

found me in respect to functional size changes, for such size variations have been smoothed out by averaging and remain to be accounted for.

It may be said that most of the discrepant results in the literature depend on this method of collective averaging, though on the other hand it did give certain correct results to the pioneers because of the tendency to size uniformity.

With the false assurance from these results, Kocher was animated to deny all other morphologic evidences of function. He admits, indeed, the existence of all the stages of function previously described by me. The importance of this as the foundation of all succeeding work he strangely does not appreciate, though such an objective confirmation from a professed critic will doubtless carry unhopd for weight. He does not explain them; to him they are tacitly nonsignificant; but he sees them. Instead, because he finds them in the control as well as in the exercised animals, he jumps to the idea that nothing has happened, and hence to a final conclusion of lack of qualitative differences from function. Here it is only that our ideas of the significance of an identical conclusion differ, for it is simply a fundamental conclusion that qualitative differences are to be ruled out. Instead of being destructive to me, it is the first induction I should wish to be confirmed, as it throws comparative function solely on the quantitative principle. The comparison must be made in terms of working cells to resting cells.

He sought for quantitative differences, it is true, by means of differential counts, but failed to find them. The explanation regrettably is that his data are of doubtful accuracy: first, since certain stages as diagnosed do not accord with his text statements and are unlikely of the stated occurrence on the basis of relative differentiation; second, the one stage most liable to confusion by one inexperienced is given scant attention. Since he denies progressive changes in the morphology of the cells, it is evident that he was indifferent to the finer points necessary for a differential diagnosis.

An anatomic basis for function stands.

#### CONCLUSIONS

Collective averages of cells, irrespective of their functional state, and resulting size variations, which have been the usual basis of comparison between individuals, afford inconstant results and should be discarded. It is a scientific solecism that function, the one faculty which results from the differentiated state, is the one factor which has been neglected in the measurement of differentiated cells. To deny functional size changes in nerve cells on this basis because of small and inconstant variations between one animal and another, as Kocher has done, is a fallacy, and such results indicate only the tendency to a uniformity of species size for corresponding nerve cell bodies.

To investigate the size changes of function, it is necessary to identify and measure functioning stages and the resting type from which they spring. This gives present function. The resting cell alone gives species size, its mean and its variations, and species relativity of plasma to nucleus, uncomplicated by present function.

**Making a Choice.**—The choice of a profession or trade is not a question to be decided by egotism, ambition or heredity, but by the individual's aptitude. In estimation of this the physician should have the deciding voice.—C. Juarros.

## THE RÔLE OF THE SEMINAL VESICLES

IN PERSISTENT NONGONORRHEAL INFECTIONS OF  
THE POSTERIOR URETHRA AND BLADDER \*

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It is well known that the seminal vesicles may become involved during the course of a gonorrheal urethritis, and, if the process remains active in the vesicles, may prolong urethral infection in a most stubborn manner. The constant or intermittent feeding of new infection onto the prostatic urethra keeps active the inflammatory processes of the urethral mucosa, just as inflammatory processes in the vesical mucosa are activated by renal infections.

It is probably not so universally recognized that the seminal vesicles, when the seat of a nongonorrheal or pyogenic infection, may result in prolonged suppuration of the posterior urethra and trigon. These infections may be even more stubborn than those of gonorrheal nature. To me it has been a new realization to find how many of these long-standing bacillary and coccal infections involving the posterior urethra and at times the bladder have been secondary to unsuspected vesiculitis.

Every urologist is familiar with the type of case to which I refer. In some cases the infection assumes the form of a bacteriuria with occasional exacerbations in which a visible amount of pus can be detected and with periods of more or less urinary irritability. Sometimes the patient is seen with a frank cystitis and with a history of repeated previous attacks. Under treatment applied to the local condition, and even often without definite treatment, the symptoms subside and the urinary condition may improve until the most careful examination is necessary to demonstrate the presence of bacteria in the urine. After a varying length of time the process repeats itself. Most often the urine at all times supplies definite evidence of infection and may be continuously cloudy. During the intervals in which the infection is at a low ebb or quiescent, examination of the urinary tract may disclose very little abnormal, and frequently nothing which could explain the persistence of an infection. When exacerbations occur, definite lesions are found; but with the disappearance of the lesions, the infection does not disappear from the urine.

