I

SOME OF THE MORE REMOTE COMPLICATIONS OF GONORRHŒA *

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MR. PRESIDENT, LADIES AND GENTLEMEN,—

It was with a feeling of responsibility and some trepidation that I accepted your secretary's invitation to give an address before the Society at its Oxford meeting: of responsibility because I am aware of the standard both of the papers and discussions that form part of the Society's public business; of trepidation because it is difficult for one who is not by rights a specialist to be able to interest those who are, and therefore I hope you will accept my remarks as from one who, though mainly a physician, has been interested for some years in venereal disease in its widest aspects.

It is true to say that the formation of public clinics for the treatment of venereal disease has had some influence in creating a new outlook on disease in general in this country. Whereas in the past physicians and surgeons in dealing with patients suffering from chronic ailments have frequently been satisfied in labelling them as having diseases of special organs, we now want to know what the ætiology is, for given that, we may have in our weapons of special therapy a means certainly of relief, if not of cure.

When we were provided with the powerful weapon of salvarsan in the treatment of syphilis and almost at the same time with a test—the Wassermann test—for the less obvious cases of syphilis, it was an advance in treatment for those who could use them rightly, and I confess to have been so impressed with the possibilities that I fell into the error of looking upon many difficult cases as possibly syphilitic unless proved otherwise.

This search for bacteriological causes of chronic conditions has fostered very considerably the study of venereal disease. It is this outlook that has enabled a proportion

* Read at the Annual Meeting of the Society for the Study of Venereal Diseases, Oxford, July 14th, 1928.

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of cases of diabetes, for instance, to be established as due to syphilitic pancreatitis, and it has been the means of identifying that large class of cases of aortic regurgitation in men of early middle life, formerly regarded as arteriosclerotic, now known to be, with very few exceptions, syphilitic.

The ætiological attitude now essential in the modern treatment of disease has been guided largely by men trained in venereal clinics, and this contribution to good practice in its inception and success must be put down to the Ministry of Health and the Government which introduced this scheme in 1917.

The penetration of this attitude has altered for good all departments of medicine and surgery, and my contribution to-day is to describe some of the complications of gonorrhœa as they are seen by the physician. I propose to omit all consideration of joint affections because this subject has recently been discussed in this Society.

CARDIAC COMPLICATIONS

The most recent and complete account of gonococcal endocarditis is the article by W. S. Thayer.¹ Out of a total of 327 cases of acute endocarditis twenty-three, or 11·3 per cent., were due to the gonococcus. The age incidence was from nine to forty-two years. There is no clear indication as to the period during which the infection attacks the heart valves. The onset of endocarditis is sudden, marked by high fever and rigors; there are periods with absence of fever. The patients are acutely ill, and there is marked increasing anæmia with a polymorph leucocytosis. In 31 per cent. of Thayer's cases there was arthritis. The clinical picture is that of a grave septicæmia with evidence of embolism. Its clinical group is that of the ulcerative type of malignant endocarditis; and, as in others of that group, the cardiac signs may be missed unless carefully sought for. The average duration of life in Thayer's cases was 9·7 weeks, varying from three weeks to eight months. All were fatal.

The lesions are found most frequently on the aortic valves, sometimes on the pulmonary valves, sometimes also on the aortic wall itself. The fibrinous exudations are large, crumbly, white or yellow vegetations. Unlike the subacute infective type of endocarditis the gonococcus

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usually attacks previously undamaged valves. Nephritis is a frequent complication.

These cases would appear to be both clinically and pathologically somewhat of the nature of a curiosity. For myself, though interested in hearts for many years, I have never yet seen a case.

LESIONS OF THE SKIN

A small number of cases of gonorrhœa with infections of the blood stream show lesions of the skin. Like the nodules in rheumatism, they might be found more often if they were carefully looked for.

