An Address ON CHRONIC INFECTION OF THE CERVIX: A FREQUENT CAUSE OF PELVIC AND GENERAL ILLNESS.*

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THE past few years have witnessed three advances in the practice of gynaecology, each significant in the measure in which it has led to a saving of life or the alleviation of pain and illness. The first of these has been the establishment of the palliative as opposed to the operative treatment of all but the exceptional cases of active salpingitis. In the past it was customary to carry out surgical intervention, ending often in extensive and mutilating operations and attended with a not inappreciable mortality, in those cases deemed to be streptococcal, the palliative procedure being reserved for the gonococcal cases. The rapid immediate recovery which is now known to follow the same regime of non-operative expectancy in both types of case has removed from the practice of the gynaecologist one of his greatest responsibilities in diagnosis, as it has resulted in the saving of lives and in the conserving of organs which the surgeon formerly considered it necessary to sacrifice. The new treatment has further vindicated itself in the frequency with which apparently grossly damaged appendages can exhibit clinical if not functional cure. Immediate abdominal operation is now reserved for those comparatively rare cases where laparotomy is the only method of removing diagnostic confusion with appendicitis and tubal pregnancy, and, on infrequent occasions, a pelvic abscess of tubal origin requires to be drained through the vaginal vault. Where persisting symptoms finally demand active intervention this can now be planned during a quiescent period and after the lapse of an interval during which death of the infective organism can be presumed to have occurred.

The second notable advance springs from the recognition of the frequency of strains of the spinal joints in gynaecological cases. With the help of Mr. W. A. Cochrane we are carrying out a special study of these cases in the gynaecological department of the Edinburgh Royal Infirmary, the results of which will be published in due course. Meanwhile we feel justified in saying that the recognition of this orthopaedic source of many of the low back pains which used to persist after our operations for prolapse, backward uterine displacement, etc., has brought with it a very great accession to the scientific treatment of our patients.

The third noteworthy advance in our subject during recent years is the recognition of the extent of the distress and ill health caused by chronic infection of the cervix. This lesion has long been recognized, and we know that from early times one of the most common therapeutic measures consisted of the local application of caustic drugs to "erosions" of the cervix. The old textbooks bear witness to the frequency of this practice. At the same time, the older attitude did not extend much beyond one which regarded the lesion as a sort of simple ulceration from which unpleasant discharges continually drained away.

It has remained for this generation to grasp more fully the wider clinical significance of the condition, and the object of this paper is to demonstrate that in many cases it is responsible for pelvic and abdominal distress, and that it may play, in addition, a profound part in the production of general ill health. Take the following illustrative cases.

1. A 2-para, aged 31, since the birth of her second child three years ago has suffered from constant leucorrhoea with more or less constant pain in the left iliac fossa. Menstruation has been irregular and excessive. The general health has been poor, headaches and attacks of faintness being common. Blood pressure: systolic 160, diastolic 100.

2. A 6-para, aged 37, for six years has had leucorrhoea with pain in the lower abdomen, exaggerated before and during menstruation. There have been bladder irritability and frequency, headaches, rheumatic attacks in wrists, and constant feeling of fatigue.

These instances are selected from a large number of patients in whom chronic cervicitis was present, and in whom treatment directed to this condition resulted either in a complete cure or in a noteworthy alleviation of the clinical features.

Space forbids me to enter adequately into a discussion of causation and pathology. Suffice it to say that the disease is found more commonly in women who have borne children—the percentage proportion of parous women to nulliparae being about 93 to 7 (Fulkerson¹)—and the most usual causal factor is the damage and the consequent infection the cervix is apt to suffer during childbirth or the puerperium. Lacerations and uterine displacements (prolapse and retroflexion) are thus found as a common accompaniment of chronic cervicitis. A proportion of the cases are gonococcal, although only in comparatively few where the condition has persisted for some considerable time (the usual history) can we isolate the gonococcus. The dominant fact in the pathology of the disease is this resistance to the process of natural recovery which in other parts of the body quickly leads to the spontaneous healing of sores of a similar kind. This intractableness arises from the natural crypts and crevices which exist in the cervix and from the racemose structure of the cervical glands, and the tendency for infection, once it has passed into the deeper layers of the cervix, to be locked up in the recesses of these glands. A contributory factor arises from the lesion being placed within a narrow canal in which swelling of the tissues tends to hamper free drainage.

