# Gonorrhoeal Prostatitis

and

# Vesiculitis,

a

# Thesis,

**Submitted for the M.D. (Glasgow) by**


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# GONORRHOEAL PROSTATITIS and VESICULITIS.

Although Gonorrhoea has been prevalent since the dawn of History we are indebted to Ricord (1830) for its recognition as a separate, although in his opinion not a specific disease, and it was not until 1879 that Neisser, by discovering the specific organism, for ever settled the question that the disease was quite distinct from syphilis.

There is much regrettible confusion in the lay mind regarding the relative importance of Gonorrhoea and Syphilis, the former being looked upon as a trivial malady. Possibly up to a few years ago Syphilis was far more far-reaching in its effects, but there can be no doubt, that, since Ehrlich's discovery of the therapeutic value of arsenical preparations intravenously, syphilis has lost many of its terrors, and Gonorrhoea must not be relegated to second place. As a post-war problem this must be strongly insisted upon.

The seriousness of this disease lies in its generality, or the frequency with which it occurs, in the difficulty with which it is eradicated, and also in the fact that an attack confers no sort of immunity upon the individual. A study of the lining of the uro-genital tract with its numerous glandular recesses which the gonococcus enters, in its usually triumphant march, and converts into "dug-outs," in which it lies secure long after the germs on the surface have been swept away, makes it apparent that to rid the urethra of Neisser's organism is one of the most difficult problems in medicine. The natural low resistance to the germ, and the peculiar adaptation of the urethra to its

growth, together with the high standard of cure, are the factors which combine to this great difficulty. While the gonococcus flourishes readily in the urethra it is never a saprophyte there, and nothing short of clearing out every single gonococcus from the urethra and from every mucous recess or secreting gland communicating with it, can be considered a cure. In very few diseases is such a complete cure aimed at. To eradicate the bacteria from the surface of the urethral mucous membrane is a comparatively simple matter but when the infection spreads to, and the germs lodge in, the glands or follicles, the disease necessarily becomes protracted or chronic. There are no glands in the urethral tract that contribute so much to this state of chronicity as those of the prostate and seminal vesicles.

Nearly all cases of chronic gonorrhœal infection of three months standing will reveal a prostatitis or a vesiculitis as a source of continued infection. In my series of 369 cases of chronic gonorrhœa 327 or 88.8% showed an infective focus in the prostate or vesicles. That the gonococcus can remain potentially active in the prostate for a considerable time without any apparent injury to its host is a matter of common knowledge to venereologists. Its virulence gets much attenuated, of course, and in time it will probably loose its power of reinoculating its host. This interval is governed by the virulence of the particular strain and the antibody-forming power of the infected person, but in any case the period of time required to render it completely innocuous must be very considerable. Luys quotes a case of eighteen years standing without any intermediate infection, and Harrison & Thomson state that they found the

complement-deviation test positive after 16 years. Kidd also reports the case of a medical man who had an infective focus shut off in his vesicle for 20 years, and who through indulgence in alcohol stirred up the trouble and developed arthritis and later urethritis. It is obvious that in such cases it is a matter of suspended warfare only as any excess, dietetic or sexual, may provoke a fresh attack in which the clinical and microscopical features of the first attack are reproduced. This process can be repeated many times unless the infected focus is systematically dealt with. On the other hand a person may have an infective focus in his prostate or vesicle and be incapable of reinoculating himself no matter how he violates the rules of careful living. This is due more to the attenuation of the virus than to the extent of immunity produced, for cases giving a dead positive complement-fixation test are frequently so reinfected. The danger to the community from these cases, however, is very great, for a person may harbour a strain of gonococci, so attenuated in virulence as to be quite harmless to himself, yet it may be highly infective when transferred to fresh soil. The importance of prostatitis is not to be measured solely by its incidence in chronic gonorrhoea, for many cases of gonorrhoea, which from the time taken to cure them, can by no stretch of terms be called chronic, exhibit a lesion in the prostate frequently destructive to its functions. In a series of 500 cases which were discharged from Hospital within an average of 50 days, there were 297 or 59.4% which showed pathological change in the prostate. It must also be noted that the prostate is a gland which may influence general

metabolism apart altogether from its being essential to sexual life. That it has a profound influence on the nervous system is quite evident.

The importance of this subject then need not be laboured, as every man discharged from Hospital without a complete investigation of the condition of his prostate and vesicles, is a potential and a very probable carrier of infection. Any lesion in the anterior urethra will show itself sooner or later in urethral discharge, but a lesion of the posterior urethra which is the precursor of prostatic or vesicular infection, will, if it shows at all, show in the urine, which the average individual never looks at. The problem of successfully treating chronic gonorrhoea is one for the specialist and it is to be hoped that public bodies, in view of the dangerous situation existing in the manhood of the nation at its most productive age, will recognise this fact. The incidence of prostatic and vesicular infection in this disease is grossly underestimated and the object of this thesis is to give an account of personal work and observation on a series of over 800 cases of gonorrhoea specially studied from the prostatic and vesicular point of view, to help to direct attention to the importance of the subject, and above all to emphasise the fact that the successful treatment of chronic gonorrhoea must entail a painstaking investigation into the condition of the accessory sexual organs. Careful and frequent examination of the prostate and vesicles should be a routine in every case of gonorrhoea. In this connection it may be stated that practically all the metastatic complications of gonorrhoea, more particularly the so-called gonorrhoeal rheumatism and the ocular complications, may be traced to a focus in the

in the vesicle or prostate and unless these organs are carefully examined the essential elements of the case have been missed.

The subject matter of this thesis is based upon experience in the Central Venereal Hospital, Lichfield, where between 3000 and 4000 cases of gonorrhoea in soldiers are treated annually. It was while engaged in the treatment of these cases that the importance of this matter appealed to me. With the exigiences of war conditions these cases were discharged upon the following data. When a soldier was free from discharge and his urine was clear of filaments for one week his treatment was suspended for six days. At the middle of that period he was given an anterior smear and if negative to pus cells and gonococci he had another smear after prostatic massage on the sixth day. If that was negative to both to pus cells and gonococci, and no lesion was apparent urethroscopically in his anterior urethra, he was considered cured and summarily discharged. With these precautions from 5 to 10% of all cases relapsed and in the vast majority of these the infective focus was in the prostate. In this thesis I propose to take a series of 369 cases whose cure took at least 70 days and look upon them as cases of chronic gonorrhoea and a further series of 511 cases which were discharged under 7 weeks. I take the latter series to emphasise the fact that prostatitis is almost an essential concomitant of posterior urethritis, and that it can hardly be termed a complication at all. It is certainly a

complication of gonorrhœa but scarcely of posterior urethritis,

# ETIOLOGY OF PROSTATITIS and VESICULITIS.

The cause of prostatitis is spreading of the gonorrhoeal infection to the posterior urethra. This usually happens in the third week, but of course, can happen much earlier, depending upon the virulence of the infection and also upon indulgence in sexual intercourse during the normal period of incubation. The posterior urethra may be infected as early as the second day. Amongst my cases there were 27 who had definite posterior sypmtoms during the first six days of the appearance of the discharge, and within ten days of the only exposure to infection. There were other cases which might fall within this category, but as the date of exposure could not be definitely fixed they are not counted. There were two cases during the second day, two during the third, one during the fourth, ten duringthe fifth and fifteen cases during the sixth day, fromt-he appearance of the discharge. Even allowing for the fact that the statement of patients is not always reliable it is evident that the spread of the infection to the posterior urethra can be fairly rapid. These cases require careful watching as they are nearly certain to be hyperacute.

When one bears in mind that the prostatic urethra is lined by transitional epithelium similar to thatof the bladder, it is easy to see that the prostatic urethra itself is not a very favourable situation for the gonococcus to thrive in, and easy to understand why it selects the prostatic ducts to lodge in. These ducts are lined by columnar cells between which it can ~~easily~~ readily penetrate and thereby obtain a footing. In view of their vulnerability to gonococcal infection it is a matter of surprise that any of the prostatic glands escape. There are various theories advanced to explain this. Some say it is

due to excessive alkalinity and others that the lecithin secreted has an inhibitory action through its antiseptic properties. This may possibly be the case as the power of secreting lecithin is lost in inflammation and Watson states that "it is a fact that a small inflammatory zone precedes the growth of the gonococcus along the ducts".

In all cases of posterior urethritis the verumontanum is more or less involved. In my experience the most constant lesion as seen by the urethroscope in the posterior urethra is involvement of the verumontanum. The sinus pocularis, upon the lips of which the mouths of the ejaculatory ducts are usually placed, is also lined with susceptible columnar epithelium and is probably early involved. Schindber has proved that under the influence of irritation of the colliculusseminalis an antiperistaltic wave is set up by means of which infection is carried up the vasa deferentia to the epididymes and some of it is probably side-tracked into the vesicles. It is possible also that infection may reach the vesicles by direct spread from the ejaculatory ducts whose mouths can scarcely escape involvement in infection of the verumontanum and utricle. In view of the fact that vesiculitis is two or three times as common as epididymitis this would seem to be the principal way of infection.