The typical keratoderma blenorrhagica, though rare, is sufficiently distinctive not to be forgotten if once seen. One such case I saw several times with Dr. Graham Jones. A man of forty-five, who had lived freely, and had suffered from gonorrhœa, but not recently, began to suffer from pains in his heels, which got worse and spread to ankles and knees. He had to retire to bed, where he had a low continuous and intermittent fever. Swelling with effusion occurred in both ankles, the right knee and the left elbow. After five or six weeks he began to show skin lesions of various types :—

(1) In the moist parts between the toes there was a granulomatous warty condition with raised-up edges upon which were fine amber-like scabs. From these lesions there was a very unpleasant smell.

(2) In the groins there was a condition indistinguishable in its general aspect from tinea intertrigo, but of a dull bluish red tint with desquamation. No spores of tinea were found in this desquamation.

(3) In relation to both these lesions were others of two types : (*a*) small (2–3 mm.) rupial conical yellow scabs on a small dull red base with some loss of tissue. These were numerous over the left knee, where a fomentation had brought them out ; and (*b*) near the groins were lesions looking like an aggravated tinea cutis, having a depressed dry surface with slightly raised spreading edges.

The sigma reaction was negative, and he did not improve as quickly as he should have done under treatment by salvarsan had the lesions been syphilitic. At a later period a minute papular rash occurred on the chest

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and arms ; some of these ultimately became vesicular and dried up after showing a yellow top. A few petechiæ were also at one time noticed.

Though gonococci were not identified in the urethral secretion, I have little doubt but that this case was one of keratoderma blenorrhagica. The interest of it lies in the variety of skin lesions.

Landouzy classified the various skin lesions in gonorrhœa as macular, papular, vesicular, scarlatiniform, and erythematous, including erythema multiforme. There is obviously nothing distinctive about the lesion of gonorrhœa as it attacks the skin except the keratoderma, but the presence of a non-suppurative lesion of any one of the above types might be a help in the clinical diagnosis of gonorrhœal rheumatism or arthritis. I saw during the war a married lady with fever of obscure origin, rheumatic pains and a large patch of erythema near the right elbow ; she subsequently required operation for salpingitis, and it was found that her husband, who was serving in France, had acquired the disease previous to his last leave.

I have somewhere seen it stated that urticaria is also a type of lesion seen in gonorrhœa ; this lesion, with rheumatic or arthritic symptoms, is fairly common in the early stage of rheumatic fever ; but since this disease occurs at an age when gonorrhœa is unlikely, the distinction ought not to be difficult.

Here I may mention that on several occasions recently I have had under my care cases of young girls who in the early stage of rheumatic fever have shown a vaginal discharge. There has never been any difficulty in distinguishing this from gonorrhœa, because a smear under the microscope shows catarrhal cells and no pus cells. A few days in hospital usually sees it disappear. It never persists and never requires treatment.

RENAL COMPLICATIONS

Cases of renal infection following gonorrhœa would appear to be rare. Albuminuria was found by B. Lewis ² to be present in 23·3 per cent. of 424 cases of gonorrhœa. Of these 14·8 per cent. had orchitis.

Simmonds,³ investigating the recorded cases of gonococcal infection of the kidneys, could find only

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twenty-four cases of proved infection. Only fifteen of these, including Simmonds's own case, were proved bacteriologically to be due to a pure infection by gonococcus. Sixteen out of twenty-four cases occurred in males. The earliest symptoms occurred in one case ten days after the onset of the urethritis. In another case it occurred nine years after the initial infection.

R. L. Dourmashkin and H. Cohen⁴ in 1923 were only able to identify twenty cases in which the gonococcus was the sole cause of the disease. They report a case of their own in which there was pyonephrosis due to a ureteral stricture in which cure was effected by renal lavage.

These figures of the rarity of renal complications contrast strongly with those of Pereira,⁵ who asserts that 50 per cent. of his cases of acute gonorrhœa had an infection of the renal pelvis. This can hardly be accepted, however, because the author relies for diagnosis on pain from deep para-umbilical pressure.

G. Murchison⁶ in 1876 described two cases of acute gonorrhœal pyelitis in fatal cases of gonorrhœa. In the first case, a male aged twenty-eight, both ureters were full of thick pus; both kidneys were in a state of acute nephritis; the pelves of both were full of pus. The kidneys were much enlarged, the outer surfaces smooth and of a deep purple, almost black, hue, and a quantity of dark blood dripped from their cut surfaces. In the second case, a female aged twenty-five, the kidneys were identical.

