SEMINAL VESICULITIS: SYMPTOMS, DIFFERENTIAL DIAGNOSIS, TREATMENT AND BACTERIOLOGICAL STUDIES IN 1,000 CASES*

BY EDWARD WILLIAM WHITE, M.D.,
Chicago, Ill.,
and

R. B. H. GRADWOHL, M.D.,
St. Louis, Mo., and Chicago, Ill.

Recent investigations and the progressive increase in the number of seminal vesicle cases constitute the incentive for this presentation. We know of no condition in the field of urology which has created more widespread interest, and in which the results of treatment are more generally unsatisfactory than in this. In reviewing the literature on the subject it is interesting to note the scarcity of material at our disposal—due in all probability to our former limited knowledge of the correct micro-pathology of the vesicle sacs. It has been our good fortune in recent years to observe a rather large collection of seminal vesicle conditions, and through classifying this data, we have arrived at definite and important conclusions which should materially assist in future studies of this interesting topic.

In an exhaustive review of former articles written by White and others on seminal vesicle disease, it is to be noted that our progress in the knowledge of these conditions has been characterized by a slow and steady growth, in direct proportion to our understanding of the anatomy, physiology, bacteriology and surgical possibilities of these organs; that the seminal vesicles are more or less an intricate series of closed or partially occluded sacs which may harbor infection indefinitely; that the vesicles are convoluted membranous pouches in close proximity to the base of the bladder and the termination of the ureters; that these vesicles may be successfully attached surgically; that injections *via* the vas materially improve pathological conditions therein. All this has helped us to acquire our present wealth of knowledge concerning these organs.

An essay on seminal vesiculitis would be incomplete were not such men as Fuller, Squier, Schmidt, Cunningham, etc., given due credit for their work. Fuller's operative studies on vesicles date back as early as 1901 and his work advanced at that time forms practically the basic principles of our present operative procedures. The Squier classification of symptomatology as pain, pus and rheumatic groups will cover, in a measure, our present series of cases. The Belfield studies and operations on the vas have shown the way for future observation.

SYMPTOMATOLOGY

The symptomatology of seminal vesiculitis naturally divides itself into neurotic, bladder and urinary, perineal and testicular, abdominal, sexual and rheumatic symptoms. This varied and extensive symptomatology is due in all probability to the anatomical proximity of the vesicles to the bladder, ureters and prostate. Since the nerve and blood supply are intimately associated, morbidity ultimately becomes uniform to a varying degree.

Neurotic Symptoms.—Neurotic symptoms are exceedingly common and are seen in 90 per cent of all cases. The degree varies from a mild state of apprehension to one of suicidal intention. This is one of the most serious phases of seminal vesiculitis. Extreme cases are not only a danger to themselves, but a menace to the community, particularly to the attending physician. We have known of two cases of suicide attributed directly to chronic seminal vesiculitis of the neuro-sexual type. We are of the opinion that these neurotic states are due to the prolonged course of the disease, persistency of symptoms, and lack of encouragement. We have a large number of these cases under observation. Some have been operated upon, others treated in a palliative way. The results are generally unsatisfactory. However, we believe the operative route in selected cases to be the correct procedure, if only from a psychological viewpoint. These cases were not infrequently the subject of varied diagnosis due to the multiplicity of seminal symptomatology. Many cases are permanently cured through vesicle attention.

Perineal, Testicular and Anal Symptoms.
The perineal and testicular disturbances

*Read in Section on Urology, Southern Medical Association, Fourteenth Annual Meeting, Louisville, Ky., Nov. 15-18, 1920.

are present in practically all cases, and although frequently referred, it is common to find a slightly thickened vas and an infiltrated sensitive epididymis. Pain is present in a varying degree, ranging from only a slight discomfort to sensations of dragging, drawing and feeling of dullness and pressure. Fifty per cent of cases complained of itching and burning about the anal orifice, which was invariably relieved by vesicle massage. Testicular symptoms are easily disposed of, in view of the fact that 30 per cent of cases have had acute epididymitis during former attacks of specific urethritis, and naturally complained of sensitive epididymis and dragging along the cord.

Noble and Picker were among the first to arrive at the conclusion that recurrent epididymitis was due to disease of the vas and ampulla.

In all cases perineal and testicular symptoms are prominent.

