IV

THE ÆTIOLOGY, DIAGNOSIS AND TREATMENT OF CHRONIC PROSTATITIS AND SEMINAL VESICULITIS*

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In this thesis 125 cases of prostatitis and seminal vesiculitis will be studied in the light of modern views on the ætiology, pathology and diagnosis of these conditions. The results of various lines of treatment as tested by a uniform method of examination will be compared, and conclusions will be arrived at.

ÆTIOLOGY AND BACTERIOLOGY

INFLAMMATION of the prostate gland was formerly regarded merely as a complication of gonorrhœa, likely to prolong the course of the disease, incapacitate the patient for some time, and occasionally give rise to abscess formation. Extension of the infection to the seminal vesicles was only briefly referred to in articles on gonorrhœa as a rarity, and little was known about the special symptoms to which it might give rise. Although it was known that a urethral discharge might be kept up by a secondary infection with pyogenic organisms long after the gonococci had died out, Professor H. H. Young's work,¹ which appeared in 1906, was the first study of chronic prostatitis in which attention was drawn to the existence of a non-gonorrhœal form of chronic prostatitis, and to the fact that a chronic inflammation due to pyogenic organisms might continue long after the subsidence of a gonorrhœal attack. Young, in a study of 358 cases, found that gonorrhœa was the ætiological factor in 73 per cent. of the cases only, masturbation and coitus interruptus accounted for 9.5 per cent., direct non-specific infection and metastases for about 2.5 per cent., whilst in 15 per cent. no cause could be traced. Young found that whereas 62 of his 358 cases suffered only from slight urethral discharge or persistent shreds in the urine,

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BRITISH JOURNAL OF VENEREAL DISEASES

296 complained of various other symptoms, which he classified into (a) sexual, (b) urinary, and (c) referred. He pointed out that the nerve supply of the prostate is derived from the tenth, eleventh and twelfth dorsal, fifth lumbar, and first, second and third sacral segments, and that the extent of the peripheral sensory supply of these segments accounts for the wide area of reference of the pain in disease of the gland and especially for the simulation of sciatica and lumbago, which so frequently leads to mistakes in diagnosis. He also noted that in 143 cases the seminal vesicles were shown to be involved by the presence of nodules or areas of induration in or around these organs, and that in ten of these cases there occurred attacks of renal pain with blood and pus in the urine, though examination of the kidneys by X-rays and ureteric catheterisation gave negative results. That the presence or absence of a urethral discharge is of little clinical importance in the diagnosis was shown by the fact that in 162 cases no evidence of urethritis was present, although in some of these it appeared later during the course of treatment.

This admirable work of Young's was the foundation on which the modern conception of the importance of prostatitis and seminal vesiculitis as a focal infection has been built up. The work of Belfield ² & ³ has added considerably to our knowledge by drawing attention to the importance of infection of the seminal vesicles and by the introduction of the method of treatment by vasotomy and injection of antiseptic solutions into the vesicles.

Of recent years numerous papers have appeared, the majority by American workers, confirming and extending Young's and Belfield's work. Hitchens and Brown ⁴ reported that in cultures from 113 cases of chronic prostatitis they found gonococci only five times, *Staphylococcus aureus* eleven times, other staphylococci thirty-four times, streptococci twenty-seven times, and diphtheroids thirty-four times. White and Gradwohl ⁵ found gonococci in 80 per cent. of 1,000 cases of seminal vesiculitis, in 60 per cent. of which they were in pure culture, but they do not state the clinical stages in which these cases were; presumably the majority were subacute cases, as the bacteriological findings were confirmed by positive complement-fixation reactions. Nogues ⁶ claimed that gonococci can always be discovered in chronic persisting

CHRONIC PROSTATITIS

infections, but, on the other hand, Player, Lee, Brown and Mathé,⁷ in 118 cases of chronic prostatitis, found 57 sterile *Bacillus coli* in 24, *Staphylococcus albus* in two, streptococci pure or with other organisms in 16, and gonococci in none. G. G. Smith⁸ studied 40 cases of prostatitis with no histories of gonorrhœa, and concluded that mumps, influenza, hard riding, alcoholic and sexual excesses were the causative factors in some of the cases; in others no cause could be traced. In three of his cases there was epididymitis, in one iritis, and in one arthritis, which would point to the vesicles also being infected in those cases. D. E. Shea⁹ quotes seven cases of arthritis, with no histories of gonorrhœa in which the same organism was found in teeth or tonsils as in the vesicles, and cure was not effected until the vesicles were treated. Baker¹⁰ found that 15 per cent. to 20 per cent. of cases of prostatitis were of non-venereal origin and gonococci were never found, *Staphylococcus aureus*, *albus*, *Streptococcus viridans* and *Bacillus coli* being the organisms recovered, each in about 25 per cent. of the cases. Young,¹¹ using a very careful technique, found 30 of 100 cases of chronic prostatitis sterile on culture, and only recovered the gonococcus on one occasion; staphylococcus alone was the predominant organism in the milder cases, whilst *Bacillus coli* was found more frequently in the severe cases. Von Lackum, of the Mayo Clinic,¹² in 405 cases of chronic prostates-vesiculitis, found 35.25 per cent. sterile on culture, streptococci (mostly *viridans*) in 35.75 per cent., staphylococci (usually *albus*) in 22.25 per cent., gonococci in none. Pugh¹³ reports similar results in 500 cases, 37 per cent. sterile, staphylococci in 22 per cent., and *Bacillus coli* in 34 per cent., gonococci in none. The probable explanation of the divergent results obtained by different workers is, as pointed out by Keyes¹⁴ in reviewing the results of earlier workers on the bacteriology of urethritis, that the bacteria normally present in the healthy anterior urethra are activated during the subsidence of an acute attack of gonorrhœa, travel backward and replace the gonococci, which can persist two or three years in the prostate and vesicles, but ordinarily die out much sooner. Notthafft's figures¹⁵ are very striking in this connection; 120 cases of chronic prostatitis showed five cases of pure gonococcal infection, all of less than eighteen months' duration, gonococci in mixed infection

BRITISH JOURNAL OF VENEREAL DISEASES

in 60 per cent. of the cases of less than eighteen months' standing, in 18 per cent. of cases of eighteen to twenty-four months, in 6 per cent. of those of twenty-four to thirty-six months, and not at all after the third year. It must be added, however, that the identification of gonococci is based on examination of smears only in this series.

