

transversalis muscles, with the formation of a large false aneurism, occupying the whole lumbar region on the left side, and extending into the groin. Erosion of the vertebræ.

THE CONSTRICTOR URETHRÆ MUSCLE.— ITS RELATIONS TO URETHRAL PATHOL- OGY AND TREATMENT.

BY A. T. CABOT, A.M., M.D.

BETWEEN the anterior and posterior layers of the deep perineal fascia, better known as the triangular ligament, lies the membranous portion of the urethra surrounded by the constrictor or compressor urethræ muscle.

This muscle occupies the greater part of the space between the two layers of the fascia. Its fibres, arising from the ischio-pubic rami and the tendinous parts about, run transversely across the sub-pubic arch, separating to go above and below the urethra. Besides these transverse fibres, there are others that run obliquely across the same space, and others still that encircle the canal.

Thus the membranous urethra is embedded in a muscle which, by its contraction, forces together the walls and closes the calibre of the tube. This constrictor is also known as the external or urethral sphincter and as the cut-off muscle. It is to a great extent under the control of the will and acts as the voluntary sphincter of the bladder. A brief review of the mechanism of micturition will help us to understand its functions.

As the bladder fills with urine a point is finally reached at which the internal pressure is great enough to overcome the strength of the band of elastic and involuntary muscular fibres about the urethral orifice (internal sphincter) and the urine forces its way into the prostatic urethra where its presence causes the sensation which is recognized as a "call to urinate"; its further escape is then only prevented by the contraction of the constrictor muscle.

If now no opportunity offers for micturition the compression and closure of the urethra is made more thorough by a conscious effort of this muscle, and, at the same time, the prostate closes down, pressing the urine back into the bladder, and the inclination to urinate passes away. Later, however, the urine, accumulating in still greater quantity, again enters the prostatic urethra, and, if urination is now desirable, the constrictor relaxes and the bladder empties itself.

Physiological micturition is thus easily accomplished. When, however, these parts concerned in the act are altered by disease, normal urination may be variously interfered with. An inflammation affecting the prostatic urethra renders it extremely sensitive, so that the presence in it of a few drops of urine brings on an almost irresistible desire for micturition; hence the frequency of the act which is so marked a symptom in disease of the neck of the bladder.

When the inflammation reaches to the parts about the constrictor it causes a more or less irritable condition and spasmodic contraction of this muscle. A parallel to which condition is found in the action of the sphincter ani when the parts about it are

ulcerated or inflamed. The obstruction to the passage of an instrument which is usually met with at the membranous urethra in cases of chronic prostatitis is caused by, and is evidence of, this action of the urethral sphincter. A spasmodic stricture of this sort is also the not uncommon accompaniment of an inflammation affecting the bulbous portion of the urethra just anterior to the constrictor.

Now the contraction of this sphincter divides the urethra into two parts, an anterior portion, extending down to the triangular ligament, and a deep part, the prostatic portion. Indeed, the muscle in its ordinary state of tonicity makes this division, but the separation of the two parts of the canal is much more complete when it is in a state of increased contraction. And this is not a matter of interest to the anatomist alone, but, on the contrary, it is especially of importance to the surgeon, for the position and action of this sphincter exercise an important influence upon the pathological processes occurring in the canal on either side of it.

If the anterior portion of the urethra is the seat of inflammation, the contraction of the muscle protects the deeper parts and hinders the passage of discharges and the extension of the inflammatory process backward to the prostate and bladder.

When, on the other hand, the inflammation is posterior to it, the constrictor acts as a dam, and by preventing the ready escape of pus outward and by offering an obstruction to the passage of the urine, it tends to aggravate the morbid process behind it just as an anterior stricture prolongs and intensifies inflammation of the deeper parts.

From a consideration of these facts it will be apparent that when a urethritis exists in front of the constrictor muscle the passage of an instrument through it should be avoided if possible, in order that the discharges, especially when of gonorrhœal character, may not be conveyed on toward the bladder. If in such a case the use of a catheter becomes necessary a preliminary irrigation of the canal may, by removing the discharges, lessen the chance of infection of the parts behind the sphincter.