Bladder and Urethral Symptoms.—If you pause to contemplate the anatomical proximity of the vesicles and bladder, as referred to by Fuller, the cause of bladder symptoms is readily appreciated. In our series of cases practically all were subjected to cystoscopic examinations, and in all cases of long duration a trigone cystitis of varying degree was noticed. The trigone was involved to a mild degree in all cases, but in a large majority a typical diffuse injection of the mucosa with markedly dilated vessels was seen. The trigonitis was frequently limited to the mucosa of the bladder overlying the vesicles. There was noted a limited area of hyperemia and dilated vessels. These findings were not limited necessarily to the trigone, as in not a few cases a generalized cystitis, with some obstructive findings, was recorded. A bladder so involved could easily account for such common symptoms as irritability of the vesicle neck, suprapubic pressure and pain, tenesmus, dysuria, and all symptoms associated with cystitis.

Urethral Symptoms.—They are many, and in some cases extremely annoying. Discharge is invariably of an extremely chronic character and resists the usual forms of treatment. These cases frequently have peri-urethral glandular involvement. These glands are continually

being reinfected from the upper genital tract. Hence comes the chronicity.

Frequency and dysuria are common, due to the chronic infiltrating posterior urethritis, which is either primarily or secondarily present. Acute retention is not seen except in those cases of marked prostatic or stricture complications.

Abdominal Symptoms.—The abdominal symptoms associated with this condition were frequently difficult to differentiate. They are generally due to the peritoneal investment of the seminal vesicles and may simulate chronic appendicitis, urethral colic, ureteritis or stone.

Due to the close proximity of the bladder, abscess formations with perforations into this viscus have been reported; also rupture into the peritoneal cavity by way of the recto-vesicle cul-de-sacs. One of us (White) reported recently a case of tuberculous seminal vesiculitis in which the pus had burrowed completely through the bladder wall, forming a permanent fistula, which discharged its tuberculous contents directly into the bladder. This was beautifully shown by the cystoscope. It exerted pressure on the right seminal vesicle per rectum. Pyemia has been seen to follow a septic phlebitis of the adjacent venous plexuses. Pelvic cellulitis with marked suppuration is not impossible. Dull, persistent suprapubic pain, constant pain in the lower lateral quadrants of the abdomen with a chronic urethral discharge should always suggest vesicle trouble. In this series of cases 95 per cent had some abdominal manifestation.

Rheumatic Symptoms.—In our series of cases we have noted about 5 per cent with rheumatic complications. Osseous formations, spiculae, etc., were definitely demonstrated in five cases. It is not difficult to understand, from our knowledge of anatomy of the vesicles and acquaintance with the character of inflammation in other organs of a similar type, the *modus operandi* of systemic infection due to this complication. When the seminal vesicles are invaded by pathogenic organisms, whether they be gonococci, streptococci, staphylococci or colon bacilli, they enter a chronic inflammatory state due to hyperemia, round cell infiltration, and insufficient drainage. Inflammation of the vesicle sacs

are characterized by marked chronicity with an attenuated form of virulence. Infection may be harbored for years, periodically expressing septic material into the general circulation. The synovial membranes are areas of predilection, due to their natural weakness for any invading organism. Squier states that the synovial fluid is lymphocytic instead of leucocytic. Hence, it does not offer a good phagocytic protection.

It is interesting to note that many of our rheumatic cases gave a negative specific history, absolutely denied Neisserian infection, nor could the gonococci be demonstrated by any fixation of complement test or cultural methods at our disposal. These cases frequently come to the urologist as a last resort after having had all other sites of pus collections eradicated.

Sexual Symptoms.—The sexual status in about 35 per cent of cases was a negligible quantity, presenting every phase of derangement from mild inaptitude to complete impotency. Atonic vesicles were noted in cases of ejaculatory praecox with mild degree of imperfect erection; whereas, cases of complete impotency invariably presented hard, fibrous sclerotic vesicles. Seminal vesiculitis in 75 per cent of these cases was productive of marked loss of strength, nightly pollution and desire. Blood and pus were demonstrated in the ejaculated material. This is readily explained on the basis of irritation, which is commonly present at the onset of any inflammatory condition. Painful orgasm, painful, incomplete erection, hemospermia, pyospermia, etc., are all common findings in seminal vesicle disease.

Blood and pus in the ejaculate and pus following vesicle massage are proof positive of vesicle involvement, and are worthy of medical or surgical consideration. It is interesting to contemplate the improvement sexually in these patients following vesicle drain. Fuller has reported a number of such cases in which the sexual status was practically normal, following vesicle drain.

DIFFERENTIAL DIAGNOSIS; COMPLICATIONS

In view of the fact that seminal vesiculitis is not a distinct entity, but is invariably associated with prostatitis, trigon-

itis and urethritis, a differential diagnosis from these conditions is obviously unnecessary. Renal, ureteral and abdominal conditions often necessitate careful consideration.