It is essential to have a clear understanding of the anatomy and physiology of these glands.

## ANATOMICAL and PHYSIOLOGICAL CONSIDERATIONS.

### ANATOMY OF THE PROSTATE.

The prostate is a musculo-glandular organ which surrounds the beginning of the male urethra. It is shaped like a horse-chestnut, the apex being direct downwards and forwards resting upon the deep or superior layer of the triangular ligament, and the base being directed upwards and backwards against the undersurface of the bladder in the neighbourhood of its urethral opening. Its transverse diameter at its base is about 1⅛ inches, its vertical diameter 1¼ inches and its antero-posterior diameter about ¾ of an inch. Its size varies very considerably in different individuals. It is covered by a capsule derived from the recto-vesical layer of the pelvic fascia. The urethra enters near the middle of its upper surface, and in its course to its point of exit on the anterior border just above the apex, describes a curve with its concavity forwards, so that the middle of the prostatic urethra is situated near to the posterior or rectal surface of the organ. The ejaculatory ducts enter the prostate in an inter-lobular depression at the border which separates the base from the posterior surface, and run downwards inwards and forwards to open in the prostatic urethra on the crest of the verumontanum, on either side of the utricle. They do not pierce the capsule of the organ but pass forward in the interlobular tissue. The wedged-shaped portion which lies between the ducts and the posterior aspect of the urethra is called the middle lobe and the rest of the prostate is composed of the two lateral lobes.

The median portion is usually in men of gonorrhoeal age a mere transverse band. There is a notch in this situation the depth of which varies considerably, and in my opinion, imparts its size and more particularly its shape to the gland.

As this thesis is a record of clinical observation it is necessary to have a clear impression of what constitutes a normal prostate as palpated per rectum. While the above description can be said to anatomically cover most ~~portstabes~~ prostates, the fact remains that, like persons, no two prostates ~~as felt per rectum~~ are identically alike. Clinically, however, prostates as felt per rectum, may be said to more or less conform to one of three types. These types have not been verified by dissection, but are merely the impressions conveyed to the examining finger in the rectum. Further I maintain that it is no fanciful classification as each type has to be approached differently, when applying the greatest therapeutic agent at our disposal, viz. prostatic massage.

(a) The "ROUND TYPE". In this class of prostate the consistence of ~~this~~ the gland is uniform and the two lateral lobes are closely approximated so that the posterior commissure is narrow. The notch is very small and the glandular tissue is evenly distributed throughout the lateral lobes. This is the horse-chestnut type usually described in the text books, but is clinically not the most common. The ejaculatory ducts are placed close together and the vesicles are usually more vertical and the middle lobe small.

(b) The "FLAT TYPE". This type is usually large and flat showing less ~~bluging~~ bulging into the rectum. Palpation over a sound indicates that the urethra is placed nearer the rectal surface than usual. I believe that a considerable proportion of the glandular acini are situated ~~in the~~ anterior ~~urethra~~ to the urethra, as this type does not yield readily to massage unless done over a sound. In chronic inflammation flat prostates have a uniform "boggy" feel.

(c) The BILATERAL TYPE. This in its varying degrees is clinically the most common type of all. Its bilateral character is imparted to it by the depth of the notch where the ejaculatory ducts enter. In some cases the lateral lobes are placed like two leaves joining at their bases and diverging towards their tips.

In others the prostate feels almost like ~~the~~ a horse shoe with the bulk of the glandular tissues placed laterally, the part immediately adjoining the commissure being apparently fibrous tissue and the notch almost extending to the apex forming what might be termed the true "marginal" type.

The recognition of this type is of great clinical importance as massage, to be effective, must be applied at the side, as it were, and it can be fairly firm without running the risk of exciting epididymitis. Further the "middle" lobe in such prostates is frequently affected and due attention must be given to it.

The prostate is really composed of twin organs which in some lower animals remain distinct throughout life, as they do for the first three months of foetal life. After that period they approach and fuse leaving a channel for the urethra.

Anatomically and physiologically they remain separate, the ducts of each tubule opening on its own side. The urethra, accompanied by its surrounding structures, longitudinal and circular muscular coats continued forward from the bladder, its fibrous and elastic tissues, its vessels and its nerves, passes forward and is enveloped by the opposing surfaces of the two prostatic lobes. (Freyer & Thompson). The different portions of the gland however are bound together by areolar tissue.

STRUCTURE and HISTOLOGY. The gland is covered by a dense fibrous coat continuous with the recto-vesical fascia and with the deep layer of the triangular ligament. This capsule which includes much muscular tissue is divisible into two layers, between which the prostatic plexus of veins is enclosed. From this fibro-muscular capsule trabeculae extend through the gland towards the verumontanum, forming a network in the meshes of which, the glandular portion is contained. The main part of the stroma is formed of unstriped muscle fibres, that part in front of the urethra being almost entirely so. The glandular tissue is practically confined to the portion of the organ situated behind the plane of the urethra. These consist of 20 to 30 alveolar tubuli, which unite into a smaller number of excretory ducts, which open on the prostatic urethra on either side of the verumontanum, the ducts of the middle lobe opening in the fossette above the urethral crest. These alveoli contain numerous irregular invaginations many of which

branch and anastomose with one another. In the healthy prostate these islets of glandular tissue convey an elastic firm feeling to the palpating finger. The epithelium is in two layers, the upper being cylindrical, and the lower of smaller cells of the same type lying direct upon a thin connective tissue wall with elastic fibres, which however is not a true basement membrane (Schafer). Isolated lymphoid nodules are occasionally found.

THE BLOOD SUPPLY is derived from the vesical, haemorrhoidal and internal pudic arteries. The veins are particularly numerous and form a rich plexus between the outer and inner layer of the capsule. They communicate in front with the dorsal veins of the penis, and behind with the branches of the internal iliac veins. The lymphatics commence in the glandular part and accompany the veins: they drain into the lymphatic glands of the pelvis.

THE NERVES are derived from the hypogastric plexus and are interspersed with ganglion cells. They end in the muscular tissue of the glands and its blood vessels and some are traced to the secreting gland cells. End blubs and Pacinian bodies occur in the superficial nerves. There is a direct communication between the nerve supply of the prostate and seminal vesides.

PHYSIOLOGY.

The prostate is essentially a sexual gland and contributes to the semen a thin opalescent albuminous fluid. The purpose of this fluid seems to be, to add bulk to the testicular secretion, and to act as a suitable medium for the conveyence of the spermatozoa and give them longer and greater viability

when introduced unto the female genitalia. Suspended in this slightly alkaline or neutral emulsion the sperm cells are safely carried through the anterior urethra, which might contain some acid elements of urine left unneutralised by the secretion of the mucous glands. The functions of the prostate are also closely correlated with those of the testicle apart altogether from the sexual act and together have a profound influence on general metabolism as well as upon the development of sexual characteristics. Removal of the testes before puberty causes atrophy of the prostate and seminal vesicles and the secondary sexual characteristics fail to develop. The body itself however grows even to over development in some cases. Serralach and Purey by experimenting on dogs proved the converse to be true, but other competent observers failed to verify their results. Freyer states that, prostatactomy for enlarged adenomatous prostate, instead of destroying the functional activity of the testes, rather increases it provided the ejaculatory ducts were not destroyed. This however is not of positive value as probably some of the healthy prostatic tissue might be left behind and the new sexual lease of life might be largely attributed to suggestion as a result of the improvement in the general health following the operation. Attempts have been made to prove that the internal secretion of the prostate is the dominant factor in sexual life but the bulk of evidence goes to prove that if an internal secretion exists at all, it is of secondary importance to that of the testicles, and certainly less important than that visible

secretion which pours out of its ducts during the sexual act.

Macroscopically the healthy prostatic fluid is a fine emulsion and free from visible particles. It closely resembles the white of a raw egg and has the characteristic spermatic odour. It is faintly alkaline to litmus. Mixed with the normal bladderwash it shows as a fine opalescent haze.

Microscopically it consists of droplets of fat (lebithin) of varying sizes with a few epithelial cells of the columnar type, and remarkably few leucocytes mostly of the mononuclear variety. These lecithin droplets readily stain with basic aniline dyes, as methylene blue. Very occasionally amyloid bodies are seen and show readily when the secretion is stained with weak sulphuric acid and iodine. Treated in this manner they show up as blue laminated circular bodies.