Bransford and Lewis⁷ describe a fatal case of gonorrhœal pyelonephritis in which there were abscesses of the kidneys the size of walnuts. The infection had reached the kidney along the ureter.

Mr. Frank Kidd⁸ refers to three cases of chronic pyelitis. In two of four cases there was recurrent hæmorrhage, endangering life. In another case, described in detail, the grave symptom was again profuse hæmorrhage, which required cystotomy and excision of the left kidney. The infection which had been present in the pelves of both kidneys continued to cause hæmorrhage from the remaining kidney.

Professor Turnbull's report on the left kidney was that the whole inner surface of the pelvis was thick and nodular. The medullary pyramids were all honey-combed by spaces varying in size from a pin-point to a

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current; these spaces contained red blood and small brownish yellow calculi. This was the result of a chronic subacute purulent infection of the urinary tract, and in the pelvis and ureter was associated with the formation of cysts. There was one small cyst in the lower pole of the kidney, and numerous collecting tubules were dilated so as to form large cysts in the medullary pyramids. The nature of the infection was established by the growth of the gonococcus from the opposite kidney.

In a case I observed post mortem, a woman of thirty-nine with chronic purulent salpingitis, non-tubercular, both kidneys had become hydronephrotic with dilated and thickened left ureter. The right ureter was occluded. The peritonitic adhesions had produced an obstruction of the small intestine, a faecal ulceration and a pyonephrosis on both sides.

The following case of extensive amyloid disease following gonorrhœa must be extremely rare. I allude to it because while in hospital the patient had the symptoms of uræmia, never fully explained till the post-mortem:—

I. M., male aged twenty-eight, had been invalided during the war for malaria and blackwater fever, but had recovered except for occasional attacks of malaria. In 1923 he suffered from an attack of gonorrhœa. Despite treatment by irrigation, his joints became affected four months later, first the left ankle, then the left knee, and later the shoulders, wrists and thumb joints. From that time till his admission into hospital, in September, 1927, the rheumatism had been more or less persistent though treatment had continued. He had been in bed for nine months. For three weeks previous to admission he had suffered from attacks of unconsciousness without incontinence or biting of his tongue. He complained of slight occasional headaches. There was no discharge from the urethra, no frequency of, or pain on micturition.

He was pale and ill. There was stiffness and pain of the cervical spine, shoulder joints and elbows. The first metacarpo-phalangeal joints of both hands were swollen, painful and limited as to movement. There was limitation of movement of both hips, swelling, pain and limitation of movement of both knee joints and ankle joints. The legs were slightly œdematous. There was no enlargement or abnormality of the heart, and the blood pressure was 103/70.

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There was tenderness to palpation in the left loin over the renal area. The spleen was palpable. There was no urethral discharge. The left epididymis was tender and enlarged. The prostate was enlarged, soft and spongy, but symmetrical. There was no scarring of the penis. The secretion after prostatic massage contained no pus cells or gonococci. The urine, sp. gr. 1020, contained albumin, but no sugar or blood, and nothing abnormal in the deposit. The blood showed a slight secondary anæmia. The blood urea was 39 mgm. per 100 c.c. The optic discs were normal.

The patient was treated first for his gonorrhœal rheumatism by vaccines and laxatives, but got no better, though his urine showed less albumin.

The subsequent history was that the patient developed fits of the uræmic type, cellular casts appeared in the urine, the blood urea rose to 58 mgm. per 100 c.c., and he died four months after entering hospital without any clear reason for the development of uræmia.

The post-mortem showed a cyst of the left epididymis, a fibrosed prostate, pus in the right vesicula seminalis and advanced amyloid disease affecting liver, spleen, kidneys and suprarenals. Both kidneys gave the naked eye appearance of chronic tubular nephritis, and the pelvis were normal.

Here was a case therefore of an unhealed gonorrhœa in the right vesicula seminalis giving rise to amyloid disease unsuspected during life, for no definite lesion beyond those in the joints could be found. There were a few gram-negative intracellular cocci in the prostate.