By virtue of the anatomical proximity of the seminal vesicles, bladder and ureters, it is not surprising that pathological conditions of the vesicles can readily produce changes with their associated symptoms within the bladder, ureters and kidneys. It is this phase of the subject that has occupied considerable of our attention, especially from the standpoint of differential diagnosis. The renal complications appearing in the course of vesicle disease are virtually obstructive in character, due to the pressure exerted on the ureter from without, and productive of symptoms not unlike ureteral stone, stricture or the acute abdominal manifestations of renal calculus. We are frequently requested to do a ureteral catheterization in cases like the above, and find that seminal vesiculitis is directly responsible for the symptomatology. The acutely distended vesicle so commonly seen in the course of a Neisserian infection is not, *per se*, productive of renal or ureteral morbidity. However, a seminal vesicle once invaded by pathogenic organisms soon enters into a state of chronic infiltration due to insufficient drainage. Peri-ureteritis follows from either direct pressure on the ureters, or some interference with the blood and nerve supply to the ureters at this point. We could cite any number of cases where ureteral catheterization was necessary to establish a diagnosis between calculus, ureteral kinks and similar conditions in the urinary tract. A thorough rectal investigation is equally important in every case of urogenital disease. The basic cause of urinary complications is indelibly fixed on operating these cases of sclerotic vesiculitis. The ureters are easily seen as they run anteriorly to the upper part of the vesicle sacs and not infrequently must be dissected free, due to adhesions and peri-ureteritis and peri-vesiculitis. This finding is sufficient to account for conditions in the urinary tract which necessitate a differential diagnosis.

BACTERIOLOGICAL AND SEROLOGICAL ASPECTS

In an attempt to throw some light on the bacteriological and serological side of these cases, we have carried out a systematic investigation of all cases presenting themselves for treatment. This consisted in obtaining under the strictest precautions of asepsis the expressed contents of the vesicles, making smears, staining with Roux blue and Gram differential stain, cultivating special media and systematically studying the organisms by plate and tube tests.

Technic of Obtaining Cultures.—Bladder and urethra were thoroughly irrigated with sterile water, after which the bladder was left with about 500 c. c. of water inside. The prostate was then thoroughly massaged. The patient was permitted to urinate a portion of the retained fluid. An attempt was then made to massage the vesicles with finger and massage steel. Secretions resulting from this were expressed by stripping the anterior and posterior urethra. The contents were caught on a platinum loop and planted in culture slants. In cases where this was not satisfactory the patient was permitted to empty his bladder. This material was then centrifugalized and cultured.

After an extensive experience with various culture media which have been suggested for the cultivation of the gonococcus, we have come to the conclusion that the use of the milk agar medium first suggested by Piorkowski suffices very well. His formula, as modified by us, consists of:

One liter of milk. Add 5 c. c. of hydrochloric acid, one to four, heat over a flame at 37° C. until the casein drops, then neutralize. Heat in the Arnold for two hours. If any more casein drops, filter. Sterilize in the Arnold. Then mix with sterile 3 per cent agar, tube.

Second place, perhaps, may be given to the starch agar medium of Vedder. We found that within the usual period of incubation of from 24 to 48 hours we obtained fairly good cultures of the gonococcus or other attendant organisms upon the medium. In many cases we found the gonococcus in pure culture. We did not find it necessary to resort to any of the methods described for cultivation of the gonococcus by increasing the surface tension by withdrawal of oxygen, heating the tubes, blood sera of any kind, etc. It

can be definitely stated that the use of milk agar gives a good working medium in every-day practice for the successful growth of the gonococcus. We obtained quickly a luxuriant growth by placing the inoculated tubes under a bell jar in the incubator with an open flask of water close by. Our procedure was to examine the tubes, make smears from same, and then plate them out on the same medium in sterile Petri dishes. The gonococcus grows fairly abundantly on this medium in the form of small pearly colonies, which are discrete at first and then gradually coalesce by the outcropping of more slowly growing groups. We made it a point to subculture the gonococci at least every five days.

Differentiation of the diplococci which we designated gonococci was made by cultivation on sugar media, by staining and by measurement of the colonies, which were 1 to 1.5 mm. in diameter. The gonococcus has an elevated center in colonies, with scalloped edges. It ferments glucose slowly. The one organism which we had most difficulty in distinguishing was the micrococcus catarrhalis, but these show small, irregularly rounded colonies, growing well on all media, and not fermenting carbohydrates.