Curtis² has directed special attention to this fact of faulty drainage being an essential element in the pathology as it is a salient consideration in regard to treatment. On examination the diseased cervix is found to be commonly increased in size, with a soft, bulky, and rough rim of reddened mucosa encircling the os and covered with a muco-purulent secretion. It is common to find the cervix lacerated, with an opening up of the lower end of the canal and an exposure of the mucous lining of the endocervix. In many instances the blocked endocervical glands become distended with an infected muco-purulent secretion and bulge on the vaginal surface of the cervix as small hard cysts (Nabothian follicles). Radiating from the cervix into the surrounding parametrium we often find bands of tissue, frequently tender to pressure, which are due to cicatricial shortening in cellulitic deposits or to the healed vaginal extension of a cervical laceration. These bands immobilize the cervix and drag it from its central position. An interesting phenomenon is that such bands may sometimes be found to disappear under anaesthesia, proving them in these instances to be due to muscle spasm and not to any organic change in the affected tissue.

CLINICAL FEATURES OF CHRONIC CERVICITIS.

The most constant symptom is leucorrhoea, and this in many instances is the only pelvic complaint, although it is common to find even in such patients evidence of impaired general health. Pain in the pelvis or abdomen is the next most common local symptom. Bladder and menstrual troubles are frequent and the general health may be involved in a variety of ways, fatigue, headaches, arthritis, and cardio-vascular disturbances being amongst the most frequent manifestations. Leucorrhoea consists of a more or less persistent vaginal discharge, sometimes thin and watery, more often thick and creamy, and sometimes frankly purulent. It is prone to irritate the mucous and skin surfaces of the vagina, vulva, and thigh.

Pain in Chronic Cervicitis.

The most distressing of the common symptoms of cervicitis is pain, which is felt usually in the lower abdomen and more especially in one or other iliac fossa or in both fossae. On occasion the pain is situated in the flank or in the upper abdomen, whilst not infrequently it is situated low in the back in the sacral or coccygeal regions, and pain in the hip and thigh would seem sometimes to owe its origin to cervical disease. In many instances there

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is discomfort or even acute pain during the action of the bowels. All these aches and pains are prone to exaggeration before and during the menstrual periods and as the result of exertion.

Because of its wide distribution this pain of cervical origin is apt to be a source of confusion in diagnosis. Tubal or ovarian mischief is often erroneously suspected, and in the presence of a uterine displacement the pain may easily be attributed to this, whilst a common source of abdominal confusion arises from the frequent right iliac fossa pain being mistaken for appendicitis. For all these reasons cervical pain merits our most serious attention.

I would say, in the first place, that as the result of a close study of pelvic pain and its underlying pathology over a considerable number of years I have come to the conclusion that, with the possible exception of vaginal prolapse in its varying degrees, the most common gynaecological cause of pain in the lower abdomen and pelvis in women is chronic cervical infection. The recognition of this common relationship is of profound importance, because it has enabled us to bring relief to a considerable proportion of the patients who in former days constituted our failures, and who in many instances spent their lives in a weary passage from doctor to doctor, suffering often futile operations in the process.

The evidence for this faith is twofold. In the first place, thanks to the accessibility of the diseased organ, it is in the majority of cases easy to demonstrate the relationship between the lesion and the pain. In the second place, as we shall see, the treatment of the disease, which is usually comparatively easy, leads in a large proportion of cases to relief.

Let me amplify the first statement. To understand the ease with which the diagnosis of the origin of the pain can be made we have, to begin with, to consider some simple facts in connexion with the ordinary vaginal examination. If the examining fingers are placed on the cervix and this be moved laterally, antero-posteriorly, and upwards, it is found that in health a considerable amplitude of displacement can be obtained in all these directions, and that even at its maximum this displacement is painless. In cases of cervicitis, on the other hand, this mobility is commonly restricted, and in those cases in which pain is present any attempt to displace the cervix at once provokes the symptom in the location in which it has been complained of by the patient, be it in the iliac fossa, the back, or the bowel. On occasion, pain may be elicited by manipulation of the cervix, although such pain does not appear among the symptoms of the case. In many instances the least pressure on the cervix causes severe pain—the type of case in which dyspareunia is apt to be a particularly distressing symptom. In not a few patients in whom nausea is a prominent clinical feature in the history I have, in addition, found a tendency to retch at once provoked by this procedure—an interesting demonstration of the widespread reflex nervous phenomena that may owe their origin to the genitalia. The nausea and vomiting which are common accompaniments of pelvic disease I have on repeated occasions found to be cured after treatment directed to this disease; this result I can recall more particularly as a sequel to operations for vaginal prolapse.

