THE TREATMENT OF TUBERCULOUS DISEASE OF THE KIDNEY FROM THE STANDPOINT OF THE SURGEON.*

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THE remarks I have to make are based on over two hundred cases upon which, in recent years, I have performed the operation of nephrectomy for tuberculous disease. All of these cases were fully investigated before the operation was undertaken, and almost all of them were carefully followed up afterwards.

The diagnosis of tuberculous disease of the kidney is usually not difficult, granted the assumption, which I have never found wrong, that primary tuberculous disease of the bladder is virtually unknown. Of the two hundred cases treated, I do not know of one in which the diagnosis was not made accurately before treatment was undertaken.

The patient usually comes to you complaining of frequency of micturition and pain accompanying the act. Pus is found to be present in the urine, and it is of acid reaction. If on examining the cellular deposit no organisms are found in it, it is safe to assume that the infection is tuberculous, and that you have failed to detect the causal virus. The recognition of the tubercle bacillus in the urine voided in these cases is not essential to establish the diagnosis. It is no more necessary to do this in such a case than it is to find the tubercle bacillus when recognising tuberculous disease of the knee-joint, or tuberculous lymphatic glands in the neck.

On cystoscopic examination, in approximately 95 per cent. of all cases, the first feature noted was the diminished bladder capacity, which might vary from 250 to 20 c.c. The ureteral orifice on the side involved usually was altered in appearance. The earliest sign is when it is reddened, swollen, and congested, and appears like a local Von Pirquet's or Calmette's reaction. In the more advanced case, the golf-hole ureter of Hurry Fenwick is especially diagnostic of chronic tuberculous disease of the kidney on that side, with a thickening and contraction of the ureter. When tuberculous cystitis is present, it is usually

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more pronounced in the vicinity of the outflow channel from the diseased kidney, but this is by no means of constant occurrence. Not infrequently, particularly prior to the introduction of excretion urography as an aid to diagnosis, it was found impossible to demonstrate the ureter on the affected side. In many of these cases, although the kidney and ureter could not be examined, on clinical grounds they were assumed to be the site of tuberculous disease, and never once did this assumption prove wrong. The grounds of the diagnosis were the typical history such as I have given, the observation of tuberculous cystitis within the bladder, changes at the ureteral orifice such as I have described, and the recognition of tubercle bacilli in the fluid voided. It has all along been our practice to carry out bilateral ureteral catheterisation. As you are aware, this is a practice which is condemned by a number of experienced surgeons on the grounds that in doing it there is a risk of carrying infection into the renal pelvis of the healthy kidney. I am not aware of a single case where harm has resulted ; but it is undoubtedly true that the tubercle bacillus may be carried by a reverse peristaltic wave from the systolic bladder into the renal pelvis on the healthy side. This fact should be particularly borne in mind when examining the urine from the healthy side, as it is possible to identify tubercle bacilli in the urine obtained by ureteral catheterisation from the opposite kidney, and that organ to be free of any tuberculous infection, and the erroneous diagnosis of bilateral renal tuberculosis be made in consequence.

I would cite an illustrative case. In 1913, Dr Dickson of South Queensferry referred a patient to me. The history she gave suggested the presence of tuberculous disease of the left kidney. The fuller investigations carried out subsequently confirmed this diagnosis. Bilateral ureteral catheterisation was carried out, and on subsequent bacteriological examination tubercle bacilli were identified as also being present in the urine from the right kidney. On the grounds that bilateral renal tuberculosis existed, operative treatment was considered to be contra-indicated. In 1921 she again came under my care, suffering from definite tuberculous disease of the left kidney with a tuberculous perinephric abscess. As it was so important to determine the state of the other organ, this was first investigated and found to be healthy. In order to determine whether a focus of healed tubercle was present in the right

kidney, at the operative treatment subsequently carried out, it was first exposed and examined, and to the naked eye appeared perfectly healthy. The diseased organ was subsequently dealt with, and I am glad to say that the ultimate result of treatment was thoroughly satisfactory.

The manner in which this fallacy originates can be well realised when a cystoscopic examination is being carried out in such cases. The bladder that is being examined is inflamed, in systole, and extremely tender and irritable. It is distended with the maximum amount of fluid that it will comfortably contain. From the movement of the cystoscope, or from any other cause, violent systolic contraction of the bladder may be induced; and on more than one occasion when this has occurred, I have observed a minute flake of lymph, or similar particle, drawn into the ureteral orifice and disappear within the channel.