Complement Fixation.—In addition to the culture methods we attempted to ascertain the gonorrheal or non-gonorrheal character of the infection by complement fixation test of the blood. One of us (Gradwohl) has called attention in a previous communication (*New York Medical Journal*, November 30, 1918) to the value of the gonorrheal complement fixation test of the blood in suspected gonorrhea, utilizing the method of Hecht and Gradwohl, described in connection with the serological test for syphilis. Briefly, the method of Hecht and Gradwohl differs from the older method in that unheated blood serum is used. Advantage is taken of the presence of native complement and amboceptor instead of artificial complement furnished by guinea pig blood serum and anti-sheep amboceptor of rabbits, previously inoculated with sheep cells.

By this method we claim, first, that we avoid the destruction of gonococci antibody consequent upon the inactivation or

heating of blood serum to 56° C. for half an hour. Secondly, we have a better balance of the hemolytic system in that we exactly titrate each serum submitted, ascertaining in that way the amount of natural hemolytic activity present and utilizing exactly that amount. In a previous study it was shown by Gradwohl that possibly the gonorrheal complement fixation test fails in 12 per cent of all cases where it is reasonable to expect it to be present, even utilizing the Hecht-Gradwohl technic, but that the result with the Hecht-Gradwohl technic showed 56 per cent better or more accurate data than the so-called regulation method commonly used. We ventured to assert at that time that with the use of a better antigen, still higher figures could have been obtained. It was for that reason that we undertook the manufacture of a polyvalent antigen from our pure gonococcal cultures of this investigation, and used this antigen on the very cases from which the gonococci had been cultivated.

The Polyvalent Antigen.—This antigen was made as follows: tubes showing an abundant pure culture of gonococci were washed off with sterile distilled water. As many different cultures from as many different cases as possible were mixed. We thus made an antigen consisting of the washings of two hundred and fifty separate cultures from as many different cases of gonorrheal seminal vesiculitis. These washings were collected in a sterile Erlenmeyer flask and allowed to autolyse for one week. The autolysed specimen was then filtered through a sterile Berkfeld filter, using a moderate degree of suction. The filtrate was pipetted into a sterile cylinder so that it would be conveniently measured and then made isotonic by the addition of pure sodium chlorid. It was treated with phenol to make the content a 0.5 per cent solution. Each step of the process was carried out with rigid asepsis and the antigen stored in small receptacles to prevent contamination. It was titrated with a known positive and a known normal blood serum, using the method of Hecht-Gradwohl for the performance of this titration. In general it might be stated that the final antigen was so diluted that the quantity used in the actual test was similar in bulk to that described in

the original Hecht-Gradwohl technic, namely, 0.1 c. c. in tube 11, 0.15 c. c. in tube 12, and 0.2 c. c. in tube 13.

For the benefit of those who are not familiar with the technic, we shall describe it. In a rack are placed fourteen small test tubes. The first ten of these tubes are used to determine the hemolytic index of the suspected blood. By this we mean the exact amount of hemolytic amboceptor and complement present in the given blood serum. The last four tubes are used in the actual test. One c. c. of fresh unheated patient's blood serum should be added to each of the first ten tubes. Then decreasing amounts of physiological sodium chlorid solution should be added to these tubes, beginning with 1 c. c., then 0.9, 0.8, 0.7, 0.6, 0.5, 0.4, 0.3, 0.2, 0.1 c. c. to the succeeding nine tubes. Next there should be added increasing amounts of fresh 5 per cent suspension of sheep's cells, starting with 0.1 c. c. and ending with 1 c. c. The rack should be placed in the water bath for one half hour. The tube which last shows complete hemolysis constitutes the "hemolytic index." If it is in Tube 4, the index is 4, because this tube had received 0.4 c. c. of sheep corpuscles. Therefore, we have obtained an idea as to how much sheep's cells is to be added to the last four tubes. The first three tubes, 11, 12 and 13, constitute the tubes for the actual test, while the last tube in the rack, 14, serves as the serum control tube. Tubes 11, 12 and 13, therefore, receive the patient's serum, the proper amount of sheep's corpuscles, dependent upon hemolytic index, and rising strengths of antigen, but no complement and no amboceptor. Tube 14 receives sheep corpuscles, but no antigen. In the new technic for gonorrheal complement fixation test we use in Tube 11, 0.1 c. c. of a diluted antigen determined by titration, 0.15 c. c. antigen to Tube 12, 0.2 c. c. to Tube 13, and none to Tube 14. In order to equalize the volume of fluid in all these tubes, we add 0.2 c. c. normal saline to Tube 11, 0.15 c. c. to Tube 12, 0.1 c. c. to Tube 13, and 0.3 c. c. to Tube 14. The tubes are then agitated and placed in the water bath for half an hour. The last four tubes are filled at the time we make addition to the first ten and are left with them

in the water bath for one-half hour for fixation of complement. The rack is then taken out and the hemolytic index computed. If the index is low, say between 1 and 4, we add 0.1 c. c. of sheep's cells to the last four tubes. If the index is between 5 and 7, we add 0.15 c. c. of sheep's cells to the last four tubes. If it is between 8 and 10, we add 0.2 c. c. If the index is more than 10, we rack up ten more tubes and repeat the titration of the natural complement and amboceptor. Then we estimate that. If the index is between 11 and 15, we use 0.25 c. c.; if between 15 and 18, we use 0.3 c. c.; and if between 18 and 20, we use 0.35 c. c. If the patient's serum has an index of only 1, we regard the reaction as of doubtful value. If it is greater than 1, we regard it as absolute.