The general trend of recent work has been to emphasise the importance of other organisms than the gonococcus in the pathogeny of the disease. Increasing attention has been directed to the group of cases in which gonorrhœa appears to play no part in the ætiology, and von Lackum¹² has found the same strain of streptococci in periapical dental abscesses, in tonsils, and in the prostate in the same individual, and has succeeded in demonstrating a prostatic localisation by animal inoculation of material from these cases. He has also established the existence of a streptococcal arthritis of prostatic origin by culture and inoculation into rabbits in three cases with histories of gonorrhœa six, ten and twenty-five years previously, and cites a case where the true nature of a typhoid-like pyrexia, which had lasted for six weeks, was only revealed when the occurrence of a transient pyuria led to a urological investigation and the discovery of a prostatovesiculitis, treatment of which brought about a rapid cure; whether this patient had had gonorrhœa is not noted.

Important as these results are, it nevertheless remains true that gonorrhœa is *the* ætiological factor, and the following quotations from the most recent text-book on urology, with which the present writer is in entire agreement as the result of personal experience, put the position very clearly ¹⁶ :—

“ In the vast majority of cases gonorrhœa in the male is an entity consisting of infection of the anterior and posterior urethra, together with some involvement of the prostate and vesicles.”

“ Gonorrhœa is very often a mixed infection from the start. The organisms normally present in the first 2 inches of the urethra become activated, and, with the extension backward of the gonococcus, these normally present non-specific organisms travel with it.”

CHRONIC PROSTATITIS

“The chronic infection in the deeper structures and the urethra may give place to the secondary organisms, which are practically always associated in chronic gonorrhœa, and the discharge continues, a chronic prostatic-vesiculitis usually catarrhal and a chronic anterior urethritis may be the sequelæ, and it may be difficult to determine when the gonococcal infection has been eliminated and when the purely catarrhal and non-gonorrhœal infection alone is present. The particular predilection of the gonococci for the seminal vesicles, which is the most frequent source of chronicity, brings these structures to the front in the attack on chronic gonorrhœa.”

PATHOLOGY

Infection may reach the prostate gland by three routes:—

(1) Extension from the prostatic urethra, the most frequent route. The gonococcus is the primary cause in the great majority of cases, though secondary infection may supervene later. A local implantation may take place during urethral instrumentation, the infection may be ascending from the anterior urethra or descending from the passage of infected urine in cases of pyelonephritis, cystitis, etc.

(2) Hæmatogenous, *i.e.*, metastatic from other foci in the body or during the course of certain systemic infections, such as influenza or enteric fever. Bugbee¹⁷ reports four cases of prostatic abscess following influenza, in one of which the *Bacillus influenzae* was recovered, and staphylococci in two. Two of these cases gave histories of gonorrhœa many years before.

(3) Lymphogenous by extension from adjacent structures, especially the rectum, the *Bacillus coli* naturally predominating in these cases. The fascia of Dénouvilliers constitutes a barrier against spread of infection from the rectum, and this route is rare.

Three grades of inflammation are described (Keyes¹⁴) which, though they shade imperceptibly into each other, yet form a basis for classification which is more in accord with clinical experience than the old division into glandular and parenchymatous. They are:—

(1) *Catarrhal*.—Here the process is superficial, in-

BRITISH JOURNAL OF VENEREAL DISEASES

volving the ducts but not the acini, and the stroma is not infiltrated. These are mild cases, in which no change can be detected on digital examination, but the prostatic secretion shows the presence of pus cells on microscopical examination.

(2) *Follicular*.—The acini are distended with pus, and the stroma is infiltrated. In these cases the prostate is tense in the acute stages, and as the congestion passes off, areas of induration become palpable, due to inflamed, suppurating or neurotic groups of acini enclosed by infiltrated stroma.

(3) *Parenchymatous*.—The follicular involvement is more intense and there is more interstitial inflammation, frequently resulting in abscess.

Microscopically there is round-cell infiltration around the ducts continuous with that in the submucosa of the urethra, and in the acini desquamation of epithelium and plugs of polymorphonuclear leucocytes. In the later stages the infiltration in the stroma may be entirely mononuclear with numerous plasma cells and eosinophils, as in chronic inflammations in other tissues (Young¹¹). Healing takes place with fibrous tissue formation and distortion of the gland, which may lead to contraction of the vesical orifice or the formation of a localised fibrous bar in the median portion of the prostate (Young¹⁸). Abscess formation may be localised, may rupture into the urethra or bladder, or may go on to periprostatic infiltration, which may track in various directions.

The severer grades of prostatic inflammation usually involve the ejaculatory ducts, vasa deferentia, seminal vesicles and occasionally the epididymis. More or less pronounced inflammatory changes are generally present in and about the verumontanum and utricle. The trigone of the bladder is usually involved with some changes around the vesical neck, accounting for the urinary symptoms, which are so frequent, and occasionally a generalised cystitis develops. Starting from the prostate, infection may spread by the lymphatics or blood vessels to the kidney and other organs, resulting in general toxæmia, arthritis, neuritis, myositis, myocarditis or other manifestations of focal infection (Young¹⁸). The ampulla of the vas deferens, though anatomically distinct from the seminal vesicle, is usually involved in infections of the latter structure. Gonorrhœa is the most common

CHRONIC PROSTATITIS

ætiological factor, but infection of the posterior urethra secondary to a chronic cystitis is also a frequent cause of vesiculitis and accounts for the occurrence of epididymitis following operations for hypertrophy of the prostate. The infection usually involves the entire wall of the vesicle and extends to the sheath and surrounding tissues, resulting in a perivesiculitis. In acute seminal vesiculitis the associated congestion and œdema of the prostate and bladder neck may give rise to considerable pain and difficulty in urination, in some cases leading to partial or complete urinary retention. Owing to the intimate relation of the ureter and seminal vesicle, obstruction of the former by inflammatory exudate or involvement in scar tissue may occur, giving rise to a train of renal symptoms (Herbst and Thompson¹⁹). The seminal vesicle, with its sacculation and tortuous folds, presents on cross-section the appearance of a multi-locular cyst, and offers an ideal site for the persistence of an infective process for a long time. The wall is composed of smooth muscle, lined by one or two layers of columnar epithelium devoid of glandular structures. In the milder degrees of infection the mucosa is only slightly damaged, and the vesicle contains muco-pus; in the more severe degrees of involvement the wall of the vesicle is thickened and fibrosed, its capacity is reduced, and some of the sacculations may be walled off by scar formation, forming blind sacs containing pus. Distortion of the ejaculatory duct by scar formation may interfere with drainage of the vesicle, or may even go on to complete occlusion. Owing to these anatomical peculiarities the seminal vesicle is more commonly the focus of infection in metastatic gonorrhœa than the prostate.