Before the operation for tuberculous disease of the kidney is carried out, it is of great importance to determine, as is the case before this operation is done for any disease, that another kidney exists and that this will be capable of carrying on renal function if the diseased organ is removed. Again the surgeon must bear in mind that in one individual out of every hundred a single functioning kidney alone exists. We have at present under our care a case of this nature, where the investigations revealed the presence of tuberculous disease of the left kidney, but the orifice of the right ureter could not be catheterised. Fortunately, we have now at our disposal the method of excretion urography to assist us in such cases; and when the patient was subsequently examined after the intravenous injection of uro-selectan B, no secretion was observed to come from the right side. Naturally, we have therefore refrained from any form of operative interference in this case.

I am convinced that, in the light of our present knowledge, the operation of nephrectomy for tuberculous disease of the kidney is warranted in a large number of cases. At the same time, I have always felt that from the surgeon who performed it an explanation is demanded of the reasons that have influenced him in carrying out so drastic a procedure. The brief explanation I give to the spectators who are witnessing my work on such an occasion is that tuberculous disease, when it occurs in the kidney, undergoes a similar process of natural healing as is met with in other parts of the body. Here, as

elsewhere, the infection is localised; the caseous debris that is formed is cast forth on to a free surface, and the cavity that results becomes fibrosed and slowly heals. Unfortunately, however, in the case of the kidney, the free surface on which the debris is discharged is the renal pelvis, and into it the tubercle bacilli are voided. These organisms are carried to another part of the kidney, re-enter the organ at the point where the expanded calyx grasps the base of the papilla, and develop there a similar cold abscess, which in its turn is again voided. This process of what I might call natural cure and reinfection proceeds until ultimately the organ is entirely destroyed and a so-called cure is effected by what is described as auto-nephrectomy. Unfortunately, however, during this time the ureter has become involved and the bladder implicated —tuberculous ureteritis set up and tuberculous cystitis developed —and the other kidney damaged. Frankly, I do not fear that it will become the site of a similar tuberculous infection, and my experience is that this is of rare occurrence; but what I do fear is the harm that results from the persistent vesical systole which produces backward pressure in the healthy kidney, the hydro-ureter and hydro-nephrosis which ultimately may have most serious consequences.

On the grounds, therefore, that a natural cure without complete destruction of the organ is impossible, I would recommend that the diseased organ be removed. I would recommend that it be removed early, before the ureter and bladder become extensively involved, especially with the object of protecting the healthy kidney from backward pressure and hydro-nephrosis.

You will observe that the reasoning I have advanced is based on the assumption that a natural cure of renal tuberculosis does not take place without complete destruction of the organ. I hold this belief strongly, not only on clinical grounds, but from the observations I have made in the Pathological Department. We are all familiar with the characteristic appearance of a healed tuberculous focus, as it is observed in the lung; and a similar healed focus is not infrequently observed in the neck and in the abdomen. Never at any time have I observed a healed tuberculous focus in a healthy kidney. I have asked many of my friends who are pathologists if they have observed this and none has done so. You will remember the excellent work carried out by Dr Tod and how in it he

mentions four cases where at first he thought he observed this change, but on re-investigating them he found that the tuberculous infection was still active. I therefore still await to have demonstrated to me a healed tuberculous scar in a healthy kidney.

In the majority of cases the operative treatment was carried out under general anæsthesia induced by inhalation. In a few cases it was done under twilight sleep induced by nembutol and spinal anæsthesia, and in all of these this proved most satisfactory and probably will be more widely adopted by us in the future.

The kidney was excised and along with it the ureter down to the pelvic brim. In a few cases the entire ureter, down to its insertion into the bladder, has been removed along with the kidney, and here again the treatment has proved most satisfactory.

The immediate mortality attending the operation was 2 per cent., but when cases are followed up over the course of years the ultimate mortality is found to be 6 per cent. The cause of this increase has been found to be due to three factors: the first being the persistence of the original infection and a gradual decline of the patient; the second, the onset of an acute generalised tuberculosis; and the third, renal insufficiency of the remaining kidney developing some years after the operation.

When the causes of this mortality are reviewed, certain lessons are learned from them. As regards the immediate mortality, it is very important to bear in mind that post-operative meteorism, which is met with so frequently when an operation on the alimentary canal is carried out, occurs as frequently and occasionally with even greater severity when a kidney is excised, and probably the explanation of this is the influence on the sympathetic nerve supply of a resection carried out in the retro-peritoneal tissue. In one patient who had marked kyphosis from old-standing tuberculous disease of the spine, not only was the original operation rendered more difficult owing to the costal margin almost having come in contact with the iliac crest, but the subsequent post-operative meteorism, occurring within the abdominal cavity, was consequently much more severe.