The reaction is read off exactly as in the Wassermann test, that is, for inhibition or non-inhibition of hemolysis. If the amount of complement or natural anti-sheep amboceptor is very low, say 1 unit, we may add the proper amount of guinea pig's serum, or rabbit immune serum, ascertained by preliminary titration. We wish to state here that the addition of guinea pig serum for complement and artificial anti-sheep amboceptor is only necessary in about 2 per cent of the blood specimens examined, provided the blood is not kept too long before examination.

We were gratified to find that with the use of this polyvalent antigen we obtained a corroboration of our cultivation tests, that is, a positive reaction in the blood in all cases in which we definitely isolated the gonococcus. We found, therefore, a consistency in the culture work and complement fixation tests of the blood. It might be well to add that in about 10 per cent of the cases in which we failed to find the gonococcus by culture methods we obtained a positive gonorrheal complement fixation test. This demonstrated that perhaps one can not always express the gonococcus in all gonorrheal vesicles cases, or that it does not always grow even when expressed, or that the reaction persists even though the in the absence of gonococci in the body, that the reaction persist even though the organisms do not survive.

Before attempting to interpret the results of complement fixation, we wish to

speak of the results of our culture work in so far as the presence of organisms other than the gonococcus is concerned. We found, first, that the gonococcus could be demonstrated in at least 80 per cent of the cases studied by us. We found that the organism next most frequently present was the white staphylococcus. We found in about 20 per cent of our cases the micrococcus catarrhalis present. In but 1 per cent of the cases was the bacillus colon communis present. In 15 per cent of the cases the so-called pseudo-diphtheria bacillus was found, that is, an irregular staining organism, with dumb-bell shape, with rounded ends, closely resembling the Klebs-Loeffler bacillus, yet failing to kill guinea pigs. In one case we had a contamination of the micrococcus tetragenus, and in several cases the bacillus subtilis.

Of the cases in which we found the gonococci present (80 per cent) we found it in pure culture in 60 per cent and mixed with one or all of the above organisms in the remaining 40 per cent. As stated above, in all cases in which we identified the gonococcus we obtained a positive gonorrheal complement fixation test of the blood.

In considering this data from the standpoint of the practical urologist, there are several questions that immediately suggest themselves for solution. First, of what value is the use of the culture methods in the diagnosis and treatment of these cases? This might well be answered by saying that it is important information in respect to vaccine therapy. Secondly, it is of immense value in definitely permitting the urologist to inform his patient that his infection is or is not specific in character. The value of an authoritative answer is manifest. In the next place, the cultural methods are of great value when repeatedly used in the same case during the treatment as indicating the probability of ridding the victim of his active gonococci. So far as the infectiousness of such individuals is concerned, the culture tube will surely play an important role.

In next order, the finding of a pure or mixed culture of the gonococci from an old case of vesicles infection will enable one to definitely establish the exact character of the infection. In some of these cases this evidence is most important, both in

regard to the definite proof to the patient of the nature of his infection and also, in rare instances, in connection with medico-legal inquiry, and in connection with marriage and the marital relationship.

As for the interpretation of the gonorrheal complement fixation reaction, much is to be said. There has been some skepticism about the value of this test in every day practice, mainly for the reason of its inconstancy in cases that are clearly and emphatically gonorrheal in nature. We have demonstrated that by the use of the revised technic of Hecht and Gradwohl, and by the use of a polyvalent antigen made as described above, many of these cases which gave a negative reaction with the common technical methods will here show a strong positive. Assuming, therefore, that with the use of these two adjuvants to the technic we are able to catch close to that 100 per cent of cases which is the ultimate goal of all ambitious serologists, does or does not complement fixation even when positive mean anything in diagnosis, prognosis or treatment?

In respect to diagnosis, we have proven that it corresponds exactly in point of percentage to the finding of the gonococcus. Again we have shown that it is present in some cases in which we failed to find the gonococcus. We assume that it is a specific antigen-antibody reaction, and that, therefore, whenever present it indicates gonorrheal infection, present or past. It is, therefore, of great value in aiding in the diagnosis of actively infectious gonorrheal seminal vesiculitis.