#### DIAGNOSIS

The fixing of the responsibility on the seminal vesicles as the source of the continued or recurrent infection is not always easy. In cases in which epididymitis occurs, and especially where there is recurrent epididymitis, the diagnosis of an active infection in the vesicles becomes reasonably certain. In many cases the presence of a vesiculitis may be readily determined by palpation; but it is surprising in what a large percentage active foci are present in one or other vesicle and still careful palpation may reveal very few changes. The diagnosis of vesiculitis in many cases depends entirely on changes which can be detected by palpation, and consequently is very inaccurate. When infection is already present in the posterior urethra, the finding of infection in the expressed seminal vesicle secretion is utterly valueless because it is impossible in such

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cases to obtain the seminal vesicle secretion uncontaminated. Neither are we always justified in considering that active infection may be present in the seminal vesicles simply because of changes which are detected by palpation. An old inflammatory process may have been present long before, and the induration the result of this process, which has entirely subsided.

In some cases the determination of the presence of infection in the vesicles must be arrived at by a process of elimination. The occurrence of a persistent bacteriuria requires some focus continually feeding infection into some point of the urinary tract where there is no obstruction to urination and no residual urine is present. It is well known from repeated experiments that if organisms are injected into a normal bladder, in a comparatively short time they will entirely disappear from the urine. We know again that if the kidney is infected and that secondarily to this there is present a simple cystitis, the removal of the renal infection will be shortly followed by disappearance of the vesicle infection.

Six cases of the type described above have been under observation for periods varying from a few months to many years. The kidney as a source of infection was eliminated in each case. The patients had been treated at varying times by prostatic massage, instillations, irrigations, stripping of the seminal vesicles, etc., but in none of the cases was it possible to eradicate entirely the infection, and they presented themselves at different periods with exacerbations. In two of the cases the infection took the form of a persistent bacteriuria, one case being due to a colon bacillus and the other to a staphylococcus. Of the remaining four cases, one was a staphylococcus infection and the other three were due to colon bacilli. In the latter four cases pus and organisms could always be found in the urine, the amounts varying at different periods.

#### TREATMENT

In the belief that the seminal vesicles were probably responsible for these stubborn and resistant infections, it was determined to do a vesiculotomy in each case. In two cases a recurrent epididymitis pointed strongly toward the seminal vesicles as the most probable cause. In three cases there were definite changes in the seminal vesicles which could be detected on palpation. In three of the cases no changes could be detected, and they were apparently normal on palpation. The results of the vesiculotomy in each case were immediate and most gratifying. The histories of a few of these cases will illustrate:

#### REPORT OF CASES

CASE 1.—G., aged 25, seen about May, 1913, complained of frequency and some burning on urination which had been present for over a year. Examination of the urine showed pus and staphylococci. The seminal vesicles presented no changes on palpation, but there was present a mild prostatitis. Catheterization of the ureters showed the urine from each kidney to be negative for infection, while the posterior urethra and trigon presented a somewhat red and granular appearance. The patient was treated with irrigations, instillations and prostatic massage for several months with very little improvement in the urinary condition, although the symptoms practically entirely disappeared. A few months later he developed an epididymitis on the right side, and some time later an epididymitis on the left side. Later on the urinary symptoms returned again and it was finally decided to do a vesiculotomy. The perineal exposure recommended by Young was employed, and the vesicles thoroughly brought into view

and opened by several incisions, the ampulla of the vas being drained as well as the vesicles. The patient remained in the hospital two weeks, and at the end of this time, although no local treatment was employed, the urine was entirely free of infection. The patient has been under observation almost a period of two years since the operation, and there has been no recurrence of his trouble.