NEURITIS

Batub in 1901 described sciatica of gonorrhœal origin. Mr. Frank Kidd in 1917⁹ referred to the fact that a large number of cases of sciatica, lumbago and chronic rheumatism have their origin in a gonococcal infection of the prostate or seminal vesicles. It is not sufficient, as he says, to find no secretion from the anterior urethra: the prostate and vesicles must be examined digitally and their secretions examined for organisms. In this way, if the case prove to be of this nature, a more rapid cure can be effected than if the sciatica, lumbago or rheumatism is treated by other methods. Fournier found that the early

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gonorrhœal form was more common in the second and third months after infection.

In 1924 I saw an otherwise healthy man whose history was that he had had a severe attack of left-sided sciatica in 1914, for which he was treated by various electrical methods without benefit. He was then put to bed with absolute rest for six weeks, after which he was able to pay a visit to an English spa. After about a year he was well enough to be accepted for the army. In 1917, having been through the Somme campaign, he had another attack of sciatica. He recovered again, more quickly, after a course of diathermy and went again to France, where he was able to carry on in the trenches.

Two months previous to seeing me he had been on a walking tour and after a long day had slept in a cold bed. This brought on an attack of lumbago, which confined him to his bed for three days. The doctor who attended him found oxalates in the urine and made the diagnosis of gout. He recovered quickly, and a further long walk caused the stiffness to disappear. A day or two after this he had a return of sciatica, as bad as before, and he was in bed for seven weeks. The attack subsided, with waves of recrudescence.

His reason for consulting me was to see if anything could be done to give him relief from the uncertainty he suffered of not knowing when he might be going to have an attack of sciatica or lumbago.

He was healthy in all his systems except that on examination per rectum the left lobe of the prostate was enlarged upwards and tender. This lobe was not so well defined as the right. Massage of the prostate produced mucoid fluid containing spermatids, no pus cells, but abundant streptococci. The urine, which contained no albumin or sugar, also contained streptococci.

On inquiry into the previous history he stated that twenty-four years previously, fourteen years previous to the first attack of sciatica, he had had a moderately severe attack of gonorrhœa. It is probable that during that attack there was a prostatitis which had healed, leaving a scar or alteration in texture of the organ. This allowed of an invasion by a secondary organism, just as might happen after damage to organs elsewhere.

Another case of this category was that of a soldier in hospital for lumbago which no amount of treatment ever

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seemed to cure, and he had been sent into hospital several times from his unit for the same complaint. I was asked to see him to determine whether he was a purely functional case. There was nothing on physical examination except slight tenderness of the lumbar and gluteal muscles. All the reflexes were natural. There was no discharge from the penis, and nothing definite could be ascertained per rectum.

A lumbar puncture gave clear fluid under increased pressure which deposited gram-negative cocci whose species could not be identified. There were no cells. The patient had not suffered at any time from meningitis, nor had he, so far as he knew, been exposed to cerebrospinal fever. The prostate was then massaged, and the fluid obtained gave pus cells with typical gonococci. In relation to this observation, there is a statement of de Long, which I have not yet verified, that the cerebrospinal fluid of a young man with gonorrhœa under his care contained gonococci.

C. H. B., a male aged fifty-four, had rheumatism in the left lumbar region after sawing some wood, and at the end of six weeks' treatment it still prevented him from playing games. Five years previously he had had a similar attack. He had slight arthritis of the third left metatarso-phalangeal joint and the second right metatarso-phalangeal joint. The finger joints were slightly thickened. There was no lesion in any other organ, including the nervous system.

The prostate was thickened and tender on the right side, but nothing could be obtained on massage. He had had gonorrhœa twenty-one years ago. The Wassermann reaction was negative (sigma 0.67 unit).

To most men in practice these cases of unhealed lesions of the prostate are not rare. Such lesions may be present in men who pay no attention to a slight discharge, or even slight discomfort, so long as it does not throw them off their work or their games; on the other hand, it is clear from these cases that they give rise to rheumatic or neuritic disorders recurrent and difficult to treat effectively. I am convinced on such cases as I have observed that, though they are mainly gonorrhœal in origin, they are not always gonorrhœal when we see them several years after the initial attack.