Is it of any value in a determination of the improvement or cure of an individual? Does the fact that it is positive at the beginning of treatment and negative at the end mean serological as well as clinical cure? Does its absence during the entire period of observation mean freedom from gonorrheal infection? Is it a measure of resistance as well as an index of infection? Should one strive for the conversion of a positive into a negative and does clinical cure suffice to discharge a patient with a persistently strong positive complement fixation?

To the first question, is it of any value in a determination of the improvement or cure of the individual we might say that

in as much as it is an index of infection, its disappearance once it has been positive is an exceedingly gratifying symptom, and in our experience clinches our clinical cure. It, therefore, under these circumstances, does mean serological as well as clinical cure.

In our answer to the next question, does its absence during the entire period of observation mean freedom from gonorrheal infection, we would add that in all our cases we have never found the complement fixation negative throughout the case where the gonococcus was demonstrated. In a few cases we found a negative complement fixation at times with the gonococci present in culture, but when re-examination of the same blood was made, we succeeded in obtaining a positive reaction. Therefore, our experience has taught us that cases with a persistently consistent negative reaction never show gonococci, and all that show gonococci will at one time or another show positive gonorrheal complement fixation. We do not find positive blood tests in those cases which showed organisms other than the gonococcus in more than 10 per cent. In other words, in 10 per cent of the cases with other organisms persisting, we found this reaction positive. This plainly indicates that the gonococcus must have originally been the invading organism, but that it had been supplanted by one or more of those organisms already catalogued. This also seems to indicate that these cases are all previously gonorrheal in nature.

In answer to the question as to whether it is an index of infection or a measure of resistance, we might reasonably answer that it is both. Inasmuch as it is a true antigen-antibody reaction, it surely measures infection. In that it persists long after the subsidence of clinical symptoms and long after the gonococci disappears so far as cultivating them from material expressed from the vesicles is concerned, we may infer that it is a measure of resistance or that there may still be inaccessible foci of living gonococci which are responsible for the continuation of this phenomenon. Our policy regarding a persistent positive complement fixation, a negative culture and a freedom from clinical symptoms is to regard these patients as cured.

In no case have we seen a positive complement fixation persist in any gonorrheal case longer than one year after "clinical cure." It is this one-year possibility of persistence of the reaction that makes it impossible to use the test as a means of defending our position of responsibility regarding the question of marriage. This answers the last question in our hypothetical consideration.

In concluding our remarks on complement fixation, we may state that it is important in confirming our culture work. It is important in demonstrating the true gonorrheal nature of a given case where the culture and smear fail. Its presence proves the existence of a gonorrheal infection, as we stated before, present or past. Its repeated absence when carried out with a polyvalent antigen, with the method of choice, using unheated blood serum, and preserving thereby inviolated all the antibody, to our minds eliminates the question of the gonococcus as the causative existing factor for the vesicle disease. In short, it is a means of diagnosis, but is not a guide to treatment or cure except with the above limitations.

TREATMENT, PALLIATIVE AND SURGICAL

Our results, either palliative or surgical, are not altogether successful. These cases present a difficult problem. We are certain that all will more or less agree with this statement. Furthermore, the neuropsychic element predominating to such a marked degree does not assist in relieving these conditions. The subjects of experimentation are pessimistic and frequently assume a state of indifference and hopelessness. This, if nothing else, is exceedingly difficult to combat. We can not believe that an extensive surgical procedure (seminal vesiculectomy) is ever indicated until all palliative measures have been thoroughly exhausted. Naturally, except in the case of acute suppurative processes, our palliative treatment, namely, irrigations, dilatations, etc., which are of necessity extended over a prolonged period, renders surgical procedure one of choice. This is in few cases attended with glowing success. We will not enter into any minute detail of the treatment. Suffice it to say that pathological conditions within the

urethra are treated in the usual manner. It is ridiculous to assume that chronic urethral discharge due to infected Littre glands or strictures can be cured by treating the vesicles, or by injecting the vas through a vasotomy incision.

Seminal vesiculitis invariably indicates a thorough routine of vesicle and prostatic massage, urethral irrigations, applications, dilatations, caput treatments, etc., all of which daily constitutes the routine of the modern urologist. These cases are often overtreated. We are inclined to believe that long periods of rest are absolutely necessary in the proper care of vesicle cases. We have seen cases of chronic irritability of anus and rectum due to frequent and prolonged massage. The habit of prostatic massage is easily acquired, and in some cases a marked irritation is set up, which is only relieved by constant use of belladonna, suppositories and massage.