I have drawn attention to the risk of the abdominal pain of cervicitis being related in error to other abdominal or pelvic organs, with the attendant danger of the patient being subjected to futile operation. Here are three examples.

1. Mrs. A., aged 31, 3-para, was examined by a surgeon because of pain, tenderness, and muscle rigidity in the right iliac fossa. Appendicitis was suspected, but before operation the opinion of a gynaecologist was solicited because of a history of leucorrhoea and low abdominal dysmenorrhoea of some years' duration. On vaginal examination cervicitis was discovered with acute exacerbation of the iliac fossa pain on displacing the cervix to the left side. Treatment for cervicitis was instituted.

2. Mrs. B., aged 29, 1-para, in 1926 had an operation for appendicitis without relief of symptoms. In 1927 she had a fixation operation for retroflexion of the uterus, with removal of a cystic right ovary. The symptoms increased in severity, the pain involving the entire area of the lower abdomen and being associated

with marked leucorrhoea and bladder irritability. In 1929 cervicitis was recognized and treated, and this was followed by a disappearance of all the symptoms, except some persisting diurnal frequency.

3. Mrs. C., aged 25, 2-para, in 1928 had a plastic operation for vaginal prolapse and an abdominal operation (Gilliam) for replacement of a retroflexed uterus. The symptoms were relieved but the abdominal pain and the leucorrhoea persisted. In 1929 treatment was carried out for chronic infection of the cervix, with immediate cessation of the leucorrhoea and relief of the pain.

This pain reference from the diseased cervix can be demonstrated easily and conclusively in regard to the common iliac fossa or general low abdominal pain, and also in regard to pain in the sacro-coccygeal region and in the lower bowel. It raises interesting questions both in connexion with the innervation of the cervix and the adjacent tissues and in regard to the nerve channels by which the irritant impulses arising in these sites are registered on the body surface in regions remote from their point of origin.

In the present state of our knowledge it is impossible to formulate an accurate anatomical basis for the phenomena. We know that the vaginal cervix is insensitive to ordinary painful stimuli. It can, for example, be grasped with a sharp vulsellum forceps without pain being elicited. On the other hand, it would seem that the low back distribution of the pains of labour is, at least in part, to be explained by the stretching of the cervix during the labour process. In this connexion Dr. Edwin Robertson has recently shown, in a series of observations carried out at the Edinburgh Royal Maternity Hospital, that by stretching the partly dilated cervix with the finger hooked into the cervical canal pain is at once registered in the sacral area, but here alone. These observations provide some basis for the belief that the common sacral pain of cervicitis may be a reference from the cervix itself. In regard to the common low abdominal and iliac fossa pain there is no such evidence, and we must conclude that here we are dealing with stimuli arising in the nerve elements outside the cervix and owing their origin to the irritation spreading into the surrounding tissues from the cervix. That the inflammatory process is a dominating factor is proved by the clinical demonstration that, whereas traction on these structures is painless in health, in the presence of the infective changes they become sensitive to this manipulation.

The cervix, vagina, rectum, and the adjacent structures are known to be supplied by branches from the hypogastric ganglion which is formed by elements passing into the pelvis from the renal and mesenteric plexuses, and through which it is linked up with the dorsal and lumbar spinal nerves. It establishes in the pelvis a connexion with branches passing directly to the ganglion from the second, third, and fourth sacral nerves. In the light of these facts we may explain the somatic registering of the cervical and pericervical stimuli, the common iliac fossa pain, for example, owing its origin to the central connexion between the corresponding visceral sympathetic twigs and the eleventh and twelfth dorsal nerves. Similarly we may formulate an explanation of the high abdominal pain, nausea, etc., experienced by such patients, on the basis of the linking of the abdominal and the pelvic plexuses. Any attempts thus to account for all the phenomena, however, must in the meantime be tentative pending research in this subject, which constitutes an attractive field in which data still remain to be gathered.