In the other class of cases, when the inflammation is posterior to the urethral constrictor and is, as has been said, aggravated by the obstructive spasm of this muscle, the passage of sounds, and dilatation of it, is a most important part of the treatment; and the acknowledged value of sounds in cases of inflammation about the neck of the bladder is largely due to the stretching of this muscle effected by them.

Occasionally, in these cases, the spasm of the constrictor and the consequent obstruction to the passage of the urine is so great that while the bladder is laboring to relieve itself of its contents the pressure in the sensitive prostate becomes so excessive as to cause a pain that is scarcely to be endured. The patient strains and assists the bladder with all the abdominal pressure he can muster; until finally a few drops trickle through and the spasm slowly relaxes.

This condition of things is well illustrated in the following cases:—

CASE I. C. D., a young man of thirty-two, with chronic prostatitis of gonorrhœal origin, was suffering at the time

I first saw him with attacks of pain which occurred two or three times in every twenty-four hours, more commonly at night, or when the urine had been held for a longer time than usual. In one of these paroxysms he would be seized with a severe pain referred to the rectum, or to the region between the rectum and bladder, and sometimes shooting out through the penis. This would be accompanied by an urgent desire to urinate, which, however, could not be accomplished, even by the most violent straining efforts. As he said, "it felt as if the water were blocked."

Finally, by drinking large quantities of water and walking the floor, he would gradually overcome the resistance, and the urine would begin to come, drop by drop, although still with great pain. After waiting a little longer he would be able to pass more, in a larger stream, and so the attack would gradually pass off, the pain diminishing as the stream enlarged.

These attacks disappeared immediately after beginning the systematic use of sounds, and the prostatitis slowly yielded under treatment by deep injections of nitrate of silver.

CASE II. F. S., a young man of twenty-four, was referred to me in the autumn of 1883 by Prof. Henry J. Bigelow.

In 1877 he had been attacked by cystitis, which followed scarlet fever, and lasted several years, never, in fact, having wholly left him.

When I first saw him he was suffering from frequent and painful micturition, and had a slightly enlarged and tender prostate.

At times he would have paroxysms of pain when attempting to pass water, and these were often so severe that he would crouch on the floor, and, seizing his penis, would squeeze it with all his force in the effort to obtain relief. The urine was always difficult to start, and he had "to strain to keep it going."

The meatus admitted only a No. 26 (French) bulb, which met with resistance at the constrictor muscle, and after passing this was quite firmly grasped upon its return.

With Professor Bigelow's concurrence he was etherized, the meatus was freely cut, and sounds up to No. 32 (French) were passed into the bladder without meeting with any obstruction except a sense of resistance, easily overcome, at the membranous urethra.

After this he was relieved of the paroxysms of severe pain, the urine passed readily and in a good stream, but the frequency of micturition, accompanied occasionally by some burning sensation, continued.

The histories of these patients illustrate very well, not only the symptoms consequent upon this sort of spasm, but also the great and immediate benefit to be derived from the passage of sounds and stretching of the constrictor muscle. When, for any reason, in a case of this sort, the use of instruments is impossible or unadvisable, much may be done in the way of palliation.

The benefit of heat under these circumstances is familiar to all, and frequently a hot bath or hot fomentations about the perineum will cause a relaxation of the muscle. A good dose of gin is sometimes of service, and a full opiate or a few whiffs of ether will occasionally succeed when heat has failed to overcome the spasm.

If the constriction amounts to a complete stoppage which none of the simple expedients mentioned overcomes, the catheter must be resorted to. The instrument used in these cases of prostatic inflammation should be of large size, and great gentleness should be exercised in its introduction. When the muscle is reached, steady, persistent pressure will overcome its resistance.