We will not enter into the details of the surgical treatment of seminal vesiculitis. The results of surgical attack on the vesicles are frequently encouraging and chiefly is this apparent in the gonorrheal, rheumatic and joint cases associated with infected vesicles of long standing, periodically infecting the blood stream with microbic organisms. Also, they are encouraging the cases of sclerotic or atonic vesicles of long duration, which are productive of marked symptoms at various intervals. We have found it advisable to operate on any cases in which the psychic elements are extensively developed. Regardless of the local pathology, the postoperative course is extremely unsatisfactory. Vasotomy in cases of recurrent epididymitis is frequently satisfactory and is resorted to in all cases. It does prevent recurrent swellings. Vasotomy is also performed in practically all cases of acute epididymitis, not that it hastens the course, but theoretically and practically treats the source of infection. We have also been injecting mixed gonococci vaccines into the vesicles through the vas incision, especially in rheumatic cases.

In order of comparative frequency our cases have been attacked surgically, first, for the relief of pain; second, for the evacuation of pus vesicles; and, thirdly, for the

removal of hard, indurated fibrous vesicles of long duration which were productive of much discomfort. In our opinion no undue haste need be exercised in advising operations until all palliative measures have been thoroughly exhausted. We have had cases under observation for years characterized by recurrent attacks of acute exacerbation, which were finally cured by persistent efforts at palliative measures. Contrary, however, to the foregoing, many cases of long standing failed utterly to obtain any material benefit by conservative methods, but were absolutely cured following operation.

Vesiculectomy is certainly the operation of choice in the hard sclerotic vesicles. Vesiculotomy and drainage have been entirely satisfactory in pus cases and acute catarrhal forms.

SUMMARY

In summary it has been found that the following classifications are all surgical possibilities:

1. Acute catarrhal cases with marked general and urinary symptoms.
 2. Chronic fibrous, sclerotic cases, unrelieved by treatment.
 3. Pus and blood after massage, or with ejaculate.
 4. Vesicle cases causing any obstruction to the higher urinary tract.
- 7 West Madison St., Chicago.

DISCUSSION

Dr. J. T. Windell, Louisville, Ky.—Up to the present time we have considered the treatment of these symptoms as surgical. Commencing with the work of Dr. Fuller, of New York, Dr. Cunningham, of Boston, and Dr. Belfield, of Chicago, have been written chapters in surgery that have been very remarkable. I hope that Dr. White and Dr. Gradwohl will develop this treatment that they propose so that we shall be able to cure these cases of chronic seminal vesiculitis without so much trouble and so much work. I believe the original method suggested by Fuller of stripping the seminal vesicles is the proper idea of treatment. If it is wrong, as has been said by certain urologists, then we are forced to the other surgical procedures that have been proposed. I have had under my care several men who have had seminal vesiculotomy and their condition long after the operation was performed was much worse than if they had been left alone entirely. I believe in the acute cases where we think we are going to have complications that vasotomy, as proposed and

performed by Dr. Belfield, of Chicago, is a very wonderful surgical procedure, but for routine work, for the patient who comes to be treated once or twice a week, I have yet failed to see a case that did not respond to methodical strippings unless the trouble was due to the tubercle bacillus.

Dr. George R. Livermore, Memphis, Tenn.—My experience coincides very largely with that of the essayists in the operative treatment of seminal vesiculitis. In the cases complicated by urethritis there is no question that some of them are markedly benefited by injection of the vas, but in the cases with all the neurasthenic element it seems to me the more operative work is done the worse the patient gets.

In regard to the complement fixation test, I am very glad to know that Dr. Gradwohl has improved the technic of this test, because heretofore it has been so unsatisfactory that not a great deal of reliance could be placed upon it and I have depended more upon cultural methods for my diagnosis and treatment. I am glad to hear the large percentage of definite findings in his cases because I have always argued that the gonococcus was largely responsible for this condition. Of course we see cases in people who have never had gonorrhea, and then the other infections he mentions are responsible for the condition.

The seminal vesiculotomies and seminal vesiculectomies I have seen have never seemed very satisfactory to me. The fact that you are so far from the seat of the operation makes it very difficult to perform and I have always doubted that the mere splitting of the vesicle was sufficient to drain out the infectious material. The removal of the vesicle seems better, but I think it is doubtful whether the whole vesicle is ever removed. We may get the tail of it or pieces of it, but the incising or removal of the vesicle is always unsatisfactory. On account of the urethritis it seems to me the injection of the vas and the other treatment the doctors have mentioned offers the best chance for the patient.