THE PRESENT SERIES OF CASES

A series of 125 cases of prostatitis abstracted from the records of cases treated personally in private practice will be studied from various points of view, and the results of different lines of treatment as tested by a uniform method of examination will be compared.

DIAGNOSIS

The diagnostic technique employed in this series of cases was as follows :—

- (1) A detailed history was first taken, with special

BRITISH JOURNAL OF VENEREAL DISEASES

reference to previous attacks of gonorrhœa and to the presence of any evidences of incomplete cure such as gleet, excess of meatal moisture, or urinary shreds subsequently. Any urinary symptoms such as frequency, especially if nocturnal, burning or urgency were inquired into, and it was ascertained whether such symptoms were present during previous attacks of gonorrhœa, though reliable evidence on this point was usually difficult to obtain. The nature and duration of the treatment given was noted, particularly whether the prostate had been massaged. Inquiry was made as to sensations of weight and fullness in the perineum and rectum, referred pains, and, in the case of married men, into the sexual history, wife's health, and dates of birth of children or miscarriages. In the case of unmarried men, it was not usual to inquire about sexual matters, unless the patient complained of symptoms, as it was feared that the suggestion thereby conveyed might have harmful results. The clinical picture of a typical case is almost diagnostic of chronic prostato-vesiculitis, and one or more of the following are generally present—a slight watery discharge from the meatus, pains in the back, in the testicles and down the legs, a sense of fullness in the perineum, frequency of urination with slight burning and weakened sexual power with premature ejaculations.

(2) A careful external examination was then made, noting the presence and character of any meatal discharge, the presence of any periurethral infiltrates and thickenings or nodules in the cords, epididymes or testicles.

(3) A film of the meatal discharge was then made. If no discharge was present the platinum loop was passed $\frac{1}{2}$ inch into the urethra and a film was made of any mucus present. The film was stained by Gram's method and examined.

(4) The urine was passed into two glasses and note taken of the presence of haze or shreds, floating or sinking, in either glass. If no meatal films had been obtained, some of the shreds were fished out and spread into films for staining.

(5) A rectal examination was then made and the prostate and vesicles palpated, noting any tenderness, tension, enlargement or induration. In cases where any acute inflammation was present the examination was

CHRONIC PROSTATITIS

concluded at this point, but in chronic cases first the prostate and then the vesicles were massaged and their secretions caught on slides at the meatus. The drops of secretion were spread out into films and stained by methylene blue and by Gram's stain. If no secretion appeared at the meatus after massage, the patient voided the last portions of urine, which he had been directed to retain, into a third glass, and films were made from the deposit. In cases where a culture was required it was taken from this material, the glans penis having been previously cleansed and the specimen being voided into a sterile tube.

(6) A *bougie à boule* of the largest size which the meatus would admit was then passed to the compressor urethræ to make sure that no stricture was present.

(7) Later a urethroscopic examination was made. Lesions of the anterior urethra are often found co-existent with chronic prostatico-vasculitis, but they are kept up by the constant passage over them of infected urine and discharges from the inflammatory conditions further back. They usually clear up during the course of treatment for the prostatitis, but special treatment is always required for strictures and occasionally for other conditions, so that the routine use of the urethroscope is advisable in all cases, as no patient should be passed as cured until he has been thus examined.

(8) The stained films of the prostatic and vesicular secretions, usually mixed, but sometimes on separate films, were then examined. A preliminary survey under a low power was made, and that portion of the slide which showed the greatest number of cells was selected for examination. Using a $\frac{1}{2}$ -inch oil immersion objective and a No. 4 compensating ocular (Magnification X500), about twenty or thirty fields were examined, the number of polymorphonuclear leucocytes present was totalled, and the average per field was calculated. A note was made of the presence of plugs of pus cells and of mononuclear cells, but they were not included in the total. The result was recorded, and at regular intervals during the course of treatment a similar estimate was made and recorded, so that the results furnish a check on the progress of the case.

The above method of checking and recording progress was suggested by the writer in a paper published in

BRITISH JOURNAL OF VENEREAL DISEASES

1923.²⁰ It was first tried as a means of testing cure in cases of acute gonorrhœa, to avoid the waste of time involved in the usual method of suspending treatment, using a provocative injection or instillation, testing and then resuming treatment if the test was not satisfactory. It was found that 84 per cent. of eighty-eight cases of acute posterior urethritis could be brought to a state in which the prostatic films showed two pus cells or less per field of the $\frac{1}{2}$ -inch obj. by three to four months' treatment, and that they were then cured; no amount of provocation could bring about a relapse, no further treatment was necessary, and they remained cured. None of these cases were known to have relapsed afterwards, and in many cases the results were verified by re-examination at intervals.