Besides this spasm of the sphincter urethræ, dependent upon neighboring inflammation, we see, also, at times, a spasmodic action of this muscle, brought about by purely nervous causes. A familiar example of this is the stoppage of urine, which occurs after an operation or during an inflammatory condition about the anus.

Ultzmann¹ says: "Not seldom we find spasmodic contractions in both rectum and urethra at the same time, when the lesion can be detected in

but one of these. Thus we find spasm of the rectal muscles in cases of catarrh of the neck of the bladder and *vice versa*. This is explained by the fact that both regions are supplied by the same nerves, namely, the middle and inferior hæmorrhoidal."

Irregularities in the action of the constrictor may also depend upon psychical causes: Thus, some people cannot urinate in the presence of others, and, at times, the muscle seems to be affected with a really choreic condition which causes an uncertainty of micturition, that has been well described by Paget² as "stammering with the urinary organs."

Paralysis of this sphincter is sometimes the result of disease or injury of the spinal cord and is ordinarily associated with paralysis of the muscular walls of the bladder. The natural obstruction in the urethra due to the elasticity of the tissues is usually enough to cause the bladder to become distended, and, unless the urine is regularly drawn, the overflow finally forces its way through and escapes as a constant dribbling.

Occasionally incontinence occurs in a seemingly healthy man without loss of the expulsive power of the bladder. This seems to be due to a direct failure of the constrictor, and may be usually remedied by a tonic course of treatment with the use of electricity, which may be applied either from pubes to perineum, or, better, with one electrode in the membranous urethra and the other upon the pubes. The incontinence of childhood arises from inattention to the call to urinate, to which is often added an increased sensitiveness of the prostatic urethra, rather than from any incompetence of this muscle.

Finally, in regard to the effect that the position and action of the constrictor has in modifying our methods in the local treatment of urethral disease.³ The normal tonic contraction of this muscle is usually of sufficient strength to prevent the passage through of an ordinary urethral injection unless it is thrown in with considerable force, or unless anaesthesia has caused relaxation.

In the use of injections for gonorrhœa, however, it is not uncommon, as an additional safeguard, to still further compress the deep urethra by causing the patient to sit on a folded towel or upon the arm of a chair during the injection. This method is objectionable in that the bulbous urethra, which is a favorite lurking-place for gonorrhœal virus, is also compressed by this procedure, and the injection fluid is thus prevented from entering that portion of the canal where it is most needed.

It is a better plan, therefore, instead of using an ordinary urethral syringe, to make the injection through a small, red rubber catheter, introduced as far as the bulb of the urethra. The constrictor is of sufficient strength to turn the fluid back and to cause it to escape alongside of the catheter, and the whole canal anterior to the muscle is thus thoroughly washed by the medicated solution. Care should be taken, of course, not to push the catheter through the sphincter, and this may be guarded against by marking the catheter at a distance of six

¹ Clinical lectures.

² For a full consideration of the question of local treatment in the urethra, see *Pyuria*, by Ultzmann, translated by Dr. Platt. New York: D. Appleton & Co. 1884.

¹ Pyuria. See below.

to six and one-half inches from the point and never allowing this mark to pass the meatus.

When now the injection is to be applied to the prostatic urethra it must be conveyed through the constrictor by means of a metallic catheter, of which the best is that devised by Ultzmann. The end of this instrument should be placed just beyond the sphincter, and the fluid, when thrown in, thus washes out the prostate and flows on into the bladder, where, if non-irritating, it may be left, or from which it may be withdrawn by slightly advancing the catheter. To determine when the point of the catheter is in the prostate is ordinarily easy to one accustomed to make these applications, for the sensation of a slight resistance at the constrictor is easily perceived, and, as soon as this is passed, the instrument is in correct position. In case of doubt, the catheter may be advanced till it draws water and then withdrawn into the prostate.

In conclusion, I would say that I have endeavored not to overstate, and do not think I have overestimated, the importance of this constrictor muscle in relation to the pathology and treatment of the inflammations of the urethra and neck of the bladder, and I believe that a correct appreciation of its action is of the greatest importance for the proper application of local treatment to these diseases.