Bladder and Bowel Symptoms.

Bladder symptoms are very common in cervicitis, taking the form of frequency and dysuria. In some cases there is definite evidence of infection of the urinary tract with bacilluria and pyuria, and in such cases it is possible to account for the trouble either by predicating a direct spread of the inflammatory process from the cervix to the adjacent bladder or on the basis of a blood stream infection. In many instances, however, the urine is free from any abnormal elements, and it may be that in such the condition is reflexly induced by sympathetic irritation.

Bowel symptoms are less common than bladder disturbances. Constipation is frequent, but this is so often encountered in women that it is impossible to recognize any relevant bearing. Pain on movement of the bowel, however, which is a not infrequent complaint, occupies a

different category, because here the relationship can be directly demonstrated by the bowel pain being accurately reproduced by traction on the cervix.

Menstrual Abnormalities.

Disturbances of the menstrual function, usually in the direction of excess or irregularity, are common, and, as we have seen, premenstrual and menstrual aggravation of the pain in abdomen or back is frequently complained of.

The factors underlying the menstrual excess and irregularity so characteristic of this as of other forms of pelvic infection are somewhat obscure. In the present state of our knowledge it would seem that the alteration in the uterine function is more easily to be explained on the basis of ovarian dysfunction than in terms of a purely uterine pathology. In the majority of such cases there is no obvious uterine disease except a varying degree of hyperplasia of the endometrium with proliferation and dilatation of the glands—changes, in other words, which are more probably dependent upon some ovarian aberration. This in its turn may arise in a variety of ways. It may, for example, be due to the general pelvic congestion which accompanies the primary cervical disease, or to an involvement of the ovary in an inflammatory spread from the cervix, or, in the third place, to influences reaching the ovary by way of the sympathetic.

The dependence of the normal ovarian rhythm upon the other endocrinal glands, especially the pituitary, must naturally raise the question as to how far such disturbances of this rhythm may spring from an involvement of the pituitary in a generalized toxæmia induced by the pelvic sepsis. Such a view draws a certain amount of support from the well-authenticated part played by focal sepsis elsewhere in the body in inducing menstrual abnormalities. On the other hand, the very special relationship known to exist between pelvic infection and menstrual excess, etc., tends to align the evidence in favour of a more local origin of the menstrual disturbances of cervicitis. In two cases of this series in which the patients complained of excessive menstrual loss, and in which panhysterectomy was performed, marked ovarian changes were found. In one a large blood cyst of the ovary, and in the other irregular ovulation, as revealed by persisting and cystic follicles, were found. In the latter case, in addition to a deep-seated cervicitis with the most marked development of Nabothian follicles that I have ever seen, there were marked hypertrophic changes in the uterine muscular and mucous walls. It should be stated that in neither case was there any evidence of inflammatory changes in the tubes and ovaries.

A survey of the pathology, taken in conjunction with the clinical features, and more especially the frequency with which treatment directed solely to the cervix is followed by a restoration of the menstrual process, has led me to the conclusion that we may formulate a satisfactory explanation of the phenomena as follows: (1) infection of the cervix, leading to (2) involvement of the ovaries (by sympathetic disturbances or in some other way), leading to (3) the uterine changes associated with menstrual excess. The establishment of such a view would naturally provide us with an explanation of many otherwise obscure uterine hæmorrhages and to at least a partial understanding of the so-called "bleeding uterus" or metropathia hæmorrhagica.

General Ill Health from Cervicitis: Rheumatism.

It is becoming increasingly appreciated that the cervix constitutes a not infrequent source of systemic disease, and it is probable that the improved general health and sense of well-being that many women experience after treatment is largely attributable to the eradication of a focal source of sepsis. In the same way are to be explained the improvement and sometimes the dramatic arrest of an active and progressive arthritis that may supervene on treatment of this condition. A series of about a dozen such cases which I have had under my care have convinced me that, where unsuccessful attempts to find focal trouble in the teeth, tonsils, nasal sinuses, and bowel have been carried out, the cervix should always be looked upon with suspicion, and any distress there be brought under prompt

control. I have referred to this matter in a communication recently published in this *Journal*,³ and in it I have cited instances of the speedy arrest of progressive articular disease by the ablation of such pelvic foci. Take the following examples which have recently been under my care.