Those cases where the later mortality was put down to persistence of the original infection raise a point that I

consider of very great importance when nephrectomy for tuberculous disease is performed. The actual operation may be an important part of the treatment, but, in my opinion, of equal importance is the post-operative care the patient receives. Before the operation is undertaken, it is always my practice to inform the patient and the relatives that a two years' subsequent convalescence will be required. In many of the cases it was possible for this to be carried out in a sanatorium with excellent results; but, not infrequently, when the circumstances have permitted, it has been carried out in the patient's own home with excellent results. I think of one case, for example, where a delicate young girl suffering from this ailment came under my care. She was a patient of Dr Mallace of North Berwick and, on her return home, her parents fitted up for her in their beautiful garden an out-door shelter where she spent the day and night in surroundings that were as ideal as could be possibly imagined, with a result that could not have been better in any respect.

The most tragic cases have been those where we have heard later that the patient, who had left hospital apparently in a satisfactory state, giving promise of a satisfactory convalescence, had later been admitted to a sanatorium and had died there of acute and generalised tuberculous infection. These cases have taught us a two-fold lesson. The first is that not only is the post-operative care of vital importance, but in many cases pre-operative preparation in a sanatorium or elsewhere is indicated. Latterly, in certain cases where the infection has been acute and the patient's resistance low, we have postponed operation for several weeks, and by the courtesy of our colleagues in charge of sanatoriums, the patients have been prepared for operation with, I am sure, great benefit to them. The other lesson concerns a point in the operative technique, namely, the most careful handling of the infected organ, so that the tuberculous infection is not squeezed from this sponge sodden with the juices of tubercle and forced into the circulation during its manipulation. As early as possible the pedicle is defined and the blood vessels ligatured to prevent dissemination by the blood stream.

Renal insufficiency in the remaining kidney as an ultimate cause of death after nephrectomy for tuberculous disease is a most important problem and one that I have not noted mentioned elsewhere. We have observed it in two cases, and

in two others damage has been produced which we fear will be ultimately fatal. It has occurred in two classes of cases. The first class is where long-standing infection of the bladder had been present and the persistent systole of that organ had led to dilatation of the ureter and the renal pelvis on the healthy side, with atrophy of the renal parenchyma and impairment of renal function in consequence. In one such case, at the original examination the bladder capacity was found to amount to only 15 c.c. His convalescence was tedious but ultimately satisfactory, and a normal bladder capacity was obtained; but four years after the operation he came again under my care suffering from renal insufficiency and ultimately he died from this cause, the tuberculous infection of the urinary tract apparently having been recovered from.

The other class of case is even more tragic as the nature of the infection, the youth of the patient, and the apparent good powers of recovery lead one to anticipate that a speedy and successful convalescence will result; but as months go on and their reports are received—and these in most respects are satisfactory in that the wound has healed well, the scar is painless, sound and strong, the patient's general health appears to be good, and within the bladder the tuberculous ulceration has diminished—the bladder capacity still remains in the neighbourhood of 75 c.c. and consequent frequency of micturition is present. It is this and its influence on the patient's social activities that are the chief causes of complaint. As time goes on, the degree of dilatation of the ureter and renal pelvis is observed to increase, until ultimately it may reach an extreme degree and an alarming situation arises. Evidences of renal impairment are now evident in the general effect upon the patient and in the high blood urea reading recorded, and the problem presented is one of extreme difficulty. We have sought its solution in various directions: by drainage of the pelvis over a lengthened period, by drainage of the ureter, and by partial denervation of the bladder through excision of the presacral nerve—the idea in the last being that we would thus partially desensitise the organ, reduce its irritability, and incidentally produce beneficial hyperæmia. We had also hoped that by it we would relax the spasm at the lower end of the ureter. The results of this treatment have been to a certain extent encouraging, but their ultimate value cannot yet be estimated. The transplanting of the ureter into the colon

has even been considered—a practice that has been carried out by Coffey; but in those cases I have mentioned the degree of dilatation of the ureter has rendered this anatomically impossible, if otherwise it had been advisable.

May I briefly tell you the history of such a case. About seven years ago there came under my care a plucky shop girl suffering from tuberculous disease of the kidney. The ureter and bladder were involved but not to an extreme degree, and the immediate result of the operation carried out appeared satisfactory in every way. She belonged to Edinburgh and reported regularly, and all appeared to be well, but for the frequency of micturition that persisted and the diminished bladder capacity that still remained. The infection had been originally a mixed infection, and at later examinations strepto-cocci were found in the urine but no tubercle bacilli. The original pyelogram showed a normal ureter and pelvis on the healthy side. Ultimately she married and, after being carefully observed in an Ante-natal Department, a successful confinement took place and she is now the mother of a healthy little girl. Despite the handicap she suffered from, she carried on in a cheerful manner that was an example to everyone. Dilatation of ureter and pelvis are now evident. About a year and a half ago another complication arose when a vesico-vaginal fistula developed spontaneously from the erosion of a small ulcer on the bladder floor. Frequency of micturition was now replaced by total incontinence, and on urograms being obtained by excretion urography the pelvis and ureter were now seen to be dilated to an extreme degree. In her case the treatment referred to was carried out with apparently a certain degree of benefit.