CASE 2.—M., aged 45, seen in 1907 with a history of having had urinary irritability with attacks of frequency and cloudy urine for over six years, on examination was found to have a staphylococcus infection with considerable pus. There was no renal infection, and the bladder was practically normal. The patient was seen at intervals for eight years, and during that time received a great variety of treatments, including autogenous vaccines. The seminal vesicles in this case were considerably thickened with some perivesicular induration. In December, 1915, the patient consented to a vesiculotomy. The seminal vesicles were found to be quite thick walled and fibrous, the right seminal vesicle being particularly pathologic. Because of the marked thickening in the vesicles, the posterior wall of each vesicle was excised so as to give more perfect drainage, and the ampulla of the vas was thoroughly opened on each side. A cigaret drain was introduced on each side, being left in position for four days. The convalescence was uninterrupted, and examination of the urine two weeks later, when the patient left the hospital, showed the complete absence of infection. He has been seen at intervals during the past six months, and the urine has remained entirely sterile. It is interesting to note that for a few months following the operation there was some diminution in sexual power but recently this has returned to normal.

#### SUMMARY

In view of the results obtained in this small series of cases, it seems probable that many at least of these recurrent and persistent infections of the posterior urethra are secondary to infection of the seminal vesicles. In some cases in which the vesicles show very few changes on palpation, it may be possible by injection of the vas with argyrol or protargol to eliminate the infection of the vesicles. Where, however, there are any marked inflammatory changes in the walls of the vesicles, it does not seem reasonable to suppose that anything short of vesiculotomy or even partial vesiculotomy will accomplish the desired results. Where the vesicles show marked inflammatory changes, it is impossible by a single incision to secure thorough drainage, and in these cases it has been found advisable to remove the posterior wall of the seminal vesicles so as to drain the different pockets thoroughly. Furthermore, the ampulla of the vas should be opened in each case; otherwise a contributing focus may be overlooked. In order to secure the proper drainage, a thorough exposure of the vesicles is important. The urethra should not be opened, and after stripping back the levators and fascia from the prostate, the seminal vesicles present themselves as a rule quite readily in the operative field. They are furthermore brought into more accessibility by means of the Young tractor, which is similar to the prostatic tractor but is introduced through the meatus. This serves to push the seminal vesicles well into the field so that they can be readily attacked.

#### CONCLUSIONS

The seminal vesicles are much more frequently the cause of persistent bacillary and coccal infections of the urine than is generally supposed. These infections do not respond readily to local measures, and stripping of the seminal vesicles has not proved of much value in many of our cases. After local measures have failed to eradicate the infection, vesiculotomy is indi-

cated. The vesicles in each instance should be thoroughly opened, the ampulla and the vas as well as the body of the seminal vesicles being thoroughly drained. In none of our cases of simple infection has a troublesome fistula resulted.

## REPORT OF FIFTY-TWO CASES OF SEMINAL VESICULITIS \*

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OMAHA

From Jan. 1, 1907, to Jan. 1, 1916, my clinical records show that we have handled, in our office, sixty-seven private cases in which a diagnosis of seminal vesiculitis has been made, most of which were complicated by prostatitis. We have subsequent reports on fifty-two. Of these sixty-seven cases, eight operations were performed for diseases of the vesicles, a rather large percentage as compared with other records. The following clinical symptoms, some of which were present in all cases, and all of which symptoms were present in some of the cases, are reviewed:

Temperature and symptoms of sepsis with blood changes, twelve times.  
Pain in the end of penis, thirty-eight cases.  
Heavy feeling in the perineum, thirty-six cases.  
Burning after urination, nineteen cases.  
Pain in the back, fourteen cases.  
Pain and heavy, sore feeling in the groin, thirty-two cases.  
Pain on ejaculation at some time in the history of the case, twenty-four cases.  
Pain on defecation, twenty cases.  
Constipation, ten cases.  
Intermittent discharge, thirty-nine cases.  
Frequent urination at night, thirty-four cases.  
Frequent urination in the day time, twelve cases.  
Sexual aberration of one kind or another, twenty-six cases.  
Complaint of passage of semen or some thick fluid at close of bowel movement, ten cases. (This fact I was not able to demonstrate in any case.)  
Complaint of passage of semen following urination, eight cases.  
Epididymitis, fifteen cases.