1. A 2-para, aged 32, had joint rheumatism for about a year, with rheumatic fever three months before being seen. There had been leucorrhœa for some years, often with unpleasant odour, otherwise there was no pelvic discomfort. The tonsils had been removed. Various joints, especially the wrists, were swollen, pale, and tender, with restriction of movement, and getting worse. The general health was poor, with shivering and sweats at night; weight 7 st. 6 lb. The uterus was large and retroflexed. The cervix was infected, and manipulation evoked pain in the lower abdomen. Active treatment had to be delayed for ten days owing to fever, which on two days rose to 103° F. and was associated with acute exacerbation of the arthritis. Despite the fever, on October 31st, 1929, dilatation and cauterization of the cervix was carried out under avertin anaesthesia. Within four days the fever settled, the joint swelling and tenderness subsided, and she left the nursing home on the tenth day. On January 13th, 1930—that is, about two and a half months later—the general condition was markedly improved, and the weight was 8 st. 10 lb. The wrists and other joints were normal in appearance, and there was no pain except occasional twinges in the knees. There was no leucorrhœa, the cervix being clean, with no pain on manipulation.

2. A 3-para, aged 37, had suffered from chronic ill health since childbirth nine years previously. Of the last two years she had spent eighteen months in hospital for valvular heart disease and progressive rheumatoid arthritis, with marked deformity in wrists, elbows, ankles, and knees. Leucorrhœa was discovered on the last occasion in hospital. The cervix was found to be very septic, and was amputated. This was followed by rapid improvement in the condition of the joints and in general health.

Such cases teach us a very important lesson, and it is interesting to find experimental corroboration of these clinical results in the work of such investigators as Laura Moench,⁴ who, in Rosenow's laboratory at the Mayo Clinic, has produced arthritis in rabbits by the artificial injection of anaerobic streptococci cultured from the cervix of arthritic women.

TREATMENT OF CHRONIC CERVICITIS.

As chronic infection of the cervix is a frequent legacy from child-bearing the ideal time for its recognition and treatment is during the post-natal period—that is, before it has succeeded in producing the deep-seated structural changes and the train of local symptoms and general ill health which characterize so many of our cases. One of the strongest arguments in favour of a post-natal examination of every woman at the end of four or six weeks is the opportunity it gives for the detection of this lesion at an early and easily curable phase.

We have seen that the dominating feature of the lesion is its chronicity, and that this in its turn is dependent upon the peculiar structural arrangements in the cervix which tend to a locking up of the inflammatory discharges. This consideration gives the key to the treatment which must be directed to the opening up of the cervical canal and the establishment of tracks in the cervix along which the pent-up infection can drain freely away. For these reasons active surgical measures are essential. Experience has shown that vaginal douching and the application of caustic or antiseptic medicaments, which have often been employed in the past, succeed in effecting at the best nothing more than a superficial temporary cleansing of the vagina, whilst at the worst they not infrequently do harm by damaging the mucous membranes, and in this way aggravating the inflammatory processes already present. Among the other therapeutic measures diathermy, about which some workers have spoken highly, has in my hands proved unsatisfactory.

In cases where the cervix is greatly enlarged and deeply disorganized the best treatment may consist in amputation, although in some such cases, if the more palliative measures presently to be described fail, the better alternative is panhysterectomy. It is remarkable to find how completely a cervix that is extensively infected and enlarged, with perhaps deep lacerations and its entire substance riddled with Nabothian follicles, can recover as the result of measures directed solely to the establishment of free

drainage. In such cases, however, the treatment may require to extend over several months, and as this deliberateness of procedure is not often permissible in the hospital class of patient, in such amputation or hysterectomy may be the only possible initial alternative course to be adopted.

The routine treatment which I practise is as follows. The cervical canal is dilated to the full extent short of tearing of the tissues, and the mucosa and underlying structures of the cervical canal are seared longitudinally with the stout terminal of the electric cautery along its entire length from internal to external os and including at its lower end the "eroded" area on the vaginal surface. Three such strokes of the cautery on the posterior wall, followed by a similar number on the anterior wall, are usually sufficient. The cauterization is attended with some bleeding, and for this reason it is wise to commence behind. If there are any visible Nabothian follicles these are punctured individually and deeply. In every case it is wise to plunge the cautery deeply into the cervical tissue in one or two places, both in front and behind, and also within and outside the cervical canal.