I have seen from time to time a man who had syphilis

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and gonorrhœa during the war. The syphilis has been healed, so far as we can ascertain, but he complains of a gleet—a slight turbid or yellow discharge in the mornings, worse at some times than at others, and worse especially if he rides on horseback, which, being a keen follower to hounds, he frequently does. The more plentiful discharge makes him feel seedy, and he constantly seeks treatment to give him complete relief. He has a tender right lobe of the prostate, which by massage can be emptied of its contents, and when so is less tender. I once found Gram-negative cocci in the secretion which I took to be gonococci. Colonel Harrison, who also saw this patient, doubted whether these cocci were gonococci and thought they were probably streptococci. A course of prostatic massage gives him some relief, and the infection disappears in the secretion, as also do the larger number of pus cells, but the gleet remains, together with the tendency to exacerbations.

I would make the suggestion that neither officers of V.D. clinics nor urological surgeons have properly tackled these cases. The prostate is scarred. Some of the acini have been destroyed, and, implicated in fibrous tissue, cannot collapse. Their secretion is retained over-long, and there may be actual obstruction to its discharge.

The prostate under conditions of a severe posterior urethritis suffers similarly to the lung when, after a severe attack of lobar pneumonia, some of the alveoli break down and form a patch of bronchiectasis. Many patients with so-called bronchitis date the onset of the disorder to an attack of pneumonia. Morbid anatomy would put these chronic sequelæ of the lungs down to damage, a scarring or more commonly a localised bronchiectasis. Lipoidol injections are now able to detect these anatomical disturbances during life. When far-reaching in their effects there are various surgical measures that can be done: artificial pneumothorax phrenic avulsion, resection of ribs and so on.

Without being too certain of my facts in regard to the prostate—for I am here indulging in that somewhat reprehensible exercise in pathology of arguing from analogy, or shall we say arm-chair pathology?—is not the condition of the prostate, so far as subsequent disease is concerned, somewhat like the lung? Now we can see post mortem some lungs scarred and even bronchiectatic

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which have given rise to no pulmonary disorder. Most scarred lungs, however, give rise to winter cough; others with various grades of bronchiectasis have the ordinary symptoms of that disease. So we have the prostate following gonorrhœal posterior urethritis in some cases scarred and healed, in others scarred but liable to occasional bouts of infection, brought to it sometimes by the blood stream, sometimes by the urethra; others again in a condition of chronic inflammation never healed, always with symptoms, sometimes slight, sometimes marked.

I think that the pathology of the prostate following gonorrhœal infection will probably be found to be nearly what I have stated. How then have the clinics and specialists tackled the problem? By prostatic massage, excellent as a temporary measure for emptying the acini, by irrigations of the posterior urethra, and by the passage of bougies. Such measures cannot do more than relieve for the time, but may do more permanent good if persisted in. My impression, however, is that such cases relapse again and again. I suggest that treatment, to be effective, must be more radical. Excision with an infected and scarred prostate might be both difficult and dangerous, but the surgeon dissects out a septic tonsil if it be quiescent with great benefit to the patient's general health; so why not the prostate?

But the prostate may be the seat of a local purulent infection from causes other than gonorrhœa. The so-called pyelitis of the kidney may at any time be complicated by an attack of prostatitis. I have recently had to deal with a case of a man, aged fifty-one, who had suffered from bacilluria since the war. Death took place from lobar pneumonia, and at the post-mortem the prostate was the seat of a chronic prostatitis in which a coliform organism was present in the acini. The kidneys showed nothing except a few cysts and nothing that could have given rise to a bacilluria, which in this case could only have been kept up by the prostatic lesion.

As a complication in the later septic stages of enlargement of the prostate septic conditions of the prostate and testis are not rare.

Sequeira in his text-book describes a case of herpes associated with a chronic prostatitis. Herpes, according to this author, is also found in those addicted to sexual excess. It is possible that an infection may be at the

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bottom of it, though this is not certain. I occasionally see a man, now thirty-two, who five years ago, after exposure to venereal infection, suffered from recurrent herpes of the penis. He was thoroughly investigated both for syphilis and gonorrhœa, but no infection was determined. He subsequently suffered from a short attack of gonorrhœa and recovered completely. I have recently had an opportunity of examining him again. He still has attacks of herpes; the prostatic secretion is normal, and the prostate is not thickened. He has recently married, and his wife has had no ill-health.