Since then the writer has tested this method on cases of chronic infection and has found it as reliable as a test of cure as in the acute cases. Bacteriological examinations are not easily arranged in private practice, nor are they very informative in these cases, as will be evident from the summary of the findings of several reliable workers given above. Various organisms may be isolated, but what means have we of judging of their virulence in the particular case? Herrold,²¹ who worked on this question in twenty-six cases of chronic prostatovesiculitis, goes no further than to say that some bacteria predominated in cultures at intervals and were more often positive in agglutination and virulence tests; also that autogenous vaccines of agglutinable strains of streptococcus viridans, staphylococcus aureus and *S. albus* gave good results in five cases. It is not the presence of an organism which is of importance, but the reactions of the host to its presence. If the organism is active, the host will react by the formation locally of an inflammatory exudate, the character of which will depend upon the nature and virulence of the organism. Opinions still differ as to how many pus cells per high-power field should normally be present in the prostatic secretion, but as in the course of routine examinations one comes across many cases where the prostatic secretion consists only of lecithin bodies with not more than one polymorphonuclear leucocyte per field, and as one finds that by persistent treatment one can get most infected cases down to this figure and that they remain unchanged

CHRONIC PROSTATITIS

when re-examined, it would appear justifiable to regard this as the normal. Any noteworthy departure from this standard means that there is an inflammatory reaction and that some abnormal agent is at work. Plugs of leucocytes come from the ducts of the glands and should be absent at the end of treatment ; free pus cells may come from glands or from the associated posterior urethritis, and treatment should be continued until they do not exceed one or two per field in the films of the secretion. Mononuclear cells often appear in very chronic inflammations and in the healing stage. The presence of epithelial cells in any number is usually an indication that the treatment is too irritating to the urethral mucosa. The secretion of the seminal vesicles is a thick mucus entangling spermatozoa and normally contains no pus cells.

A possible source of error is the failure to express pus from a deep-seated collection in the prostate or from a seminal vesicle whose outlet is occluded. The results of the first few massages must therefore be accepted with caution, as the film counts may deteriorate as drainage is established. Many relapses are undoubtedly due to an undrained vesicle being overlooked.

CLASSIFICATION

The series of 125 cases has been divided for study into the following seven groups :—

- 1. Acute cases of gonorrhœa in which there was no clinical evidence of infection of the posterior urethra 8
- 2. Acute cases of gonorrhœa in which there was obvious involvement of the posterior urethra 12
- 3. Subacute cases of gonorrhœa with no cessation of the discharge, although the acute symptoms were subsiding 19
- 4. Cases of chronic prostatitis with antecedent gonorrhœa in which involvement of the vesicles could not be demonstrated 21
- 5. Cases of chronic prostates-vesiculitis with antecedent gonorrhœa 53
- 6. Cases of prostatitis with an antecedent urethral infection of doubtful character 9
- 7. Cases of prostatitis with no history of any urethral infection 3

BRITISH JOURNAL OF VENEREAL DISEASES

GROUP I.—*Acute Cases of Gonorrhœa in which there was no Clinical Evidence of Involvement of the Posterior Urethra*

Of the eight cases five were first infections, two were fresh infections in cases under treatment for a chronic condition, and one had had four previous attacks. Gonococci were present in the discharge in all eight cases. None of these cases had any symptoms suggesting involvement of the posterior urethra, and throughout the treatment the second glass of urine remained clear. The cases were first seen from two to seven days from the onset, gonococci disappeared from the films after two weeks in three cases and after one month in five cases, the discharge lasted from two weeks to two months. No relationship was apparent between the date of commencement of treatment and the duration of the discharge. The usual treatment was two intramuscular injections of manganese butyrate to stimulate the antibody formation, followed by a course of stock gonorrhœal vaccine or detoxicated vaccine. Local treatment was administered to the anterior urethra only. Urethro-vesical irrigations were employed later in one case in which a secondary infection appeared in the discharge, and from the start in two cases in which the treatment of chronic infections was unfinished when the fresh infection occurred.

As soon as the discharge ceased and the urine cleared the prostate was massaged and the films counted. In no case could any change be detected in the gland by rectal palpation, but the results of the microscopical examinations were as follows :—

(a) In five cases of first infection with no secondary infection the films showed one to three pus cells per field. Three to four prostatic massages were given, which resulted in reduction of the count to one pus cell per field or less. Average duration of treatment two and a half months.

(b) In one case in which a secondary infection developed the films showed three to four pus cells per field, eight prostatic massages were required to reduce the count to one to two pus cells per field, and the duration of the treatment was four and a half months. This result was checked three and seven months later and was found to be

CHRONIC PROSTATITIS

unchanged. The patient subsequently married and reported that all was well.

(c) In two cases in which the treatment of chronic prostatic infections was unfinished when reinfection occurred, the films showed five to ten pus cells per field in one case and over fifteen per field in the other. Both these cases required five months of treatment, in the first the final count was one pus cell per field, which was checked five months later and found to have improved, after which the patient was allowed to marry without untoward results; in the other the final count was six per field when the treatment had to be discontinued. Some months later this patient wrote that he was quite well, but no opportunity for re-examination occurred.

The point which I wish to make is that in every one of these cases a mild catarrhal prostatitis developed which, though it gave no clinical evidence of its presence, was nevertheless a potential source of future trouble, but yielded readily to appropriate treatment.

GROUP II.—*Acute Cases of Gonorrhœa in which there was obvious Involvement of the Posterior Urethra*

Of the twelve cases in this group six were first seen as cases of anterior urethritis at the second to sixth days of the disease. Three of these cases were treated by vaccines and local anterior irrigations or injections only, and developed posterior infections with very mild symptoms in the second and third weeks; three were treated by detoxicated vaccines and urethro-vesical irrigations, and these developed marked posterior symptoms in the second to fifth weeks. There was no apparent relation between the mildness of the symptoms and the period of treatment necessary to attain a satisfactory standard of cure. Six cases had already developed posterior urethritis when first seen, but the total period of treatment necessary was the same as in the former group, except in one case which was not seen until the sixth week.

Five cases were first infections, six were second, and one a fourth infection, but the period of treatment necessary was not affected by this fact.

Urethro-vesical irrigations were used in all cases, gonococci, which were present in all cases, disappeared

BRITISH JOURNAL OF VENEREAL DISEASES

after four weeks' treatment and the discharge ceased on the average after four and a half weeks. Secondary organisms appeared in the discharge in one case only. Prostatic massage was started as soon as the urine cleared, on the average at four and a half weeks, and in four cases it caused a relapse of the discharge, in three cases with reappearance of gonococci. In only two cases was the prostate enlarged or indurated, but the vesicles were palpable in four cases. No cell count was made at the commencement of prostatic treatment, as only gentle prostatic massage could be employed for fear of precipitating an acute prostatitis. Gonococci were seen twice, and secondary organisms once in the prostatic films; in other cases no organisms were seen. In the cases in which the vesicles were not palpable the average period of treatment necessary to attain the usual standard of cure was just under four months, whilst in those in which the vesicles became palpable it averaged seven months. It is stated that in acute gonorrhœa the vesicles may be atonic and distended without being diseased, but the fact that these cases took three months longer to cure than the others is difficult to explain unless they were involved.