Bottcher or Charcots crystals can be demonstrated by mixing a drop of secretion with a drop of one per cent solution of ammonium sulphate, and allowing it to dry under a cover slip. These crystals are characteristic of prostatic secretion and their presence is positive proof that the fluid being dealt with actually is of prostatic origin.

ANATOMY OF THE VESICULAE SEMINALES.

Developmentally the vesiculae seminales may be looked upon as diverticula of the vasa deferentia from which they originally arise as small pouches. They are in close relation to the posterior surface of the bladder and are separated from the rectum by a layerof recto-vesical fascia. Their upper or blind ends are just covered by the vesical reflection of peritoneum and their direction roughly corresponds to the outer sides of the triangular area of the bladder that is not covered by peritoneum. In their downward inward and slightly forward course they traverse the ureter as it joins the bladder or just pass to the outer side of it. Inferiorly they become constricted to form short ducts which join the outer side of the corresponding vas deferens at an acute angle to form the common ejaculatory ducts. Structurally each seminal vesicle consists of a much sacculated tube of about two inches in length widening slightly towards its middle and acutely tapering before it joins the vas. If the convolutions are straightened out the length is about six inches. There is a main tube from which usually several branches, some of large size, are given off. These convolutions are bound together by highly vascular areolar tissue. There is also a muscular coat for the expression of secretion and an inner coat lined by the secreting epithelium. The seminal vesicles on palpation show considerable variation in different individuals. Normally they are scarcely palpable except in thin subjects, but when pathological processes are present their outline is easily felt. Some are felt as straight sacculated tubes and others are felt to be acutely bent so that the blind end is almost on a level

with the lower end, with an acute upward bend in the middle. Their position varies according to the condition of the bladder. When the bladder is full the vesicles are inclined more towards the vertical and when empty they are inclined to the horizontal. As already stated they converge towards the middle line and joining the ampullae they form the common ejaculatory ducts which lie near to one another. These later enter the substance of the prostate at its base, and passing through the fascia lined tunnel, open on the prostatic urethra usually on the lips of the sinus pocularis. These ducts are deeply corrugated longitudinally and closely resemble generally the ampullae and vesicles, having minute diverticula on their dorsal surfaces and the same secreting epithelial lining. Their entrances into the prostatic urethra are directed forwards and are controlled by sphincters.

PHYSIOLOGY.

The functions seems to be to store the semen, and the vesicular secretion itself may do more than add volume to the seminal fluid. Its muscular coat expels the secretion into the urethra during coitus. The strong sphincters of the common ejaculatory ducts would seem to ensure the flow of testicular secretion into the vesicles rather than into the urethra except when relaxed in coitus. Spermatozoa can always be expressed by vesicular massage but it is difficult to determine whether they come from the vesicles or simply just out of the ampullae. At any rate it would appear from the examination of a large number of cases, that in vigorous men, such as one sees in Military Hospitals, vesicles are generally palpable in a larger number of cases towards the end of the disease when sexual irritability has disappeared. As these vesicles cannot

all be pathological a reasonable inference would be that the vesicles do act as seminal reservoirs.

## INCIDENCE and FREQUENCY OF PROSTATITIS.

Before discussing the incidence of prostatic disease in chronic gonorrhoea it is necessary to have a clear understanding of what is considered pathological. Palpable changes in the prostate, that is, a difference in the size, shape or consistency of the lateral lobes cannot be relied upon, unless accompanied by tenderness or other signs of acute inflammation. Let me say at the outset that I consider that traumatic injuries of the prostate aremuch more common than is generally supposed. Out of 880 cases which I examined on admission 379 showed palpable lesions in the prostate i.e. lesions indicating old prostatitis. Of these 281 were admittedly relapses or second infections. This leaves 98 cases who would not admit a previous infection. Some of these were in young boys, where a previous attack was improbable. Making every allowance for the difficulty of extracting reliable information from these men, one is forced to the conclusion that at least some of them were due to traumatic lesions. Most, if not all, of these were ardent cyclists, and it is easily conceivable that bicycling over a rough road might give rise to bruises of the prostate, resulting in small haemorrhage which would leave a small sclerosed spot in the prostate. This opinion is strengthened

by the well known fact that some people after a long tiring bicycle ride where the call to micturate was not ~~proper~~ promptly answered, suffer from congestion of the posterior urethra giving rise to difficulty of micturition at first, and later, for a few days, to slight frequency.

Palpable change in the prostate unless accompanied by tenderness, does not refer as a rule, to the attack under consider-ation, but is a relic of a previous infection.

In these cases then prostatitis was not established upon palpable changes in the prostate, but upon examination of the prostatic fluid both macroscopically and microscopically.

The precentages of prostatitis increased with the duration of the disease.

Taking 500 cases who were discharged from Hospital under 50 days, 297 had prostatites or 59.4%. If that period of residence in Hospital is extended another ten days the percentage rises to 61%.

Now if we take 369 cases whose cure took 70 days or over we find that prostatitis was present in 327 cases or 88.8%.

Taking these figures in their proper ratios, I have found prostatitis to be present in 65% of all cases. This is almost certainly a conservative estimate as only positive cases were counted and all cases where pathological secretion was not found were excluded. Another factor, which convinces me that 65% of of all cases is an underestimate, is, that at least 80% of my cases had posterior urethritis. This means that 15 out of every 80 cases of posterior urethritis or 19%, escaped infection of the prostatic ducts. This in my opinion is highly unlikely.

As early as 1885 Montaganin and Ernad, writing independently, stated that 70% of all cases of gonorrhœa show prostatitis. It is likely that with modern methods of diagnosis this percentage would be somewhat increased. Indeed as already stated it is difficult to see how any case of posterior urethritis can escape infection of the prostate. Casper (1900) examined 100 cases of chronic urethritis and found the prostate inflamed in 85%. Zeissl (1902) expressed the opinion that prostatitis is an invariable accompaniment of protracted gonorrhoea. Other workers give a much smaller percentage. Indeed there is a considerable divergence of opinion amongst writers on the subject, being in most cases due to the standards adopted.

The methods of examining have been different and there is no general agreement as to the amount of inflammatory re-action considered necessary to establish the diagnosis of prostatitis. For my part I consider that a prostate is pathological if pus cells are intermingled with the prostatic secretion. Pus cells are foreign to normal prostatic secretion and their presence in any quantity should be considered pathological. I should, of course, not include the mononuclear leucocytes which are frequently present, though sparsely, in prostatic fluid. In the large majority of cases pathological prostatic secretion can be readily told by the naked eye or a magnifying hand lens. Pathological secretion is frankly or finely granular and the homogeneous opalescent appearance of the normal fluid is broken up by them.

## DIAGNOSTIC METHODS.

A large and tender prostate may be at once accepted as indicating prostatitis, but in the majority of cases of chronic gonorrhoea no such tender lesion is apparent and the examination of the prostatic secretion is necessary to establish the diagnosis. For the examination and massage of the prostate I adopt the following routine :-

The patient is instructed to micturate and wash out his anterior urethra (with oxycyanide of mercury 1 in 4000 or sterile water) until the washings return clear. He is then directed to irrigate into his bladder until the washings are also clear, paying particular attention to the last ounce or two, expressed from the bladder, which should be passed into a urine glass for the purposes of control - "Control glass". Finally he fills his bladder about a third full and retains that. A well trained orderly supervises this preparation of the patient. It is not sufficient to rely upon micturition to perform this preliminary cleansing for unless one is certain that the bladder and urethra have been completely cleansed of all debris, the whole procedure is nullified.

The patient comes from the irrigating room into the examining room with his control glass in his hand. This glass is carefully examining personally for flakes or filaments and if clear put aside. If not clear he is returned into the irrigating room to repeat the above process. Having lowered his trousers below his knees he stands at the side of the examining table, on which he is directed to lean forward on his forearms, with his forehead resting on his hands and his back

arched forward as much as possible. This arching has the effect of pressing down his bladder and making palpation somewhat easier. The trunk thus forms a right angle to the legs and the knees should be relaxed but not flexed, and the legs separated as far as the trouser-hobble will permit. The patient is now in the position of least muscular tension. As a lubricant I prefer soap and hot water. The gloved hands are well lathered and a few rapid up and down rubs ~~and~~ are given with the ulnar edge of the examining hand in the region of the anus and intergluteal space, and on the last downward rub the index finger is quickly slipped into the rectum. I consider this lathering a very useful manoeuvre as if one is examining twenty or thirty prostates at a sitting it saves much time, as the patient's attention is distracted and one's finger is on his prostate before he realises what is taking place.