IRIDOCYCLITIS

J. R. S., a male aged forty-six, was first seen in 1916, after he had had four attacks of iritis, the earliest of which had occurred nine years previously. He had suffered from an attack of gonorrhœa fourteen years previously, when he had had severe gonorrhœal rheumatism and had been seen by the late Dr. Mitchell Bruce. *Gonococcus* was still present in the prostatic secretion, which was discharged if he strained at stool. He was sent to me by Mr. Philip Adams to know if anything could be done to avoid a recurrence of the iritis, which was apt to occur in the colder months of the year. No progress had been made by prostatic massage and treatment by diathermy. I proposed to him that he should be given a short course of gonococcal vaccine in the autumn as a routine procedure to protect him during his danger period. He agreed to this, and they have been continued with omissions since.

From 1916 he has had altogether eight courses of injections, usually of three injections each course, and during these twelve years he has had two attacks of iritis, an average of one every six years, which is much better than his average of one every two years before the injections. There has been no reaction with the maximum dose of 300 millions of gonococci for the final dose, and in future I think he might be given a still higher dose with benefit.

I have examined him carefully after a recent course of vaccine. He has a thickened and tender left lobe of the prostate, and after prostatic massage the secretion is normal to the naked eye and contains an occasional pus cell. There are also a few intracellular Gram-negative

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cocci, not identifiable as gonococci, but probably of that species. If this opinion is correct he has harboured the infection for twenty-six years.

Brieger¹⁰ reported nine cases of this type of recurrent iritis. In two of these the original attack of iritis occurred sixteen or seventeen years previously. E. R. Chambers¹¹ also reported cases four, five, nine, ten, thirteen and sixteen years previously with gonococci in the urethral secretion.

A former president of this Society, Colonel Harrison, in making observations on these two papers in the *Medical Annual*, ventures to doubt the persistence of the gonorrhœal infection in all these cases for such periods. He suggests with some probability that Gram-negative cocci are difficult to distinguish from gonococci in these situations, and in this I thoroughly agree.

These cases belong to the group that used to be called rheumatic iridocyclitis. Though iritis due to gonorrhœal infection is divided into various types—plastic, exudative or hæmorrhagic—my colleague Mr. Philip Adams tells me it is impossible from local ocular evidence to decide whether the lesion is gonococcal, streptococcal or due to some other organism. Whatever the infection, the problem is that of dealing properly with the local infection, and is exactly the same as that of sciatica I have mentioned before. It is that of obtaining proper healing of the prostate.

CENTRAL NERVOUS SYSTEM COMPLICATIONS

Gonococcal meningitis is an extremely rare but interesting complication of gonorrhœa, and though I had during the war to see a large number of cases of meningitis, mainly meningococcal, I never once saw one of this ætiology. Lindenfeld in 1922 in a careful examination of the literature was able to find seventeen cases of undoubted infection of the nervous system. Of these nine were meningitis or meningo-myelitis, and eight were myelitis. Of the nine cases of meningitis four were fatal. A number of cases of meningitis in soldiers with co-existent gonorrhœa have been reported in which the meningitis was due to the meningococcus. The liability of young soldiers to both diseases was borne in upon us in the war. It is not therefore enough to find a urethritis

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and Gram-negative cocci in the cerebrospinal fluid or even a purulent meningitis post mortem. The cocci must show their typical cultural features.

The clinical features of this type of meningitis are indistinguishable from those of other acute purulent meningitis, though, if we distinguish the fulminating pneumococcal meningitis from the meningococcal type, the gonococcal is more like the latter, but without the petechial skin complications. Erythemata, however, have been described.

A large number of cases of myelitis in the course of an attack of gonorrhœa have been described. Cases described by neurologists such as Charcot and Gowers must be accepted as proven even though there was no elimination of syphilis by a Wassermann test. Charcot drew attention to the frequency of spinal affection with arthritis, and thought there was some inherent connection between the two. The immediate cause of the myelitis is probably embolic. Recovery is seldom complete.