In two cases the treatment was not finished, but cultures were made elsewhere after three months' and one month's further treatment respectively with satisfactory results, only secondary organisms being reported present.

Two cases were cultured at four months when the prostatic condition was satisfactory and staphylococcus albus, alone in one case, mixed with a hæmolytic streptococcus in the other was recovered. This latter patient relapsed two and a half years later with symptoms of mild vesiculitis, although no involvement of the vesicle was detected during the original attack, but the possibility of a mild reinfection could not be altogether excluded. The case in which staphylococcus albus alone was cultured was one of those in which gonococci were seen in the films of the prostatic secretion. No other case than the one referred to above is known to have relapsed, and in two cases the final results were checked some months later.

It will be noted that in this series of cases the period of treatment required was much longer, at least three months of prostatic treatment subsequent to the cessation

CHRONIC PROSTATITIS

of the discharge was necessary to clear up the prostatic condition, still longer if the vesicles were infected.

Prostatic massage every five or six days usually suffices, and towards the end of the treatment larger sounds should be passed to open up the prostatic ducts and facilitate drainage.

GROUP III.—*Subacute Cases of Gonorrhœa with no Cessation of the Discharge*

This group comprises 19 cases of severe antero-posterior infections, seen in the later stages, one to five months from the onset. Fourteen of these cases were first attacks and 5 were second attacks, but this made no difference to the results. Only 2 of these cases had had prostatic massage, posterior symptoms had been present in 11 cases, 7 had had epididymitis, and 1 had conjunctivitis. Discharge was present in all the cases, purulent in 8.

Gonococci were present in the meatal films alone in 12. Gonococci were present in the meatal films mixed with other cocci in 2.

Secondary organisms were present alone in 1.

No organisms were seen in the films in 4.

No difference in the duration of treatment resulted from the above differences.

The urine showed purulent haze in both glasses in 7.

The urine showed purulent haze in first glass only in 5.

The urine showed purulent flakes in clear urine in 7.

The prostate was normal to palpation in 6 cases, all fairly recent.

The prostate was enlarged in 8.

The prostate was tense and tender in 4.

The prostate was indurated or irregular in 4, all of over two months' duration.

The vesicles were palpable in 18.

The vesicles were not palpable in 1, which, however, proved very intractable.

All these cases were put on urethro-vesical irrigations, and a course of stock vaccine was usually administered. Diathermy was used with great benefit for the control of acute prostatitis or epididymitis, and as soon as the subsidence of acute symptoms permitted, gentle prostatic massage was started, later the vesicles were

BRITISH JOURNAL OF VENEREAL DISEASES

attacked. Large sounds were passed towards the end of the course of treatment.

An immediate improvement was often followed by a relapse of discharge as collections of pus in the prostate and vesicles drained with consequent reinfection of the urethra. This happened in 6 cases, in 1 of which gonococci appeared in the meatal discharge where they had not previously been found. In 2 cases epididymitis supervened during the treatment, making 9 cases in all in which this complication occurred.

The average period of treatment necessary was five and a half months, excluding 5 cases in which the patients were lost sight of. Seven cases yielded to prostatic massage alone after an average period of just under four months, but 7 cases required other treatment and took on an average seven months. In 1 case gonococci were cultured from the prostatic secretion, but at the end of treatment only staphylococcus albus was grown in culture. Two cases were checked at intervals after apparent cure and the results were confirmed.

These were two relapses both in patients who had been discharged with palpable vesicles, in one case three months later after a doubtful reinfection, and in the other nine months later with no reinfection. In both these cases the symptoms of the relapse were typical of chronic vesiculitis and necessitated prolonged treatment.

These results are not so good as those reported in my previous paper.²⁰ In that series of cases I was able to bring 84 per cent. of 88 cases of acute antero-posterior gonorrhœa up to my standard of cure in periods varying from three months to four and a half months, but the explanation is that in the series on which the first paper was based the patients were treated in a military hospital under rigid discipline with the treatment carried out by orderlies and medical officers, and therefore strictly controlled, whereas in the present series the patients carried out the irrigations themselves, and were often unable to attend for prostatic treatment as regularly as was desirable.

The conclusion to be drawn from the three series of cases is that in every case of gonorrhœa the prostate is involved to some extent and the vesicles in the more severe cases, consequently treatment must be continued until the pathological findings are satisfactory, regardless

CHRONIC PROSTATITIS

of an apparent clinical cure, if the incidence of the chronic conditions to be considered in the next sections is to be prevented.

GROUP IV.—*Cases of Chronic Prostatitis with Antecedent Gonorrhœa in which Involvement of the Vesicles could not be demonstrated*

Of these 21 cases, 14 gave a history of one attack of gonorrhœa, 6 of two attacks, and 1 of four attacks, at times varying from three months to fifteen years previously.

Five cases gave a history of posterior symptoms during the attack, and 3 of these and 2 others had been treated by prostatic massage.