If the patient is confined to bed he should be examined in the knee elbow position. Another position, that certainly gives an extra 1/3rd or ¼ in. reach, is to raise one foot on a stool or rung of a chair. This can't very well be done without the patient having to take off his trousers altogether, and the waste of time is seldom compensated for by the increased reach. As a rule one can easily determine the utmost limits of the prostate by the routine method. In some cases, however, the writer has had some difficulty in accurately reaching the upper limits of the left lobe, but by introducing the left index finger instead of the right the left lobe can be more easily palpated as one can bring it better under the sensitive pulp of the left index finger. With the other hand

pressed suprapubically, the examining finger rapidly sweeps over the apex and notes any irregularity there. The course of the prostatic urethra is palpated for any hardness or tenderness. The relation of the lateral lobes to the urethra is defined and the type of prostate noted. Each lobe is then taken in its turn and compared with its fellow, as to size, shape, consistency and sensitiveness. Search is made for nodules or soft spots and tender areas. These indicate inflamed follicles or cystic abscesses. In cases of enlargement a rough sketch is made for future comparison.

The vesicles are then examined, and here it is necessary to press firmly over the pubes directing the patient to relax his abdominal muscles by ~~curving~~ arching his spine backwards.

If the prostate is swollen and tender one should proceed no further. In the absence of any tenderness the gland is massaged by gentle sweeping movements of the examining finger from the outward limits of the gland towards the centre, paying particular attention to the region where the glandular tissue predominates, and pausing to empty any soft spot that the finger encounters. One must insist that the greatest gentleness is necessary and that brute force is not required. It is surprising how easily one can 'tease' the secretion out of the prostate and with practice one can instinctively guage the amount of pressure necessary to make the secretion appear at the meatus. With increased experience one's touch certainly never gets heavier. The movement should be stopped as soon as one gets to the urethra and on no account should any massage be applied to it. The dangers of over energetic massage are injury to the rectal

mucous membrane which I have never seen, and the excitation of an acute epididymitis which is very liable to occur. Some authors state thatone is apt to provoke an acute posterior urethritis but if the routine procedure described here is carefully adhered to the patient is not likely to permit one to use such force as could induce that complication.

If this massage is performed for the first time it is advisable to use atropine suppositories (gr 1/70 atropine sulph.) the night before and the morning of the examination to safeguard against epididymitis. This prevents the antiperistaltic wave up the vas which Schindler considers the most potent cause of epididymitis. Personally I never adopted this as a routine except in cases where massage of the middle lobe was essential or where massage had to be resorted to before the case was considered quite"ripe" for the operation, but there is little doubt one would be studying the best interests of the patient by giving atropine to each case.

After gentle massage is persevered with for a minute or so drops of prostatic secretion will appear atthe meatus and these are allowed to drop direct on to a slide. The macroscopic characters are noted. It is easy to tell pathological prostatic fluid by the naked eye or weak hand lens. Healthy fluid is a clear emulsion, which drops rather tardily, like raw white of an egg only that the colour is slightly more milky. It is quite free from granules as seen on the slide. Pathological fluid on the other hand is more or less granular and of a "dreadnought" grey colour. These

granules can be readily detected by rotating the slide to and fro between the fingers so as to catch the light at different angles. It drops on to the slide with a "flop" especially if the granules are large on account of their interrupting the homogeneous character of the fluid. The secretion is now spread out on the slide to make a thin even film and it is allowed to dry in the air, covered up to exclude dust. Fixing the film by heat, no matter how gently done, does not give such good results, the matrix being always hazy and the granules not so distinct. I adopted this method after reading Paul Asches book.

Having put aside the slides to dry, the patient is directed to pass the remainder of his urine into a second urine glass. Patients sometimes have great difficulty in micturating after prostatic massage, but if they are sent into a corner and ignored they can always manage it after a time. The second glass is put beside the 'control glass' and is referrred to as the 'bladder wash' glass. The patient is then directed to return to the irrigation room and irrigate urethro-vesically with Pot. Permang. 1 in 8000.

The macroscopic character of the fluid is now examined. The healthy bladder wash so obtained is a clear opalescent fluid without any granules or flakes while the pathological one is not homogeneous and contains plugs expressed from the inflamed ducts. In some cases these plugs are so gross that they have the appearance of small bread crumbs. These on shaking the glass rapidly sink tothe bottom being heavy masses of pus with entangled epithelial cells. These can be fished

out with a platinum loop and mounted and stained, or the fluid can be centrifuged and the deposit similarly treated. When dry the specimen is stained with methylene blue, washed, dried and covered up with a drop of cedar oil and examined by the 1/12 oil immersion lens. For the differentiation of organisms a second specimen should be stained by Jensen's modification of Gram's stain. The character of the fluid can best be studied in the methylene blue specimen. The normal fluid consists of a fine emulsion of lecithin, containing globules of various sizes, a few epithelial cells and here and there a mononuclear leucocyte, pus cells being conspicuous by their absence. Pathological fluid on the other hand contains pus cells numerous or otherwise according to the stage during which the smear was taken.

Writers on the subject differ greatly regarding the bacteriological findings. Neisser believes that the gonococcus is always present. Others take an opposite view. Leedham Green says they are found in recent cases only, and Kidd states that bacteria of any sort are rarely found except as the acute stage is subsiding. That the microscopical findings in my cases have been so singularly uniform is perhaps due to the fact that I was mostly dealing with comparatively recent cases. Gonococci were found in nearly all and the writer's experience is, that whereever one finds pus as a result of gonorrhoeal prostatitis there also one finds Neisser's organisms, if the search is systematically conducted, and if the case relapses gonococci are always to be found in readily detectable numbers both intracellular and lying free. Staphylococci were frequently present especially in old cases.

In cases of mixed infection various other organisms were seen, such as diphtheroids and a short diplobacillus. The number of pus cells and their grouping vary with the stage of the disease. At first one finds islets of pus cells and not infrequently one sees almost complete casts of the prostatic tubules formed of pus cells and epithelial debris. As the case advances towards cure the cells tend to remain separate and get fewer in number so that only one is seen here and there before the smear finally gets free.

During an attack of prostatitis the lecithin droplets, as such, disappear almost entirely from the secretion. This is due to the secreting cells being shed in the inflammatory process before the droplets are actually set free. Epithelial cells of the secreting type can be seen containing fine granules deeply stained with methylene blue lying amongst the pus cells. As the inflammation subsides these lecithin bodies re-appear in the secretion more or less in proportion to the disappearance of pus cells, this being a valuable prognostic sign. Very rarely does one see amyloid bodies in prostatitis.

URETHROSCOPIC CHANGES. The mouths of the prostatic ducts have a surrounding areola of inflammatory mucous membrane. Patches of soft infiltration were occasionally seen both on the roof and floor of the urethra. In almost every case there were evidences of inflammatory involvement of the verumontanum - a red and congested appearance and bleeding very easily.

## SYMPTOMS OF PROSTATITIS.

Most text books on Gonorrhoea divide the affections of the prostate into three distinct types.

There is the superficial or catarrhal prostatitis where the inflammation is limited to the epithelial linings of the ducts and acini, there is the follicular prostatitis in which the process in the glands predominates to such an extent that the glands are usually blocked with their own secretions giving the appearance of miliary abscesses and finally there is the parenchymatous or phlegmonous prostatitis where the disease has extended to the supporting stroma which takes part in the inflammation and may terminate in the most distressing complication of gonorrhœa - namely, acute prostatic abscess.

~~There~~ This is an arbitrary classification which is neither pathologically sound nor can such distinction be in accordance with the predominant clinical symptoms. If one recollects that the ducts of the prostatic glands - from 20 - 40 in number open individually into the urethra and that these glands are not structurally the same as those of the anterior urethra, which have a definite submucous layer, whereas the glands of the prostate are lined by two layers of cylindrical epithelial cells directly planted upon the supporting stroma, one recognises that there is no basement membrane to act as a barrier to infection, and it becomes difficult to understand how the inflammation can be limited ~~by~~ to the glandular elements. Bacteria can easily penetrate between the columnar cells and as soon as the two layers are shed the stroma is bare, and is then probably involved. Hence my conception is that in all

inflammations of the prostate the stroma is very early affected Besides, the blocking of a duct by its own inflammatory contents is surely an incident, rather than a distinct type of disease. In fact it must be obvious that all these types can be, and, indeed often are, present at the same time.

For our purpose the more correct classification is based upon the acuteness or otherwise of the disease as evidenced clinically, which is the standpoint from which these cases were approached.

As mortality was 'nil' there was no opportunity of studying post mortem findings, and the pathological picture can only be inferred from a study of the clinical symptoms checked - except in acute cases - by frequent examination of the secretion of the diseased prostate.

ACUTE PROSTATITIS.