In five of the foregoing cases, the question of etiology was doubtful. In all of the others, it was definitely laid at the door of gonorrhea. There is no record in my histories of any cases having exhibited the symptoms spoken of by some of the writers as a colic simulating the passage of a kidney stone. No cases of metastatic infections are included.

These symptoms fall into three classes: general, genital and urinary.

### General Symptoms:

Temperature and blood changes, twelve times.  
Pain in different regions, 154 times.  
Malaise and headache practically in every case.  
Constipation, ten times.  
Heavy feeling in the perineum, thirty-six times.

### Genital Symptoms:

Increased sexual desire, twelve times.  
Decreased sexual desire, ten times.  
Excessive and uncontrolled sexual passion, four times.  
Impotence, three times, sterility, five times.  
Spermatorrhea (a) following bowel movement, sixteen times; (b) following urination, eight times.  
Pus discharge, thirty-nine times.

### Urinary Symptoms:

Frequent urination by day, twelve times; by night, thirty-four times.

Painful urination and pain in the end of the penis, fifty-seven times.

After washing out the urethra by a fluid passed into the bladder under a hydrostatic pressure and passed out again, thus washing out the urethra, the vesicles were massaged as distinctly as possible from the prostate. A Valentine endoscope was introduced into the bulb of the urethra before massage, and the fluid flowing out was collected and examined. The following are the results:

### Unstained Microscopic Examination:

Sago bodies, thirty-eight times.  
Sugar b6dies, eight times.  
Skins, ten times.

### Stained Specimens Examined by the Microscope:

Staphylococcus, thirty-six times.  
Diplococcus, gram negative, eighteen times.  
Diplococcus, gram positive, twelve times.  
Colon bacillus, six times.  
Pus in every case.  
Blood in ten cases.  
Lecithin globules in every case.

In forty-two cases the records show inability to determine whether this pus came from the prostate or the seminal vesicles. In most cases I was sure that it came from both, and in only one case was I positive that the pus came alone from the seminal vesicles, because the prostate had been removed. On endoscopic examination the verumontanum was shown to be swollen and red and bleeding easily in practically all cases. In forty-nine cases the colliculus was inflamed. The infection of the verumontanum and the posterior urethra was due to the discharge of pus from the ejaculatory duct or from the ampule of the vas deferens or from the seminal vesicles.

The study of the urethra by sound and the dilation frequently showed narrowing in the bulbous urethra. In eighteen cases the urethra was exceedingly sensitive to the passage of the sound, and bled at the slightest touch. In twenty-five cases, on examination of the vesicles by the finger through the rectum, we have noted the following:

Vesicular enlargement, sensitive and thickened on the right side, twenty-nine times.

Vesicular enlargement on the left side, twenty-three times.

This is contradictory to the reports of many of the writers that the infection of the vesicle is much more common on the left side than on the right.

The prostate showed signs of enlargement in forty-six cases, indurated nodules in thirty cases, and it was soft and boggy in the remainder.

Vasotomy was performed eleven times, and the Hagner operation for epididymitis eight times. Eight patients were operated on for vesicular infections. The results of these eight cases form the most interesting portion of this paper:

### REPORTS OF CASES

CASE 1.—Mr. A., from South Dakota, family presented negative and personal history, except that about one and one half years ago he had contracted gonorrhea. After three or four months the continuous discharge ceased. The

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