys, and find that both organs may be easily displaced downwards for an inch to an inch and a half. We have, then, in the condition known clinically as "movable kidney," simply an exaggeration of a normal condition, induced probably by loss of abdominal fat, by lax abdominal walls, occasionally by actual violence, influenced also probably by the lumbar pouches being more shallow in some individuals than in others.

SIGNS AND SYMPTOMS.

Of the frequency of undue mobility there should be no doubt; it is common in women, comparatively uncommon in men, though by no means rare in the male. Its detection is generally quite easy with proper method in examination. The patient should first be examined lying on the back in such a way as to produce muscular relaxation. The left hand is used to investigate the right side, the right hand to investigate the left side, the palm of the hand being pressed firmly against the lumbar muscles immediately below the last rib, the thumb lying on the front of the abdomen, close to the costal arch, so that the hand can grasp the patient's side. The patient is now told to take two or three deep inspirations, and at the second or third effort, whilst the palm pushes firmly up from the back, the thumb follows

the retreating abdominal muscles at the beginning of expiration, and when the expiratory act is completed, if the kidney is movable, it may be found either in the grasp of the examining hand, or quite below it, and palpable by the hand which has hitherto not been concerned in the examination. If the kidney is not detected in this way a bimanual examination should be made in the semiprone and in the knee-elbow positions. Finally, the condition of the kidney should be investigated in the upright position, one hand pressing firmly into the loin from the back, the other being used on the front of the abdomen, the patient leaning slightly forwards and resting the hand of the side under examination upon some support. It is important to examine in this position, because there are some kidneys which do not reveal their displacement until the patient is vertical; or if the kidney is already found to be displaced downwards in one of the previous examinations, it will generally be found to come lower down when the patient is in the vertical position.

The kidney having been recognized will, when allowed to do so, often shoot back into the loin with a slip which is absolutely unmistakable, or it can alternatively be gently slid back beneath the costal arch. If the patient has been recumbent for some time mobility of the kidney is likely to be detected only on examination in the vertical position.

I have passed briefly over these less controversial points, but when I come to consider the symptoms complained of by patients with undue renal mobility I am upon less certain ground, and may fall to carry agreement with what I have to say. That such patients complain of many things is notorious; the real point at issue is whether the troubles complained of are due to the movable kidney, are merely coincident with it, or whether the symptoms complained of and the mobility of the kidney are both due to some common factor, such as gastropnoxis, the stomach dragging down the kidney as it descends.

The symptom complained of most commonly, I think, is tiredness from inadequate cause, whether from physical or from mental work. Worse than the simple exertion of walking in some patients is standing about, whether at the wash-tub or at some social function. If pressed to explain why they get so tired, many patients attribute this to dragging and discomfort in the back on one or both sides. Exertion, such as is involved in stooping or in playing games such as golf, occasionally produces marked discomfort, amounting it may be to pain, and I have known riding also cause pain which is of a sickening character in women who hunt, though a feeling of complete exhaustion the same evening, and for a day or two after, is more often complained of than actual physical pain. Several of my cases have complained of the discomfort they experience when in bed if they turn to the side opposite to the mobile organ. Occasionally this produces a feeling of rather severe nausea; and if both kidneys are mobile, comfortable rest is only obtained when the patient lies on the back. Indigestion is a common trouble, pain coming on at irregular intervals after food, it may be independent of the nature of the food; flatulence is often associated. Suspicion of gastric ulcer may be excited, especially if the patient vomits from time to time. But ulcer and stenosis are generally excluded by the erratic nature of the symptoms, the absence of a fixed point of tenderness, the absence of stasis. The stomach will often be found proptosed and with atonic dilatation; and we may have the converse—marked gastropnoxis and dilatation with nephropnoxis.

As an uncommon condition we meet with attacks of renal pain so severe and so colic-like in nature as to suggest a diagnosis of calculus, blood in considerable quantity and pus may be found in the urine, the kidney may be very tender on palpation, vomiting may be persistent, and frequent micturition completes the picture. Such a case has been under my care during the last few months, a lady sent to me by Dr. Faulkner of Banbury. The symptoms had troubled the patient intermittently for twelve years; both kidneys were movable, but the principal symptoms implicated only the left side. Renal stone recently impacted in the ureter of a movable kidney seemed the appropriate diagnosis, but it was not confirmed by radiography. Exploration, which involved the opening of the kidney for digital examination and the passage of a bougie down the ureter, showed conclusively the absence of stone. A considerable degree of dilatation of the calyces