The cause is, of course, a direct backward extension of the urethritis to infection of the prostate through the ducts. The infection first affects the lining cells of the ducts and acini, destroys them and causes them to be shed. There is in the adjacent stroma, resulting in migration of leucocytes then a condition of inflammatory vascularity induced and the usual connective tissue cell infiltration. The result is that there is so much inflammatory material poured into the gland that its comparatively narrow duct is insufficient to drain it. The contents then increase under great pressure. They may remain discrete forming the so-called pseudo-abscesses or retention cysts which are easily discerned on rectal examination, as soft boggy tender spots- if they are situated close to the rectal surface. They may be so close to the

urethra that nothing can be made out per rectum. If, however, the lateral lobes are carefully and gently palpated tender spots can generally be found. Rupture of theseretention cysts into the urethra, individually and direct, is, I believe, the most frequent termination. In course of time the contents drain away or get absorbed, when a hard cicatricial module takes the place of the previous soft spot.

In some prostates the cicatrization of the connective tissue surrounding these cavities is so pronounced that it gives an irregularity lobulated feel to the whole organ, with the healthy portions raised as soft bosses. As acute prostatitis in the earliest stages is symptomatically indistinguishable from acute posterior urethritis, it is probable that they more or less co-exist and hence the complication is most common in cases who were late in getting lavage.

In my series of cases there was only 56 of acute prostatitis (all in first attack cases, except one in a relapse) i.e. cases acute enough to necessitate suspension of local treatment and the substitution of general-rest in bed, soothing alkaline mixtures etc.

In 38 of these cases the inflammation did not assume a greater severity than above indicated.

The remaining 18 cases resulted in definite prostatic abscess. In these cases there is so much delay in the evacuation of the contents of the retention cysts or the process is so acute that distention of the folicles with inflammatory contents early ruptures the walls, and any inflammatory barrier which the stroma may have set up, allowing the free access of

pus into the substance of the organ. Contiguous acini may similarly burst, causing a large collection of pus and thereby forming a true abscess. Frequently the peri-capsule of the whole gland takes part inthe inflamation, usually through the medium of the lymphatics, more than by a direct rupture of the capsule. Resolution usually takes place after proper drainage through the ducts is established or the inflammatory exudation may be absorbed and fresh connective tissue laid, which may be so extensive as to cause a sclerosed condition of the organ.

This condition of small retention cysts must be more common than is generally supposed to be the case, for one finds many pathologically lobulated and sclerosed prostates from a previous attack, during the occurrence of which no urgent or acute prostatic condition was complained of. It is probable also that in cases where a large and definite abscess is present from the coalescing of many follicles, there are small pseudo-abscesses in other parts of the gland. These abscesses usually burst without any operative interference into the urethra. This has been the happy termination of all my cases. I have searched the records of this Hospital which during its 4 years' existence must have treated 20,000 cases and in no instance has a prostatic abscess had to be opened either through the perineum or rectum. One case went on for 14 days without rupture and was then transferred to a General Hospital for operation but I have been unable to follow the case up.

The subjective symptoms vary according to the severity of the inflammation. They may range from those of a mild

posterior urethritis to those of the definitely distressing prostatic abcess.

If there is an anterior discharge it usually gets suddenly less in amount but the morbid evidences in the urine become more than correspondingly increased. The onset may be so insiduous, and little enlargement be made out by rectal examination, that it is only when the secretion of the prostate comes to be examined later on that evidence is found of any inflammatory involvement having existed. Neither can tenderness be always reliable on account of the variability of sensitiveness in different persons. In well marked cases however the onset is acute and is usually characterized by a slight rise of temperature and in rare cases a rigor.

The patients complain of intense burning during micturition, especially at the end of the act, frequently referred to the root of the glans penis. Apart from this there is usually a throbbing discomfort in the perineum and pains in the inner side of the thighs and also in the region of the hips, and only in the later stages, suprapubically. In most cases there is involvement of the neck of the bladder. The inflammation does not as a rule extend beyond the trigone.

It is probable that such involvement is the principal cause of the frequency, as two of my cases of acute prostatitis did not show any frequency. One case could hold his urine all night notwithstanding that his prostate was palpably affected and that he had terminal haematuria.

The desire to micturate is much increased and the stream losses its force, dribbling may occur and acute retention is

common, in fact one looks for it, as its occurence is a sure indication of the presence of a large prostatic abscess.

As in acute posterior urethritis a few drops of blood may be passed at the end of the act on account of the powerful sphincter muscle squeezing it out of the imflamed posterior urethra. The urine is blood stained or turbid with pus. In these cases there is considerable tenesmus and pain on defaecation. The temperature is not always a guide. It is surprising what a large collection of pus can be present in the prostate, giving rise to the most distressing symptoms, without any corresponding rise of temperature. One of my worst cases ran a normal temperature thoughout, although he was an obvious wreck at the end of it. The examination of the prostate per rectum is very instructive. Usually a uniformly smooth enlarged and very tender prostate is found: there may be a considerable surrounding cellulites in which the clear outline of the prostate is lost, and the vascularity may be so great that a feeling of pulsation may be conveyed to the examining finger. Under treatment the severe symptoms usually subside in from 5 to 10 days by resolution or it may pass on to a subacute or chronic state - the former termination is the most common. Even in those cases of apparently uniform enlargements soft spots may later be detected showing that small abscesses have been present. In cases that go on to large abscess formation rectal examination reveals a diffuse boggy swelling occupying most of the rectal space.

The outline of the prostate is lost in the involvement of the pericapsular connective tissue infiltration. The

rectal tenesmus in these cases is very pronounced. A careful look-out is kept for areas of softening, and until these occur surgical interference, should it be necessary (which in my experience it ~~is~~ has not) is out of the question.

Spontaneous rupture usually takes place during micturition or defaecation. A patient's life is a burden to him during the course of acute prostatic abcess, but his relief comes with dramatic suddenness. While straining to urinate or defaecate, his obstruction suddenly gives way and he can pass without any pain a larger quantity of urine, mixed with pus, than he thoughthis bladder contained. The abscess has burst into his urethra. It is worth many hours anxiety over a case to see his happy expression of relief. He carefully measures his progress by the amount of his anterior discharge which usually re-appears or by the amount of pus in his urine. These cases also usually resolve by considerable fibrosis of the gland, but the process is painfully slow. There may of course be more serious complications such as pyelonephritis, thrombosis of the iliac veins with thrombotic detachments and pyaemia, but I have never seen them. The worst complication I have had to deal with was recurrent epididymitis of a subacute nature and this, in my opinion, was due to injudicious massage of the organ during the period of resolution.

## SUBACUTE PROSTATITIS .

While the above is a general outline of the symptoms of the more acute cases, which in my series did not amount to more than 7%, 2.25% of which resulted in definite prostatic abscess, there is a second class of prostatitis - a much larger class - in which the process is somewhat acute, but falls short of the necessity of the interruption of local treatment. These are the subacute cases. In these the inflammation is slow but progressive and usually multiple. Different portions of the gland are in different stages of inflammation, but the process is essentially the same as the acute, it is simply a question of degree. Cystic abscesses slowly form and the connective tissue slowly reacts, but prostatic abscess never occurs unless the inflammation is spurred by personal indiscretion or inopportune and careless therapeutic measures.

The subjective symptoms are the same as those of acute prostatitis only that they are much milder, in fact, they have frequently to be elicited. In my experience they have never amounted to more than frequency, indefinite uneasiness in the perineum and frequent seminal emmissions. Rectal examination reveals an enlarged and slightly tender prostate with follicles in various stages of tenderness and softening. The urine is sometimes turbid but more frequently contains a purulent haze and a large number of prostatic plugs with a heavy deposit of urates.

It is impossible to fix the frequency of this subacute type of prostatitis as, on the one hand, the line dividing it

from the acute can only be drawn with difficulty, and on the other, it gradually merges or develops into the most common type of all, namely, chronic prostatitis.

It is probable that this is the type, perhaps stage would be a more accurate term, which is responsible for the gross changes in the prostates of some second or third attack cases, who never complained of any urgent or definite posterior symptoms. It is certainly the stage that is usually associated with the ~~xxxxxxx~~ metastatic complication of arthritis.

CHRONIC PROSTATITIS.