Dr. E. H. Martin, Hot Springs, Ark.—Just a word about the fixation test. We have been using the fixation test for about five years and our experience is that it is absolutely worthless in all acute cases. We begin to get positives about the second month and after clinical indication that the prostate is involved. If the urethra alone is involved we never get a positive. Dr. White mentioned the finding of a positive reaction after an apparent cure. In our experience the positive reaction has been present in many cases ten to fifteen years after any symptoms have been present and it has led us to believe that as the antibodies persist so long that a relative immunity is present probably for life. As a matter of course this immunity is only relative, but that it is truly present is very apparent from the difference in severity of the symptoms accompanying the first and subsequent infections.

Dr. J. L. Boogher, St. Louis, Mo.—I have had some of these cases and have been seeing them for a number of years. I was interested in the matter and when Dr. Fuller began his drainage for seminal vesiculitis I went on to New York and saw two or three of those heroic operations. And having seen these measures, it seemed a ter-

rific operation to relieve a vesiculitis. I have never had a successful one. Any one who will find any serum that will relieve the neurasthenic symptoms and the trouble these patients give by coming back time and time again for treatment, will be hailed with delight. I hope that Drs. White and Gradwohl will achieve at least some measure of success with this serum they are now developing.

Dr. R. B. H. Gradwohl, Chicago and St. Louis.—I want to say a few words about complement fixation in this disease. One point we have made, which has been observed before, I believe, is the persistence of this reaction after the so-called clinical cure. The fact that a positive gonorrheal fixation persists in the absence of clinical symptoms and inability to obtain a culture is not to be regarded as indicative of the necessity of continuing the patient under treatment. I believe this is a true antigen antibody reaction and it is perfectly logical to assume that antibodies temporarily remain after the infection has subsided. In other words, that it can not be used as an absolute guide to treatment. Its presence, I think, is important in a diagnostic way. Its absence, I believe, if repeatedly absent, indicates freedom from gonorrheal infection. I mean to say that those cases that give a persistently negative gonorrheal fixation test, with absence of symptoms, are no longer gonorrheal. I think that had been proved by a long series of blood examinations.

Another point was the ease of the identification of the gonococcus in these cases by culture methods, and I believe that is a laboratory procedure that should be carried out more frequently than has heretofore been the case.

We were not able to report on the vaccine because results so far as we have gone are not worthy of reporting, but I hope later to say that we have or have not something useful along this line of treatment.

Dr. White (closing).—In regard to vasotomy, Dr. Herbst and Dr. Belfield are among my best friends. We look upon this operation as upon the preliminary operation in prostatectomy. You have probably seen the pictures of Belfield's taken recently showing the argyrol in the lining of the vas some two or three months after the injection, so we feel that it does have some influence. We are using the vasotomy as the preliminary step, and if we do not get results from it we should attempt some further surgical measures. We are getting results, in the majority of cases. The men clear up and then within a few months break out again. Our coming down here is an evidence of weakness, because we need your help. Seminal vesiculitis is characterized by frequent recurrence, hence these cases often return for further observation regardless of the form of treatment to which they have been subjected. These cases are all difficult and I believe should be given further attention by the medical profession in general.

STATIC CONDITIONS OF THE LOWER EXTREMITIES AS INFLUENCED BY CIRCULATORY DISTURBANCES*

BY THOMAS MADDEN FOLEY,
M.D., F.A.C.S.,
Washington, D. C.

Few orthopedic surgeons are fortunate enough not to have had a certain number of patients who, while exhibiting many symptoms of orthopedic disease of the lower extremities, are not benefited by the measures which usually control the results of static disturbances. The existence of this fairly large class of cases is unsatisfactory to the orthopedist and especially to the sufferers themselves. Pain in some form exists after all ordinary measures in vogue have been employed for its relief and we are forced to conclude either that our orthopedic treatments are unsuccessful or that these disturbances of sensibility are not solely dependent upon well recognized causes, but arise from some other source of nerve irritation that sometimes accompanies the purely orthopedic malady.

Having encountered many such cases in my own practice, I undertook to analyze the findings in one hundred patients, who obtained only partial relief from treatment, with a view to discovering if possible the most frequent cause of these pains in the lower extremities.

In this group, pain being the outstanding symptom, it was important to determine the nature and distribution of the pain impulses. In practically all of this group the pains were described as occurring not in the joints, but rather in the regions between the joints. A fairly large number complained of discomfort or actual pain on the inside of the thighs and legs, as well as on the anterior aspects, regions not usually affected by the well known static disturbances.

Examination showed that in 50 per cent of the patients a hard swelling was noticed over the lower aspect of the leg, especially about the region of the internal malleolus.

*Read in Section on Orthopedic Surgery, Southern Medical Association, Fourteenth Annual Meeting, Louisville, Ky., Nov. 15-18, 1920.