In 3 cases the symptoms of shreds in the urine or prostatorrhœa had been continuous since the attack, in 15 there had been reminders in the form of recurrent gleet with or without urinary symptoms, and in 3 there had been clear intervals free from all symptoms of two, six and fourteen years. The symptoms were :—

	Cases.
1. Gleet continuous or intermittent	13
2. Posterior symptoms with gleet	9
3. Posterior symptoms without gleet	3
4. Shreds or pus in the urine	2
5. Prostatic pain (acute inflammatory symptoms in 3)	6
6. Pain in the lumbar region	1
7. Arthritis	1
8. Epididymitis (old)	2
9. Prostatorrhœa alone	1
10. Sexual troubles	2
11. Other metastatic signs (retinitis)	1

The findings on examination were :—

	Cases.
Meatal drop	4
Excess of meatal mucus	2
Nil abnormal in meatus	15
Pus cells in meatal films	4
Secondary organisms in meatal films	4
Urine : hazy with pus	5
Urine : clear with purulent flakes	5
Urine : clear with mucus flakes	7

BRITISH JOURNAL OF VENEREAL DISEASES

	Cases.
Urine : Nil	4
Prostate acutely inflamed	3
Prostate indurated and nodular	5
Prostate small and fibrosed	3
Prostate enlarged, but of normal consistency	4
Prostate apparently normal	6

Microscopical examination of prostatic secretion :—

	Cases.
Plugs of leucocytes and free pus cells present	5
Free pus cells present over 5 per high-power field	5
Free pus cells present under 5 per high-power field	9
No films made	2

It will be seen that there were two cases of epididymitis; in both cases this complication had occurred some time before, and the presumption is that in these cases the vesicles were infected, especially as in one case there was also retinitis, but as no clinical evidence of this could be detected on rectal examination they were included in this series. Three cases had acute prostatitis when first seen, in 1 of whom there had been a clear interval of two years without symptoms. That 15 of 21 cases had no meatal discharge is noteworthy.

The microscopical findings indicated a mild degree of infection, 5 cases with plugs and pus cells, 5 with pus cells over 5 per field, and 9 cases under 5 per field.

These cases were all treated by regular prostatic massage, irrigations being only used when there was a meatal discharge sufficient in amount to inconvenience the patient. In the cases with acute prostatitis, a course of diathermy was first given to reduce the inflammation and relieve the symptoms. Vaccines were only occasionally used, and in all cases sounds were passed at the end of the treatment. In one case prostatic massage caused the appearance of a discharge containing secondary organisms where there had been no discharge before, and in one case with acute prostatitis an abscess drained and gonococci appeared in the urinary shreds, though only staphylococcus aureus was grown in culture. In this case there had been a clear interval of two years, the acute symptoms appearing shortly after coitus, which suggests that a seminal vesicle was the real source of the

CHRONIC PROSTATITIS

trouble. Two of these patients were married and had not infected their wives, though in one case an intermittent gleet with attacks of frequency had lasted for six years, culture in this case yielded only gram-negative bacilli ; in the other case there had been no symptoms for fourteen years, till an attack of dengue brought on the urinary symptoms for which he sought advice.

In 5 cases the treatment was not finished, 13 cases cleared up under prostatic massage alone in periods averaging just under three months, whilst 3 cases required instillations of silver nitrate, which prolonged the average period of treatment slightly to three and a half months. Three of the cases were checked some months later, and the results found to be unchanged.

GROUP V.—*Cases of Chronic Prostatovesiculitis with Antecedent Gonorrhœa*

Of these 53 cases, 39 gave a history of one attack of gonorrhœa, 9 of two attacks, and 5 of three attacks at times varying from two months to fifteen years previously. In 22 cases there was a history of posterior symptoms, and 16 had been treated by prostatic massage.

In 19 cases the symptoms had been continuous, in 21 there had been reminders in some form, and in 13 there had been a clear interval of three months to six years since the attack.

In 7 cases the recurrence of symptoms closely followed coitus and was mistaken by the patient for a fresh infection, especially as in four of these cases there had been clear intervals of six months, two, three and five years respectively.

The symptoms present are set out below :—

	Cases.
1. Gleet (continuous or intermittent)	44
2. Posterior symptoms with gleet	12
3. Posterior symptoms without gleet	4
4. Pus or shreds in the urine	12
5. Prostatic pain	6
6. Pain in the lumbar region	5
7. Joint pains or arthritis (acute in 2)	7
8. Attacks of pain in the kidney region	2
9. Epididymitis	11
10. Prostatorrhœa	1

BRITISH JOURNAL OF VENEREAL DISEASES

	Cases.
11. Sexual troubles, impotence, etc.	2
12. Other metastatic signs—	
Iritis	1
Abscess in epididymis	1
Pyelitis	1

The findings on examination were as follows :—

Meatal drop	21
Excess of meatal mucus	15
Nil abnormal in meatus	17
Pus cells in meatal films	30
Gonococci in meatal films	4
Secondary organisms in meatal films	15
Urine : hazy with pus	19
Urine : clear with purulent flakes	25
Urine : clear with mucus flakes	6
Urine : Nil	3
Prostate : enlarged	21
Prostate : nodular or indurated	14
Seminal vesicles, palpable	40
Seminal vesicles, nodular or indurated	7
Seminal vesicles, not palpable, but evidence available of vesicular involvement in films, etc.	6

Microscopical examination of prostatic and vesicular secretion :—

	Cases.
Plugs of leucocytes and free pus cells present	10
Free pus cells present over five per high-power field	28
Free pus cells present under five per high-power field	11
No films	4

It will be obvious that we are here dealing with a much more serious infection, as shown by the high incidence of such complications as arthritis and epididymitis and the occurrence of 2 cases presenting symptoms resembling attacks of renal colic and of 1 case in which pyelitis was present. More than half the cases had pus cells in the meatal films, secondary organisms were present in 15 cases and in 4 gonococci were found. The microscopical findings in the prostatic and vesicular secretions were very bad, 38 cases showing either clumps of pus cells or free

CHRONIC PROSTATITIS

pus cells in excess of 5 per field of the $\frac{1}{12}$ -inch obj., often in the portions of the films which could be recognised as of vesicular origin ; in 2 cases gonococci were seen in the films of the vesicular secretion, though in one of these only secondary organisms were present in the meatal films. Cultures of the secretion in 3 cases showed only staphylococcus albus alone or mixed with *Bacillus coli*.

These cases were treated on the same lines as those in the last group, irrigations were employed when indicated by the presence of a discharge, and diathermy was used for the treatment of acute inflammatory conditions of the vesicles or epididymis.

The results fall into three groups :—

(a) Those which yielded to prostatic massage alone, 27 cases. Of these 7 were unfinished, and the remaining 20 attained a satisfactory standard after four and a half months' treatment on the average, *i.e.*, one and a half months longer than was necessary in cases without demonstrable vesicular involvement. In 2 cases the commencement of prostatic massage caused relapse of meatal discharge containing gonococci where none had been seen before, and in 3 cases relapses of discharge occurred later, but with no organisms present. The results were checked by culture in 2 cases, and only staphylococcus albus was found.