Both the acute and subacute forms of prostatic infection usually develop into chronic prostatitis, but in as much as these combined can scarcely amount to more than 20% of all cases of prostatitis, it follows that in the large majority of cases chronic prostatitis develops insiduously during the course of chronic gonorrhœa, without at any time evoking any characteristic symptom. The urethritis spreads as in the acute cases, but very slowly to the ducts and glands of the prostate. A mild desquamative catarrh is set up with little tendency to spread to the stroma. The onset is very difficult to fix and usually the first indication is to be found in the urine, minute comma threads making their appearance with little or no mucous cloud. Careful questioning reveals a slight frequency of micturition with vague bladder and perineal discomfort. A few cases complain of precipitancy and most cases urinate slowly and fail to completely expel the last drops with their usual vigour, and have a feeling, not amounting to a definite call to urinate, that the bladder has been incomplete-

-ly emptied. This is not entirely a functional disturbance although it is more pronounced in debilitated cases. It is probably due to lack of tone of the sphincter and inability for a sustained "cut-off" action. These symptoms are usually accompanied by a low state of health. The cheery soldier never complains of being "run-down", but he looses the appearance of robust health and he takes a most morbid interest in his disease. He has pronounced sexual symptoms, being in a state of sexual irritability with frequent seminal emmissions. He is usually constipated and some secretion may escape while the sphincter is relaxed in the process of defaecation. This, in his debilitated state, considerably alarms him and at once he comes to complain that his " substance" "strength" or "goodness" is flowing away from him. One who has not had experience in the treatment of chronic prostatitis cannot form any estimate of the magnitude and reality of this subjective symptom.

I have never seen more severe nervous symptoms than above indicated, but the class and age of men from which my cases were drawn, are not those in which aggravated nervous symptoms are likely to be present. The sexual neurasthenic is a considerable time in the making, and none of my cases were of sufficiently old standing or long enough under observation, for their nervous system to be profoundly affected. I have little doubt however that a good many of these cases will ultimately develop nervous tendencies, as the exigencies of the military situation necessitated the discharge from Hospital of many cases before their cure was firmly established.

In brief, the symptoms of chronic prostatitis are usually indefinite and many have no subjective symptoms whatsoever.

A characteristic feature of these asymptomatic cases is their liability to periodic exacerbations in which mild symptoms are definite. The urine always shows evidence of this, the threads being more numerous and there is a stickiness or ropiness present which delay their sinking. This is very pronounced in cases of mild mixed infection and the microscope shows it to be prolific epithelial desquamation. This lasts for a day or two and the urine gradually clears, and after an interval the process may be repeated unless the mixed infection has been thoroughly dealt with.

Rectal examination will usually reveal an asymmetrical prostate with slight enlargement of either or both lobes most commonly at the bases. Most text books refer to a fibrotic shrinking of the prostate as a result of chronic prostatitis, but I have not seen this condition except as a result of an acute or subacute case developing into a chronic case. The large majority of my cases of true chronic prostatitis showed some degree of irregular hypertrophy. About sixty cases had perfectly symmetrical and apparently normal prostates, but the examination of the secretion indicated otherwise.

Reference must here be made to prostatic gleet. That prostatic secretion can escape while the compressor urethra is relaxed in defaecation is common knowledge, and further that the sphincter looses tone in chronic gonorrhoea, especially if there has been much instrumentation, but that there is such a thing as prostate gleet is, in my opinion, open to some doubt. At anyrate all the cases of gleet I had to deal with showed lesions in front of the sphincter and as soon as these lesions were cured the gleet disappeared. No gleet

was seen that looked anything like prostatic secretion. This is what one would expect on anatomical grounds. To take for granted that the sphincter should be able to discriminate between prostatic or vesicular secretion and urine is probably rating its intelligence too highly.

As can be inferred from the mildness and indefiniteness of the symptoms, the condition of chronic prostatitis can be easily missed hence the importance of rectal examination and massage for diagnostic purposes as a routine in every posterior case.

## TREATMENT OF ACUTE PROSTATITIS and PROSTATIC ABSCESS.

Acute cases wre treated on the following lines. The patient was kept in bed on milk diet, and if necessary, irrigation was suspended until the acute symptoms were on the wane. An alkaline diuretic mixture was given three times a day and mistura alba each morning. Hot sitz-baths of ten minutes duration were given three times a day and in the interval a hot sphagnum-moss bag was constantly kept on the perineum. Atropine suppositories (at. sulph. gr 1/70) or Ext. Bellad. Gr ¼ were given each night to relieve tenesmus and safeguard against epididymitis. The cases did well. Thiry eight cases were sufficiently recovered to resume irrigation in an average of three to four days, the longest period taken by one case being five days. In eighteen cases the acute symptoms failed to subside under the above treatment in six days and each of these had then formed some degree of prostatic abscess, and the treatment with certain additions had to be continued.

The tenesmus, rectal and vesical, present in these prostatic abscess cases, required morphia to relieve it. All the cases had dribbling and some varying degrees of retention. Hoth baths caused urine to flow in all but two cases, which had to be regularly catheterized with a soft rubber catheter of small calibre. One case was admitted late on Thursday night and he had voided nø urine since the previous Monday night. He was in a most distressing

condition, crouching forwards supporting his distended abdomen against his thighs, and it was with great difficulty that even a small catheter could be introduced. In prostatic abscess Ichthyol (gr. ii) suppositories combined with Extract of Bellabonna (gr $\frac{1}{4}$) were tried before the abscess had ruptured in order to hurry the process. The bowel was washed out with a hot enema and a suppository was introduced night and morning. There can be no question of the"drawing" action of Ichthyol in these cases, in fact it was so severe that it had to be stopped at this stage. All the cases burst spontaneously into the urethra.

The after treatment of these cases is of prime importance. Irrigation should be resumed as soon as possible, followed immediately by prostatic massage as soon as the patient will permit one. In the first few cases I waited for some considerable time until the prostate had practically become painless. These cases did badly and lingered a long time and a considerable amount of prostatic tissue was destroyed. These cases, a few years hence, will probably have hard sclerosed prostates, almost glandless and consequently functionless, of the atrophic type. In view of later experience such profound faith in nature was unfortunate. Contrary to the usual teaching massage was instituted in the later cases as soon as the pain and tenesmus allowed it. In fact massage can be given almost as soon as irrigation can be resumed, and one's guide should be that if the patient can irrigate into his bladder, even with a little discomfort, he should be ripe for massage.

The massage should in every case be given by the surgeon

himself and it should be of the lightest character - experience alone can teach how light.

At this time it should amount to no more than a mere gentle stroking of the gland, and is primarily intended to prevent the closing up of the opening of the large abscess, and the emptying of small retention cysts, which usually coexist, more by stimulating the contractile tissue than by actual pressure from the finger. This manipulation - it can hardly be said to amount to massage - should be done every second day. Each massage should be followed at once by irrigation of warm potassium permanganate (1 in 8000). At this stage Ichthyol and Belladonna suppositories are of decided value in promoting absorption and the sitz baths should be continued for a week or ten days. I have not had the opportunity of trying the hot rectal tube, but it appears a sound method of treatment.

The cases that were treated in this manner did remarkably well. The destruction of prostatic tissue was less - and future cicatrization will be also less - and they got better quicker than cases in which massage was delayed. There were two attacks of subacute epididymitis, but this can be avoided.

The above were the general lines on which cases were treated, but each case was considered separately, the most vital question at the onset being, whether irrigation should or should not be suspended. There were many cases showing acute prostatic symptoms, but only fifty six were considered to demand the stoppage of irrigation. If at all possible irrigation should be continued, the deciding factors being,

tenesmus, much frequency, or the presence of haematuria, terminal or otherwise.

Most of these fifty six cases were late in irrigating or had been treated with injections by a small hand syringe. This is the most potent cause of acute posterior symptoms and the practice should be universally condemned. The tendency is to force a syringeful or two into the urethra, and in order to more effectively destroy the germs, the fluid is kept in for some time. The sphincter, under the continued pressure, slightly relaxes and infected matter from the bulb slips into the prostatic urethra and infects it, as there is no fluid to wash the infected matter away, the patient being usually very careful not to ~~irrigate~~ urinate for some time lest the disinfecting action be lost by washing away the fluid bathing the urethral walls.

I am of the firm opinion that were Janets irrigation carefully carried out with due regard to the strength and force of the fluid, acute prostatic complications should be very few indeed, except in the hyperacute cases that are usually pretty well on the way before irrigation can be properly instituted.

Urotropin should in this stage be avoided as it is either inert on account of alkalinity of the urine or irritating to the urethra on account of the formalin liberated if the urine is acid. Boric acid or sodium salicylate should be the drugs used if a urinary antiseptic is required. One hyperacute case who grew a profuse streptococcal growth was much relieved after the administration of 10 c.c. polyvalent anti-streptococcic serum. His temperature dropped from 102° Fah to 99° F. in 12 hours

## TREATMENT OF CHRONIC PROSTATITIS.

Watson tersely puts the objects aimed at as "the conservation of the remaining healthy gland tissue, the restitution of the affected epithelial areas, the destruction of infecting organisms and ~~a~~ the maintenancy of a free exit for the secretion".

The most potent individual therapeutic measure at present at our disposal for these purposes is prostatic massage. This should not be applied intil the urine is clear of any deposit of pus, and in ordinary cases not before the end of the fifth week, but each case must be treated on its merits. The massage should always be performed by the gloved finger and the whole gland systematically gone over in the manner already indicated, paying particular attention to any boggy spot encountered, and avoiding any massage of the urethra except to give a final sweep with the finger along its course after the ducts are emptied. This massage should lastfor two or three minutes and should not be given oftener than twice a week, and at the end of every four or five weeks there should be a period of rest.