The dilatation of the cervical canal is an important part of the procedure, since it is only in this way that free access for the cautery and the subsequent free escape of the discharges can be obtained. To allow of the dilatation an anaesthetic is necessary. Curettage is usually neither necessary nor advisable. Where there are deep lacerations with ectropion of the endocervix a repair operation should be carried out. In lacerations of a lesser degree this is not necessary, because after the longitudinal cauterization the internal tissues of the cervix tend to cicatrize and shorten in their long axis, with a consequent rolling in of the mucosa. In some cases the cauterization has to be repeated once or twice at monthly intervals. Healing of the wounds is fairly rapid and the patient is allowed to get out of bed in five or six days. There is usually little or no post-operative pain. On the other hand, where pain has been present before the operation, this often disappears rapidly with the subsidence of the cervical infection, and before the patient leaves the hospital or nursing home the pain elicited by manipulation of the cervix has frequently also disappeared.

AFTER-RESULTS.

For this investigation we have a consecutive series of hospital and private cases which have been brought under special study for this purpose during the year 1929. In attempting to assess the value of treatment it has been necessary to select for analysis out of the large number of patients with cervicitis under our care during this period those in whom this was the solitary lesion. This segregation is necessary because in many cases the cervicitis is merely one feature in the total disease picture, the symptom complex being built up of such conditions as retroflexion, vaginal prolapse, salpingitis, etc., in combination with cervicitis, and in which for purposes of accurate analysis it is often impossible to allocate the exact source of the individual subjective phenomena. At the same time I have included in my figures those cases in which, after operations for prolapse, retroflexion, appendicitis, etc., the persistence of symptoms has been considered to be due to the existence of an untreated cervical infection.

After these allowances we are left with a total of 86 successive cases. Of these, 69 were parous and 17 nulliparous women; of the latter, 9 were married and 8 single. The relatively high proportion of nulliparae in this list is doubtless to be explained by the exclusion, for reasons just stated, of a large number of cases in which cervicitis was combined with other lesions, such as displacements, whose incidence is highest in the married.

The results, as judged after an interval varying from two months to twelve months subsequent to the last treatment, are available in 75 out of the total of 86. To increase the accuracy of the findings the two most important symptoms—namely, leucorrhoea and pain, in regard to each of which precise data could be fairly expected—were segregated for purposes of special investigation. It so happens, however, that a large body of valuable evidence has been obtained in regard to some of the other symptom data—for example, the state of

the general health, the menstrual and bladder functions—although these cannot be set out with the same statistical precision.

Leucorrhoea.—In 74 cases positive information is available. In 1 there was no leucorrhoea to begin with. In 44 (60 per cent.) there was complete cure, and in 13 (18 per cent.) improvement in this symptom—that is, in 78 per cent. there was cure or improvement. In 16 (22 per cent.) there was no appreciable abatement, in 2 it was stated to be worse.

Pain.—In 75 patients in regard to whom we have information, 8 had no previous pain. There was complete cure of this symptom in 33 out of the remaining 67 (49 per cent.), whilst there was improvement in 21 (31 per cent.). The total cure or improvement percentage is therefore 80. In 13 (20 per cent.) the pain was unaffected by the operation, whilst in 2 it was stated to be worse.

Menstrual Function.—No special follow-up investigation has been directed to this subject. This is now recognized to have been somewhat unfortunate because the number (20) in regard to whom there is stated to have been a cure of menstrual irregularity or excess, usually both, is so large as to indicate a positive benefit in these respects from the operation. In 5 the condition is put down as unimproved, whilst in 1 there is stated to have been persisting haemorrhage with only short dry intervals since the operation four months previously.

Bladder Function.—Although no complete follow-up has been instituted in regard to this condition, in many cure or improvement of frequency or dysuria, or both, is recorded.