Eight of the cases were checked from two months to two years later, and the results were found satisfactory. Three of the cases were already married, of whom 1 had infected his wife about one year before ; 1 married before the treatment was completed, but no infection resulted.

(b) Those which required instillations into the posterior urethra. Silver nitrate is the most potent germicide we possess, and is particularly indicated in cases where gonococci persist in the discharge for a long time, as an adjunct to the main treatment. It has the drawback of being very irritating, and can only be used in cases which are in the very chronic stages. It acts on the urethral mucous membrane and the superficial glands of the prostate, but cannot reach the deeper parts or the vesicles. It was used as a posterior instillation in strengths of 0.2 per cent. to 1 per cent. or 2 per cent. in 5 cases of this group, and in 6 of the subacute cases in conjunction with prostatic massage. It frequently appeared to be the means of bringing about disappearance

BRITISH JOURNAL OF VENEREAL DISEASES

of the gonococci, and rapid improvement in cases which had failed to respond to prostatic massage alone. Naturally the duration of treatment was much longer in these cases—seven and a half months on the average.

(c) Those which were treated by instillations of mercurochrome. Mercurochrome was introduced into urology by H. H. Young at the Johns Hopkins Hospital. It has the advantages of being non-irritating and of penetrating deeply into the tissues. Its use in acute gonorrhœa has proved disappointing, but in chronic secondary infections with persisting haze in the urine and involvement of the trigone of the bladder it is useful in clearing up the urine. The instillation of 10 c.c. of 1 per cent. solution was tried in 13 chronic vesiculitis cases and in 5 of the subacute cases, 7 of these cases were unfinished, and in the remaining 11 the average period of treatment necessary was six months. One of these cases was checked seven months later, and 2 subsequently married and reported all well.

(d) Eight cases which on examination did not appear to differ from the others, proved very resistant to all forms of treatment. Six of the 8 relapsed during treatment, in 2 cases with reappearance of gonococci after over two months of treatment. Three of these cases were unfinished, but the other 5 and one of 3 subacute cases of similar character were brought to a successful termination after an average period of treatment lasting ten and a half months. In 2 of these cases the results were checked later. Five uncured cases out of 11, after the use of all the modes of treatment detailed, is not satisfactory, but the cause for the refractory character of these cases could not be ascertained.

GROUP VI.—*Cases of Prostatitis with an Antecedent Urethral Infection of Doubtful Character*

Of the 9 cases in this group, 3 gave a history of a mild urethral infection not identified as gonorrhœa some years before; in the remainder there had been no previous infection. All complained of a scanty meatal discharge with trifling subjective symptoms, coming on one to two weeks after exposure. The discharge was scanty, mucoid or muco-purulent in character, and under the microscope showed pus cells with no organisms in 8 cases, gram-positive cocci in 1 case. Only 1 case was cultured, and

CHRONIC PROSTATITIS

staphylococcus aureus was grown. All showed haze or purulent flakes in the urine. All pursued a very chronic course with mild involvement of the prostate, except in one patient who developed an acute vesiculitis and another in whom acute prostatitis and epididymitis supervened. The course of treatment required to bring the prostatic films to the usual standard of cure was five and a half months.

It is difficult to be certain of the nature of these cases, as gonococci were never found in spite of repeated examinations. Non-specific and chemical infections rarely infect the posterior urethra, and discharges not containing organisms, when associated with involvement of the prostate and vesicles, are usually relapses of chronic vesiculitis. This was not the case in these patients, and they must be looked on either as very mild gonococcal infections with organisms of low virulence which quickly died out, or as examples of the non-specific forms of prostatic-vesiculitis, originating in congestion of the prostate and vesicles with secondary bacterial infection, to which reference was made in reviewing the literature of the subject.

GROUP VII.—*Cases of Prostatitis with no History of any Urethral Infection*

Only 3 cases of this kind were met with, in 2 of which there was a history of coitus interruptus preceding the onset of symptoms. One had frequency and pyuria, and had been suspected of suffering from renal tuberculosis, but a definite prostatitis was found with staphylococcus albus and diphtheroids on culture, treatment of the prostate produced immediate marked improvement. The other two suffered from mucus flakes in the urine, pains in the lumbar region, prostaticorrhoëa and sexual neuroses, a few pus cells were present in the films of the prostatic secretion, and a short course of massage gave considerable relief to the symptoms, which were probably mainly due to congestion of the prostate.

THE USE OF DIATHERMY

Some years ago very exaggerated claims were made for the value of diathermy in the treatment of gonorrhœa,

BRITISH JOURNAL OF VENEREAL DISEASES

the rise of temperature in the tissues which could be produced by this means being supposed to be capable of killing the gonococci *in situ*. Increased experience has led to considerable modification of these claims, at least so far as gonorrhœa in the male is concerned. The writer has used it in 52 cases, 44 of which are included in the series here reviewed. The method of application was by an active prostatic electrode containing a thermometer, as recommended by Cumberbatch, with a belt of sheet lead for the inactive electrode. In cases of epididymitis the scrotum was enclosed by sheet lead, lined by lint moistened with saline, with the prostatic electrode as the other pole, so that the current was applied to the prostate and vesicles, as well as to the epididymis. The current was increased until the heat was as great as the patient could bear, and was maintained for twenty minutes. The thermometer readings varied from 107° F. to 111° F., and the applications were made twice weekly. The results were as follows :—

6 acute antero-posterior cases. No effect	6
(One case relapsed under treatment, and 1 still showed gonococci after six treatments.)	
7 subacute cases—	
Some improvement	2
No effect	5
(Gonococci still present in 2 cases after six to eight treatments.)	
8 chronic cases with acute posterior symptoms.	
Relieved	8
(Gonococci persisted in 1 case, although the symptoms were relieved.)	
4 acute prostatitis cases. Relieved	4
(One case relapsed with gonococci in the discharge.)	
7 epididymitis cases. Relieved	7
20 chronic prostatitis-vesiculitis cases—	
No effect	13
Worse	4
Prostatic pain relieved	2
Joint pain relieved	1

One of the cases shown as “ no effect ” had a relapse of discharge with gonococci present.