As already pointed out particular attention should be given to the type of prostate present and the massage applied accordingly. In prostates of the 'round' type the massage should be applied uniformly. In the flat type of prostate which has a tendency to have a uniform "boggy" feel massage over a sound is a decided advantage. While in the bilateral type the massage is principally confined to the lateral aspects of the gland. Further if a prostatitis of the 'middle' lobe be diagnosed either by the urethroscope or by a process of exclusion, massage should be applied to it over a sound and

never unless atropine has been previously administered. Irrigation with potassium permanganate 1 in 4000 always followed massage.

Under massage a gradual change for the better is evident in the urine, the heavy prostatic plugs get fewer and fewer although for a long time light epithelial flakes may be present Corresponding changes are present in the secretion as it appears at the meatus. In a marked case the amount expressed at the first few sittings is considerable but this gets gradually less and the smear shows a steady diminution of pus cells and organisms and pari passu with those a reappearance of free lecithin granules. One aims at the total disappearance of pus cells, but as a matter of fact a few pus cells can be seen long after all organisms have disappeared, and after the smear is macroscopically normal and the patient as far as one can tell cured. These changes are accompanied by a steady improvement in the general health of the patient and particularly in their nervous condition. The benefits of massage in these cases must be ascribed to the emptying of the inflamed follicles of their pathological accumulations and keeping their ducts free for drainage. The attainment of those ends is necessarily followed by a better circulation in the capillaries, and this tends to the absorption of any connective tissue infiltration present, and to an increased tone of the muscular tissue of the organ. Better muscular tone means a more complete expulsion of infected matter from the diseased follicles. It is possible also that massage liberates a certain amount of endotoxins which increase the antibody-content of the blood. The pronounced nervous

symptoms of chronic prostatis are possibly due to the prolonged irritation of the complicated nerve endings by toxic materials, and prostatic massage acts beneficially by the removal of these irritating toxic substances.

Most of these cases were given iron and arsenic as a general tonic. Irrigation was always kept up usually with pot. permang. 1 in 4000 or sometimes stronger. This was at first given twice daily, some cases once daily and later once every second day, depending upon the condition of the urine which was systematically examined at least once a week. If there was a mixed infection irrigation with perchloride of Mercury (1 in 20,000) was resorted to with beneficial results. It is my belief that the tendency is to overdo irrigation in chronic cases. It is most essential that the irrigation in these cases should be as hot as possible at least 110 F. In this connection much benefit was derived in obstinate cases from the use of Valentine's hot water bougie. The best results were obtained by twenty minute applications twice weekly at a temperature of not more than 118°F. Temperatures up to 125°F can be well tolerated but the application must be shorter and the results were not as good. Some cases that resisted massage yielded to this line of treatment, more particularly cases of the 'flat' prostate type. Two such cases who had been in Hospital for nearly six months got rapidly better under this treatment. The urine voided after these applications would seem to indicate that it acts by encouraging the glands to secrete and force out the contents through the ducts - internal prostatic massage.

Another line of treatment that helped a few obstinate

cases was treatment by suction using Mills' negative catheter. It certainly sucks out the secretion from the ducts, and is a very useful means of obtaining deep smears. The suction was applied by means of a strong rubber ball and it can be controlled by a manometer.

Hot sitz baths, even in chronic cases, are of decided value, but application of drugs such as ichthyol per rectum appeared to be valueless in this stage.

Instillations of nitrate of silver through Ultzmann's syringe were tried with disappointing results. Anything over 2% creates a strong reaction without any apparent benefit and I blame it for two cases in which acute posterior urethritis supervened. The blind use of silver - no matter how weak - should be condemned as whilst attacking the diseased tissue it cannot fail to damage the healthy parts. It is useful for provocative purposes.

Two hundred cases of gonorrhœa were treated by Collosol Manganese as recommended by Mr McDonagh, but it did not appear to lessen the incidence of prostatitis, and the use of Intramine in this complication failed to yield the excellent results claimed for it. On the contrary these colloidal drugs seems to overstimulate the tissues and lessen their power of reaction. For some time gonococci would be found although the clinical evidences were slight, but after a time the tissues seemed to recover and a large percentage of the cases relapsed.

Exactly the same applies to large doses of vaccine as recommended by Lumb. His idea was to give large doses of vaccine beginning with 50 million and then 100 million twice weekly in order "to create a series of strong positive phases

The danger of treatment on these lines is that entirely from the clinical point of view the cases do well, and are apt to be discharged before the tissues recover their power of reaction. The microscope and cultures show most of these cases to be infective. Under the control that can usually be exercised over patients in civil life, such treatments should in the interests of the community be absolutely avoided.

About a third of the above cases were treated by a stock vaccine, whose antigenic power was supposed to be high - the Newbould strain made at Rochester Row. The initial dose was 5 millions combined with 15 millions of a mixed staphylococcal vacine. The result was that, in my opinion, these cases did no better than those treated by irrigation and massage alone. The only exceptionsthat were apparent were cases of epididymitis and arthritis. While these complications appeared to be benefited somewhat, it seems not to influence the primary foci.

I have not had the opportunity of trying the detoxicated vaccine that is giving such good results at Rochester Row Military Hospital, and which appears to be a real advance in vaccine therapy.

Systematic dilatation as far as this can be done by Chitton sounds was applied in every case. It certainly helps to absorb the soft infiltrations.

The use of the posterior Kollmann's dilator is fraught with danger. With this instrument, as at present made, dilatation of the prostatic urethra is impossible, without damaging the sphincter and causing incontinence. The expanding portion of any mechanical dilator should not be longer than the length of the prostatic urethra.

The results obtained in my cases were, on the whole,

satisfactory, but one must emphasise that prostatic massage will not cure every case of prostatitis. I have not attained sufficient dexterity to use the posterior urethroscope except as a diagnostic measure. An expert urethroscopist would probably have cured ~~a few~~ some of my cases at a few sittings. Sufficient has been said to make it evident that the cure of prostatitis is long and tedious. Two of my cases took close upon two hundred days. It is impossible to state the -- average period of cure as some of my cases were still in Hospital after my transfer, and the number of relapses who were honestly discharged as cured showed that some cases were really only latent. It is probable that the cure of chronic prostatitis will take at least three months.

The exigiencies of the military situation did not permit a more strict test of cure than is indicated above, but observation of relapse cases convinced one that any test of cure should be periodically repeated, after the exhibition of provocative measures, for at least six months. Any laxity of this rule is detrimental to the interests of the patient and the State. Herein lies the principal value of serological tests.

## SPERMATO - CYSTITIS or VESICULITIS.

Gonorrhoeal infection of the seminal vesicles has not received the attention that its frequent occurrence would seem to merit. The seminal vesicles are in direct communication with the prostatic urethra through the ejaculatory ducts. The verumontanum is early involved in gonococcal infection of the prostatic urethra and the cul-de-sac of the "uterus masculinus", lined, as it is, with susceptible columnar epithelium, can scarcely escape infection. On account of its anatomical peculiarities infected debris can only be swept away with difficulty. Infected matter is thus kept in close proximity to the mouths of the ejaculatory ducts and can readily pass up into the vesicles by direct spread along the longitudinal sacculations of these ducts. Some writers maintain that this is unlikely to happen as long as their sphincters are unaffected but this theory does not bear the light of the fact that gonorrhoeal infection can "cheat" a much more powerful sphincter - namely, the compressor urethrae.

Irritation of the colliculus seminalis or prostate has been experimentally proved (Schindler) to excite a reverse peristaltic wave up the vas and some of the infective material can then readily be side tracked into the vesicles.

By whichever of these methods infection reaches the vesicles it is certain that it does so frequently, so that gonorrhoeal vesiculitis is commoner than is generally anticipated.

A true estimate of the frequency of this complication is difficult to arrive at as accurate diagnosis is beset with pitfalls. Columbini's 60% is probably a gross overestimate and

Peterson's 4% is an obvious error at the other end of the scale. My own figures I submit with reservation. Based as they are almost entirely upon lesions of the vesicles gross enough to be evident on rectal examination, it is obvious that it is an underestimate, as there must be many cases of infected vesicles without appreciable enlargement. In 880 cases of gonorrhoea, one or other vesicle was considered pathologically enlarged in 207 cases, or 23%. The only reliable deduction that can be made from these figures is that spermato-cystitis is present in at least 23% of all cases of gonorrhoea. The percentage in cases whose cure took 70 days or over was 26, and in case considered dured within 50 days, 21.