General Health.—Marked improvement in general health is the rule in those cases where the other symptoms show abatement. This expresses itself in an increased sense of general well-being, in a loss of such sensations as fatigue, faintness, nausea, etc. These results follow naturally from the cessation of pain and depleting vaginal discharges, to which the removal of a septic focus of toxæmia probably in part also contributes. I have already referred to the significance of this last factor being specially exemplified in those cases in which a progressive rheumatism exhibits a rapid abatement after treatment of the cervix. Two such cases in this series show this well. In one an acute articular rheumatism subsided rapidly after cauterization of the cervix, whilst in another a progressive rheumatoid condition showed signs of arrest after hysterectomy where cauterization had previously failed. This case is especially interesting because a cardiac lesion with commencing decompensation and an associated hypertension both improved markedly after the operation. After an interval of two months the blood pressure had decreased from 200/110 to 140/98, the previous shortness of breath and attacks of faintness and oedema of the ankles had disappeared, and there was a marked general gain in health.

It will be noted that "cure" in terms of leucorrhoea and pain was obtained in 50 to 60 per cent. of the cases. In this connexion it is important to point out that in the great majority of the cases (69 out of 75) the treatment did not extend beyond one application of the cautery, whilst experience shows that in many instances one or two repeat operations are required before the maximum benefit is obtained. This is well seen in the fact that out of 6 patients, who had such recauterization, 5 were "cured." Amongst the 40 to 50 per cent. "uncured" cases it may therefore safely be presumed that a considerable proportion are capable of being further benefited, and that this has not been accomplished is due to a variety of factors, the chief being, on the one hand, the recency of the cases, and, on the other, the failure of the patients to report at the clinic, and the fact of their condition being discovered only in response to a circular letter requesting them to attend for the purpose of this analysis.

In the series panhysterectomy was carried out on 5 occasions, in 3 by the abdominal and in 2 by the vaginal route. In 2 cases there was cure of the symptoms, in 1 there was marked improvement both locally and generally, whilst in 2 both leucorrhoea and pain persisted and the general health was not appreciably altered.

This question of the persistence of pain in the abdomen and pelvis after the removal of the apparent pelvic source of the trouble constitutes one of the most acute and at the same time most baffling concerns of the surgeon. In some cases it persists after the cervical disease has cleared up, and in such it can only be explained by a perpetuation of the irritation of the sympathetic fibres. In others—as in the two cases I have cited, in which the vaginal discharge and pain persisted after hysterectomy—it is

probably dependent upon a locking up of the sepsis in some of the cellular tissue planes of the pelvis. Cotte⁵ of Lyons has claimed to obtain marked relief of pelvic and abdominal pain in otherwise intractable cases from a division of the main trunks of the pelvic sympathetic where they lie in front of the fifth lumbar vertebra, and it may be that with the aid of this procedure we might bring help to some of the distressing cases I have cited. This sympathectomy as described by Cotte I have carried out in one case. It is simple and apparently has no untoward effects on function, and it is therefore specially worthy of consideration in those cases in which it has been decided in any event to open the abdomen—as, for example, for the performance of hysterectomy.

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TRAUMATIC AND OTHER AFFECTIONS OF THE KNEE-JOINT.*

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THE knee-joint is more frequently damaged than any other joint in the body. Let us first consider simple uncomplicated traumatic synovitis of the joint, without a lesion of any important named structure. Such synovitis results from simple strains, blows, and kicks on the knee. The synovial membrane and capsule are slightly damaged by a tear or bruise, the site being indicated, perhaps, by local tenderness and pain. A small amount of blood is effused into the joint, but this is soon mixed with an excess of synovial fluid. The history, carefully inquired into, reveals nothing suggestive of a cartilage or other lesion, while the radiogram is negative. Routine examination shows that the joint can be fully extended. It is as well, perhaps, to emphasize the fact that the treatment demanded by this simple type of case must also form a part of the treatment of all forms of traumatic synovitis. Injuries of special structures call for special methods of treatment, and sometimes for postponement of those to be now discussed, but sooner or later these must be adopted before the joint can be restored to its full function.