The question therefore arises that if this is a real danger, how is it to be prevented; and the problem is raised in a patient we have at present under our care. Nephrectomy was done. The convalescence was satisfactory. Seven months' post-operative convalescence led to marked improvement, and he returned to his occupation as a postman in a country town. Recently he has relapsed; the frequency has returned, hæmaturia has reappeared, and he has an occasional attack of threatened retention of urine from clots impacted in the urethra. Cysto-scopic examination showed a diminished bladder capacity, and active tuberculous disease has reappeared in the bladder. Fortunately the remaining kidney is healthy and no hydro-

nephrosis or hydro-ureter is present. We feel convinced that in his case there is a grave risk of hydronephrosis ultimately supervening; and if it does, what course should we follow? The first question to answer is how has the infection again got lit up. Has it come from the stump of the ureter that was left at the original operation? The cystoscopic appearance did not suggest this contention but did not disprove it, and the possibility of this, although we never have previously found it to be the case, has been pointed out by Sir John Thomson Walker. If it is correct, should we operate again and remove this portion of ureter? On the other hand, would it be preferable to obtain for him careful sanatorium treatment over a lengthened period? Would this of itself be sufficient to arrest the process of ulceration in the bladder, or should we endeavour at this early stage to relax the vesical systole by vesical denervation, or even would it be justifiable to transplant the ureter into the colon? So grave is the problem that we feel that this last suggestion deserves mature consideration. When we have gained greater experience in this department of surgery, we may advocate its practice more strongly than we do at present.

[Since addressing the Meeting, the above case has been operated on under twilight sleep and spinal anæsthesia. The stump of the ureter was exposed by extra-peritoneal dissection. It was examined to determine whether it was the source from which the bladder had been re-infected by acute tuberculous disease. The stump of the ureter was found to be small, shrivelled, fibrosed, and healthy, and it was therefore not removed. As a source of re-infection it was thus excluded, and the conclusion was come to that this re-infection had been due to a lowering in his general health. His case was considered as further confirmatory evidence of the importance of prolonged and careful after-treatment during the patient's convalescence.]

In conclusion, I feel justified in putting to myself this question: From the experience you have gained over a considerable number of years in dealing with cases of tuberculosis of the urinary tract, as a surgeon, what lessons have you learned, what impression remains as to the value of radical operative treatment in these cases? If I may attempt without bias, which perhaps is hardly possible, to express the opinion I have formed, it is that in the light of our present knowledge the removal of a kidney, the site of tuberculous disease, is warranted and is justified. At the same time, I believe the surgeon who

does this must ever bear in mind that he is providing an important part of the treatment of the case, but at the same time, what I may describe as the medical aspect is of vital importance and should even predominate. The ideal I should like to see achieved would be co-operation between the physician, the surgeon, and the pathologist. As my experience increases, I realise more and more the value of the pre-operative preparation; and just as the recognition of this point has had so beneficial results in the treatment of diseases of the thyroid gland, similarly a patient with active tuberculosis of the kidney may not be able to be cured of this disease by medical treatment. But the physician, by his care and treatment, may render it possible for the surgeon to effect this where alone his interference would have been much more harmful than helpful. Of the lessons I have learned from the immediate surgical standpoint I have spoken.

I should like again to speak of the importance of the post-operative care. Almost every week I see a case in the post-operative stage. The record they bring is one that gives great satisfaction. They come from the various sanatoriums and Homes that fortunately are now available for the treatment of these cases. Looking the picture of health, cheerful, happy, well-nourished, and contented, their one complaint is that they are not allowed to return to full active life at once. By honest means and subterfuge we are keeping them from going back to live in the crowded tenement and to work from 8 A.M. until 6 P.M. beside the printing press or power loom. More and more we speak to them in terms of years, and they are each being reminded of the original promise of the necessary two years' convalescence; and, briefly, we are finding that the more thorough and the more prolonged the post-operative treatment is, the more complete and more perfect the cure that is resulting. I have spoken of that case where, in ignorance, we allowed the uncured patient back to duty too soon, and where the silent damage of the systolic bladder continued until finally grave harm has resulted. The surgical point of view of the treatment of tuberculosis of the urinary tract is therefore that the operative treatment is but a milestone to be passed in a long and weary journey, which if followed correctly to its end will lead to health and happiness, but if deviated from may lead to disaster.