The results in this series of cases fairly represent the

CHRONIC PROSTATITIS

value of diathermy in these conditions. It does not eradicate the gonococci, but it causes an active hyperæmia which carries off toxic products, stimulates antibody formation and brings fresh blood to the parts laden with antibodies. In this way it relieves symptoms due to chronic congestion and is indirectly beneficial. The relief afforded in cases of acute prostatitis and epididymitis is remarkably rapid, though in the latter class of cases it has been objected that the heat produced in the testicle may permanently impair its spermatogenic power.

THE USE OF VACCINES

No systematic attempt to compare cases treated by vaccines with others not so treated was made in this series. Detoxicated or stock vaccines have been used in all acute cases for many years, and the general impression one gets is that patients so treated do better than those not receiving this treatment, but as local treatment of various kinds was also employed, no fair comparison can be made.

The employment of vaccines to supplement treatment aiming at the drainage of collections of pus is as rational here as elsewhere in the body, but in the 16 chronic cases in which they were used (in 3 cases an autogenous vaccine was used), it was impossible to say that the improvement was not due to the prostatic massage given, as these cases did not do any better than others treated without vaccines. In metastatic infections, however, there is a consensus of opinion that vaccines, autogenous for choice, are very helpful.

The production of protein shock by the injection of sterile milk intramuscularly, or of anti-typhoid vaccine intravenously has a field of usefulness in these chronic infections, but the number of cases in which it was employed in this series was too small to permit of any conclusions being drawn.

THE UNFINISHED CASES

In all there were 26 cases in this series in which the required standard of cure was not reached, 5 in the subacute group, 5 cases of chronic prostatitis, and 16 cases of chronic vesiculitis. However, 3 of the subacute, 2 of the

BRITISH JOURNAL OF VENEREAL DISEASES

chronic prostatitis, and 5 of the chronic vesiculitis cases had reached a standard in which they had no symptoms or clinical signs, although the pathological findings were still unsatisfactory, and it was unlikely that they would have any further trouble, as the tendency of these cases is to improve spontaneously after the cessation of treatment. The 11 chronic vesiculitis cases represent 20 per cent. of the cases treated in that group, and the average period of treatment in these cases was four and a half months, the same as the majority of cured cases, and it would seem that nothing further can be done for these cases by ordinary methods of treatment.

There are two methods of treatment highly recommended in such cases. The first is a series of five or six doses of sulpharsenol intramuscularly, which is claimed to give promising results, possibly owing to the formalin it contains. It is regretted that this simple line of treatment had not come to the writer's notice when these cases were treated. The other method is Belfield's operation of vasotomy and injection of collargol into the vesicles, an operation which is more popular in America than in this country. In all these refractory cases a bilateral operation would require to be performed with a certain risk of occlusion of the vas on one or both sides, but this risk is stated to be so small in skilled hands that it is certainly worth taking in patients such as these who steadily deteriorate both physically and mentally, as the hope of cure is dashed by successive relapses. Such cases have long ceased to harbour gonococci and to be a danger to the community, but the focus of infection left in the body is a continual menace to the health of the individual.

CONCLUSIONS

(1) By the method of enumeration of the polymorpho-nuclear leucocytes in the prostatic and vesicular secretions, it was found that cases were permanently cured when the count of these cells did not exceed one to two per field of the $\frac{1}{12}$ -inch objective. This was used as a standard of comparison. It is, of course, advisable when the count has reached this standard to repeat the examination two or three times at monthly intervals.

(2) In 8 cases of acute gonorrhœa with no evidence of involvement of the posterior urethra, a mild catarrhal

CHRONIC PROSTATITIS

prostatitis was found to be present in every case, and the total period of treatment required averaged two and a half months. Failure to recognise and treat this condition is the cause of many cases of chronic prostatitis.

(3) In 12 cases of acute antero-posterior gonorrhœa, treatment for four months was requisite to bring the prostatic films to the standard of cure, but if the vesicles became involved the period requisite averaged seven months.

(4) In 19 subacute cases the seminal vesicles were affected in 18, and the average period of treatment requisite was four months if prostatic massage alone sufficed, seven months if other treatment was required in addition.

(5) Twenty-one cases of chronic prostatitis with a history of gonorrhœa were treated, of which 5 were unfinished, 13 cleared up under prostatic massage alone in just under three months on the average, slightly longer if instillations were necessary.

(6) Fifty-three cases of chronic prostato-vesiculitis showed more serious clinical symptoms and worse pathological findings than the previous group. Twenty cases were cured by prostatic massage alone in an average period of four and a half months. Five cases also had instillations of silver nitrate and were cured after seven and a half months' treatment, 13 cases received also instillations of mercurochrome and required six months, 8 cases had all forms of treatment over a period of ten and a half months resulting in the cure of 5 of them.

(7) Nine cases of prostatitis with a history of a doubtful urethral infection were either mild gonorrhœal infections or non-specific infections from the start. They ran a chronic course and required an average of five and a half months' treatment.

(8) Three cases of prostatitis without any history or evidence of urethral infection were seen. They ran a mild course, but the real cause of the symptoms in such cases is likely to be overlooked.

(9) Diathermy is useless as a means of cure of gonorrhœa in the male, but is very valuable for the relief of the symptoms of acute inflammation in the prostate and epididymis.

(10) Of 16 cases of chronic vesiculitis which failed to reach the standard of cure after four and a half months'

BRITISH JOURNAL OF VENEREAL DISEASES

treatment, 5 were clinically cured and unlikely to have further trouble, leaving 11 or 20 per cent, in which treatment definitely failed. Possibilities of further treatment of these cases lies in the use of sulpharsenol injections and in Belfield's operation.

(11) Of 86 cases of prostatitis left after excluding the acute and subacute cases of gonorrhœa, 86 per cent. had certainly suffered previously from gonorrhœa, in 10.5 per cent. there was a doubtful history, and in 3.5 per cent. there was no history of gonorrhœa.

(12) The seminal vesicle is the reservoir of infection in the majority of cases of chronic gonorrhœa, and must be treated until the pathological findings are satisfactory, regardless of apparent clinical cure.

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