Frequently vesiculitis is the precursor of epididymitis, but this however is not always the case, as one often feels a normal vesicle, where the corresponding epididymis is affected, while the other vesicle may be frankly pathological.

The diagnosis of spermato-cystitis usually can only be made after rectal examination. Clinically two forms of the disease were met with (a) acute and (2) chronic.

ACUTE VESICULITIS.

The cases are not common except as an accompaniment of acute Epididymitis, and the clinical picture is usually over--shadowed by the more urgent testicular symptoms, and I am afraid that many of them were at first missed.

There were, however, two cases of acute vesiculitis without a coexisting epididymitis. The symptoms evoked were practically the same as those of acute prostatitis. One of them developed a very large acutely tender rectal swelling which at first was considered to be a prostatic abscess. It was its definite unilateral character that first suggested a vesicular source.

This patient complained of left sacro-iliac pain and pain over the left iliac crest. The acute symptoms subsided in about a week leaving a cystic condition of the vesicle which was gradually absorbed. The case evidently stopped short of actual pus formation as very little detritus came away in the urine.

The second case was much milder but had rather pronounced urinary symptoms, which supra pubic pain, neuralgia of the corresponding testicle and painful seminal emissions. A fairly acute catarrhal condition of the vesicle may exist without any definite symptoms. Examining cases on admission one frequently finds an enlarged and highly tender vesicle without any subjective symptoms. In these cases epididymitis usually follows in a day or two.

The diagnosis should rest upon the presence of an enlarged and tender vesicle and no attempt should be made to obtain vesicular secretion in this stage.

CHRONIC VESICULITIS.

Most of the acute cases gradually become chronic or the case may be chronic from the start.

Mildly catarrhal is clinically more correct as these cases are so mild as to be asymptomatic and the rapidity with which cure is often established can hardly warrant the term "chronic" to be applied to them.

The symptoms when present, were frequency of micturition especially during the day, a general feeling of discomfort about the neck of the bladder and a dull pain in the back and thighs. In the text books much is made of painful and frequent seminal emissions as a symptom of vesiculitis. These are due to an irritable inflammatory condition of the verumontanum

involving the mouths of the ejaculatory ducts causing some stenosis. The frequency of these emissions is in direct proportion to the irritability of the erectile tissue of the colliculus and the pain in proportion to the stenosis of the ducts. This symptom appeared to me to be just as as common in prostatic urethritis where there was no apparent lesion in the vesicles. Sacro-iliac pain, frequency of micturition in the daytime, and seminal emissions leaving a faintly rusty stain surrounded by a greenish halo, upon the patient's linen, would seem to indicate involvement of the vesiculæ seminalis.

The diagnosis rests entirely upon the rectal examination The walls of the vesicle are usually thickened and there is some degree of enlargement. One case showed a cystic condition of the left vesicle nearly occupying the whole rectal space yet he had few subjective symptoms. He could retain his urine all night but had frequency during the day. There was no tenderness nor irritative sexual symptoms. The swelling completely disappeared after three sittings of vesicular massage. To obtain the secretion for diagnostic purposes the prostate is first massaged and the bladder afterwards emptied to clear away any secretion expressed from the prostate, The bladder should then be fully distended to make the vesicles more accessible. The contents of the vesicles are then expressed by the finger - the other hand pressing the bladder supra pubically.

In marked cases a large amount of debris is expressed. which is very tenacious and sticks together in such large lumps that one is surprised that they could pass through

the orifices of the ejaculatory ducts. It is essential to avoid pressure upon the ampullae of the vasa deferentia, as they also can be affected in gonorrhoea and easily mistaken for an enlarged vesicle.

Slides are prepared and examined for pus cells, gonococci and sperm cells. Normal vesicular secretion stained with methylene blue shows epithelial cells and large pale blue discs (vesicular bodies) and healthy sperm cells. The characteristic features of pathological secretion are the number of pus cells and disintegrated sperm cells with or without gonococci.

TREATMENT.

ACUTE CASES should be sent to bed and given an alkaline mixture with hyoscymus to lessen the vesical irritation and if necessary an opiate at night. Atropine suppos. (gr 1/70) should be given night and morning to every case, avoiding constipation by the free use of mist. alba. Hot hip baths are also soothing. Unless there are symptoms of acute posterior urethritis or prostatitis irrigation should be continued with 1 in 8000 potash permang. I think that weak and warm irrigations are very beneficial even supposing acute epididymitis co-exists. Massage should not be resorted to for five or six weeks.

CHRONIC or MILDLY CATARRHAL CASES should have general tonic treatment with iron and arsenic and an occasional blue pill. The urine should be maintained acid by urotropin and acid sodium phosphate. Irrigation as hot as the bladder can bear are necessary but most benefit can be derived by systematically emptying the affected vesicle of its inflammatory contents. This should be done every fourth day until the vesicle can be emptied at each sitting. Then once a week

is quite sufficient. If the vesicular smear is still infective after twomonths the patient should be given a rest of one month and massage then renewed. To thoroughly empty a vesicle, pressure by lateral movements should at first be applied in the short axis of the vesicle so as to empty the saccules into the central canal and this is cleared by fairly firm pressure in the long axis of the vesicle always working towards the middle line.

In cases of gonorrhoeal rheumatism the massage should be delayed until a few doses of vaccine have been given, and then it should be of a light character, otherwise infection of another joint, or an acute exacerbation of an existing one, may be precipitated.

Some vesicles do not yield to massage and it is in such cases that Luys obtained such brilliant results by catheterization of the ejaculatory ducts.

Bellfield applies direct medication through the vas and in obstinate cases this treatment should be resorted to. Kidd publishes some excellent results from it. I have tried intramine and collosal manganese as recommended by McDonagh, but found no benefit from it. The same applies to Vaccine unless metastatic complications are present. Graduated doses up to 150 millions are certainly useful in these cases.

An account of gonorrhoeal prostatitis or vesiculitis would be incomplete without reference to metastatic complications. An infective focus in the prostate or vesicle is the starting point of all cases of gonorrhoeal iridocyclitis and arthritis. This must be strongly insisted upon and the cases treated accordingly.

There were 35 cases of metastatic complications - twenty

seven cases had gonorrhoeal arthritis or synovitis, six cases had iridocyclitis, and two cases showed both arthritis and iridocyclitis. Each one of these cases showed a definite prostatic or vesicular lesion, and the vesicle seems to be the greater offender. The arthritis does not supervene until the vesicles have been affected for some little time. ~~Exactly three quarters~~ Twenty eight of my cases were relapses or second attacks, with an infective focus probably remaining from the previous attack. The arthritis of first attacks ran a much more acute course, but yielded more readily to treatment, as soon as massage of the prostate and vesicles could be instituted.

The clinical appearance and behaviourof these joint and eye cases suggest that many cases of so-called rheumatic iritis and arthritis that one sees in civil practice, may have a vesicular or prostatic focus as the causative factor. Each one of them should be examined in order to exclude any such focus. It is interesting to note that in the few cases where the focus was purely prostatic, the result of examination of that gland showed a prostate of the flat type that felt "boggy" indicating a diffuse catarrhal condition without any definite localised modules.

Prostatic massage must be combined with carefully graduated doses of mixed gonococcus vaccine. In cases of arthritis with considerable effusion into the joint intraven-ous injection of anti-typoid vaccine should be tried. The initial dose should be 120 millions made up to 1 c.c. with sterile water and increased to 200 millions after five days. A strong re-action is produced and the improvement is proportion-ate to the reaction. If no reaction is produced by the

increased dose the treatment should not be persevered with. The improvement is quick, usually quite apparent in twelve hours Three of the above cases were thus treated, two responded and one failed.

SUMMARY and CONCLUSION.

1. Prostatitis is a common complication of gonorrhoea occurring in over three fifths of all cases and in nearly nine tenths of chronic cases.
2. Vesiculitis complicates at least one fourth of all cases of gonorrhoea.
3. Gonorrhoeal infection may remain latent in the prostate or vesicles for years, but is always liable to be stirred into activity.
4. Such cases will remain "gonorrhoeal carriers" until these glands have been systematically dealt with, and they should only be declared cured after the most rigid tests have been applied spread over a period of at least some months.
5. The prostate and vesicles and their secretions should be regularly examined in every case of gonorrhoea.
6. The best preventative of acute posterior symptoms, is Janets irrigation.
7. The treatment of chronic cases is long and tedious and entails exact diagnosis.
8. Prostatic massage ~~if~~ is the most successful measure but the physician will have to use every arrow in his therapeutic quiver before a cure is obtained in some cases.
9. Attacking these foci through the blood stream has, up to the present, not yielded good results.
10. The metastatic complications of gonorrhoea are due to the gonococcus entering the blood stream from a focus in the vesicles or prostate and the indications for treatment are therefore obvious.

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