The following case comes under this category: P. K., a male aged twenty-five, was admitted to the Radcliffe Infirmary with a history of having lost power in his legs. He woke up one morning feeling well, but with a sensation of heaviness in the legs, which became worse as the day wore on. There was no pain. The weakness increased until in three days after the onset he could not walk at all, and he lost control of his sphincters. Beyond a slight dull ache in the small of the back on the third day of the illness there was no discomfort.

On examination he had the signs of transverse myelitis with impairment of heat and cold sensation to the middle of the thighs, but no impairment of tactile sensation. There was no zone of hyperæsthesia. The lumbar puncture gave fluid not under pressure; there were 650 cells per cubic millimetre, 94 per cent. of which were lymphocytes. The patient was in hospital for ten weeks and gradually improved, regaining power over his limbs and sphincters.

The history was that several weeks previously the patient had suffered from an attack of gonorrhœa which had cleared up. There was no sign of urethritis during his stay in hospital. There was a doubt at the time whether this was not a case of syphilitic myelitis, as there was a doubtful Wassermann reaction. But there was no

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history of any syphilitic infection, and though he was and has been treated with salvarsan, on no subsequent occasion has his sigma reaction been positive. There may be some doubt as to the exact ætiology in his case. The sequence, however, of the myelitis to the attack of gonorrhœa followed by no other manifestation of disease during a period of three or four years, during which he has been watched, inclines me to think that his original myelitis was of gonorrhœal origin.

T. R. Glynn, in 1902, described two cases of general peripheral neuritis in males of forty-eight and seventeen years respectively. The first case had had gonorrhœa at twenty-eight and one month previous to admission. He had noticed some days previously a weakness in walking, a difficulty in raising his feet, a feebleness in his knees and some tingling in his feet. A few days later the arms and trunk were involved, and he took to his bed. The urethral discharge, which had been profuse, almost ceased. He was perfectly helpless, but did not complain of pain. There was partial double ptosis; swallowing and speech were unaffected. All the deep and superficial reflexes were absent. The heart was normal. The tongue was furred and the bowels confined. On admission they had not acted for five days.

The patient at night was restless and delirious and complained of thirst. His symptoms during the subsequent days became very exaggerated. The respirations became entirely abdominal. The paralysis of the left arm became worse and the ptosis absolute. Urine and fæces were voided involuntarily. Gonococci were present in the urethral discharge, but a blood culture was negative.

Five days after admission he became rational and complained of a "flannelly" feeling in his hands as well as pins and needles. There was much loss of sensibility. After a month improvement in the limbs was noticed, and in eight weeks the ptosis had disappeared and the movement of the eyes was normal. He left hospital perfectly recovered after four months.

For those who are interested in the nervous complications I would recommend the review by E. O'Connor in the *Quarterly Journal of Medicine* for October, 1921, which is a mine of information on this subject. There he refers to cases of temporary diplopia and hemiplegic embolism with Jacksonian epilepsy. He describes a case

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- which had been observed in Mr. McDonagh's clinic of a man with recurrent attacks of paralysis from which he recovered in the intervals.

Optic neuritis is another rare complication, and finally there is a whole literature of the mental symptoms associated with gonorrhœal attacks, some of which are avowedly psychical and others from definite brain changes.

I do not wish you to look upon these remarks as a collection of isolated facts dealing with clinical conditions of considerable rarity. I hope you will receive them as an attempt to give a wide survey of what might be termed the penumbra of gonorrhœa. I suggest that none of the aspects of the subject I have touched upon are out of the way if it is realised that any of us in active practice of our profession may meet with examples.

The importance of a proper realisation of these remote consequences of gonorrhœa is that they are all due to metastases from the main focus. They are set up by living cocci, disseminated from the focus in the genital organs. I think we can put on one side the hypothesis of toxins. Therefore treatment must be directed first to the genital organs, and if the cause can be eradicated or lessened there the chances of cure are much greater than if the local disorder alone is treated.

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