REPORT OF A CASE OF MONOMANIA.¹

BY E. S. BOLAND, M.D.

Miss X. consulted me in September, 1883, for what she recognized as a third attack of insanity. Aged thirty-one. She is the youngest of five children. There is no insanity in the family as far as known. She is a Catholic. Naturally amiable, sociable, and intelligent. A graduate of one of the city grammar schools, she declined a proposed normal course and began to learn dressmaking with an older sister.

She is of rather slight build, but is fairly well-proportioned and has pleasing features. Her hair began to turn in her teens and is now quite gray. Menstruation began about the age of twelve, but was always scanty and the periods painful. At fourteen or fifteen there was amenorrhœa for a year or more, for which she was treated locally with some benefit. With this exception her general health has been good except during the two former attacks, which shall be referred to later.

When she presented herself she had for some years been employed as a saleswoman in a large dry-goods house. Beginning to feel unequal to her work she took a vacation, but received no permanent benefit. She complained of failing general health and inability to fix her mind on her work. She had an involuntary and irresistible impulse or conception to *repeat every act, word, or thought five times*. This occupied all her waking hours, to the exclusion of almost every other mental operation.

This symptom was present in both former attacks and she has learned to fear it. The first of these attacks she recovered from at home in four or five

months, the second attack lasted over a year and was recovered from in the Boston Lunatic Hospital. Along with the imperative repetition of everything in series of fives there was complete menstrual suppression and dreamless sleep. Both these symptoms had again recurred. She knew too well their significance and was in dismay at the prospect of months of suffering before her. There was some loss of flesh, poor sleep, and great mental suffering. She knows the absurdity of her counting and felt that it is a great annoyance to her family and yet she was totally helpless to resist it.

Hospital treatment was advised but was not acted on and she was treated at home. A liberal diet, wine, and rest was ordered, and iron quinine and strychnine in tonic doses was prescribed and various combinations of sedatives given for the relief of her broken sleep.

After several weeks of this treatment, no improvement could be seen. In fact she seemed to get worse. The counting continued on every occasion, the sleep was poor, appetite deficient and irregular, and from standing and debility her feet and ankles became œdematous at night.

Still, her ordinary intelligence was not markedly affected, her memory was good, her hope of recovery persisted, and she was keenly aware of her unfortunate and troublesome condition. Hospital treatment was again urged. The friends would gladly have sent her to the hospital, but it was then crowded and they refused to have her sent to a State hospital. She would not go voluntarily, as she dreaded the surrender of her own way, which commitment implied. She was ordered to bed, and no evidence of heart or kidney trouble being found, the treatment before instituted was continued, both as to medicine and diet. For three months she gradually grew worse. She ate irregularly, sat up in bed, counted, and compelled the rest of the family to count, or repeat anything said or done. If she moved her hand or her body once she *had* to repeat the act five times. If she swallowed saliva once she had to do so five times. She had grown so persistent and noisy that she was kept in an attic room. Here, if she heard the front door closed, she would give the family no peace until it had been closed five times. When I called and took her pulse or examined her tongue she would manœuvre to have the operation repeated five times.

With failing general health the dominant idea grew stronger. She resisted noisily every effort for her care. Her toilet, her meals, her bedmaking, etc., became occasions of great trouble to her family. She wet the bed, refused food except at night, and kept an elderly aunt, who had the immediate care of her, so busy counting and repeating acts, that she was almost worn out. She opposed any disturbance or change in her clothing, etc., and grew exceedingly dirty and disagreeable-looking. The family were worn out by her exactions and the neighbors complained to the police of the noise she made.

She was conscious of her state and actually loathed it, showed mortification at being seen in such a plight, but was so inert bodily and mentally she would not try to help herself. There was no turning against any of the family and she realized what a nuisance she was at home.

¹ Read before the Boston Medico-Psychological Society, December 18, 1884.