Every synovitis is associated with two complications—weakness and wasting of the muscles, particularly of the quadriceps group, and a tendency to the formation of adhesions if preventive measures are not adopted. The objects of treatment are three: to get rid of the excess of fluid in the joint, to restore the muscles to their normal condition, and to obtain full movement, including rotation. These objects are best served by commencing active treatment at the earliest possible moment—that is, within twenty-four hours in an average case. This treatment consists of firm elastic pressure about the knee, massage to the knee and thigh, and faradic treatment of the anterior thigh group of muscles. The last is gradually replaced by active exercises. The pressure is best obtained by covering the knee with a thick layer of wool and a firm bandage. A special pad of wool or felt should be placed over the damaged portion of the capsule or ligament. The massage must be skilfully performed, soothing and not painful, and therefore must be gentle to begin with. The faradic treatment has certain great advantages: it can be used at once when the muscles are still suffering from a functional paresis almost amounting to paralysis. It can be graduated so as to cause contraction of the various muscles without at first producing movements of the joint, and it can be applied to every muscle in the group so that none be allowed to shirk. The tensor fasciae femoris and the vastus internus should receive special attention. The importance of the muscles in maintaining the stability of the joint and keeping it free from excessive fluid must never be forgotten.

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This line of treatment I wish to emphasize particularly, because it is still far too common to meet with cases that have been treated by rest in bed for a month and the application of iodine. The former is unnecessary and the latter worse than useless, since the skin is rendered unfit for massage. After a month of this treatment the joint is often still distended with fluid, while the muscles are markedly wasted and will require prolonged treatment to restore them to their proper size and strength. As often as not the knee has been kept slightly flexed on a pillow, and full extension is impossible until the tissues at the back of the joint have been gradually stretched. Flexion due to this cause is distinguished from that due to mechanical obstruction by the fact that forcible passive extension causes pain at the back of the joint instead of the front. Rest is unnecessary in the milder cases, and even in the more severe walking can usually be indulged in after twenty-four to forty-eight hours. The amount of pain induced by walking should be our guide. We are not dealing now with gross rupture of ligaments. Active movements should be encouraged as soon as the patient can manage them. If walking be indulged in as early as possible, and electrical treatment carried out from the first, the muscles are never allowed to waste, and recovery is rapid. Golf and the more violent games which involve sudden twists and turns must not be allowed till the joint is free from fluid and the muscles are as large and as hard as those of the other leg. Rowing and cycling may be indulged in much earlier, and are useful and safe. Passive movements are hardly required if treatment is efficient from the first. In the nervous patient, and when active treatment has been delayed for any reason, they may be necessary. Gentle measures are usually better than violent.

The results of inefficient or injudicious treatment of a synovitis are chronic fluid, quadriceps insufficiency, adhesions, and occasional pain. The longer the knee remains distended with fluid the greater the laxity of the capsule and its supporting tendons, and the greater the difficulty in getting rid of this waterlogged condition of the joint. The fluid may have disappeared and yet the muscles be in poor condition. This wasting gives rise to a feeling of weakness, difficulty in negotiating stairs, especially descending, while there may be sufficient instability to give rise to symptoms which may easily be mistaken for cartilage trouble. Faradic treatment and exercises must be persevered with for weeks or even months before the muscles are completely restored to full vigour.

Adhesions should be avoided by restoration of full movement as early as possible. If present, however, and the injury be fairly recent, perseverance with physiotherapeutic treatment will probably cause them to yield, but if some few weeks or months have elapsed a manipulation under an anaesthetic will be necessary. Gas is unsuitable; ether is preferable, since absolute relaxation is necessary. What are the indications? Limitation of movement (not forgetting rotation), local pain when approaching the limits of motion, or both of these, and sometimes recurrent fluid. The longer the history the more reason for manipulating, and, if this fails, for exploring the joint. It is well known that a common site for local minor adhesions is the region of the internal lateral ligament, with limitation of flexion and local pain, and that manipulation in such cases is usually successful. In doubtful cases manipulation should be given a trial before resorting to operation. It is not very uncommon for a patient to complain of occasional pain, on certain days or after exercise, for months after an injured knee appears to have been completely restored to normal. Bruising of the articular ends of the bones is the probable explanation of this; in older patients osteo-arthritis will develop in the course of time.

Now let us consider some of the injuries to special structures which may complicate the synovitis. A fairly common injury is *strain of one lateral ligament*, usually the inner. The upper end of this ligament is damaged seven times as commonly as the lower. Local tenderness and pain on exerting a valgum strain on the knee, with or without some lateral instability, will be present. In the average case, seen shortly after the accident, it is worth while applying an outside splint to prevent the slightest