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ORIGINAL ARTICLES.

CYSTITIS IN THE FEMALE.

Contributed to the Section on Obstetrics and Gynecology, at the Thirty-Eighth Annual Meeting of the American Medical Association, June, 1887.

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This paper is limited to the discussion of certain changes that are of common occurrence in the bladder of the female, and that are often so intractable to treatment as to warrant the query made some time since by one of my eminent surgical friends, "Did you ever know a permanent cure of chronic cystitis?"

The mucous membrane of the bladder is composed of epithelial cells, arranged in several layers. The deeper cells are round, conical, or cylindrical, but they change towards the surface, until the superficial layer is composed of flat, laminated cells, which may be always seen in normal urine. Mucous glands, simple and aggregated, lined with cylindrical epithelium, are found at the neck of the bladder and towards the fundus. This epithelial lining of the bladder is continuous into the urethra, and contains there numerous large glands, glands of Lithré. They are often 1 millimetre or more in diameter and from 2 to 5 millimetres in length. They secrete mucus. This delicate arrangement of epithelium plays a more important part than is usually ascribed to it, in protecting the highly vascular tissues beneath from injury arising from contact with the urine; an organic fluid so highly complex that, under certain conditions, it easily undergoes decomposition and becomes exceedingly irritating. The mucus, secreted by the glands at the base of the bladder and of the urethra, serves a valuable protective purpose, but we shall see later that they may themselves become the seat of most important pathological changes which are generally overlooked. In certain pathological conditions of the bladder, these glands may be easily distinguished by the unaided eye, as small pearly vesicles, filled with a transparent, turbid, or mucopurulent secretion. The vascularization of the mucous coat is then greatly increased, and the increased nutrition causes a proliferation of epithelial cells of such a rapid growth that they widely depart from an even layering of a protective character, and not seldom appear as papillæ more or less prominent. The muscular fibres become greatly increased by overactivity to expel the irritating contents of the organ.

The development of this irregular network of muscular fibres changes the symmetry of the bladder, the mucous membrane is thrown into crypts and folds from which the urine cannot be easily expelled, and thus, from step to step, the changes in this important organ may be traced, until a pathological factorage is developed inimical to life. *Pari passu* the kidney, surgical kidney so-called, often, perhaps generally, becomes affected, and a chronic nephritis closes at long range what at first seemed a simple affection.

There can be no doubt that the more marked structural changes which are so often met with in the bladder not only in large measure incapacitate it for the fulfilment of its normal function, but also are beyond the remedy of our art. The surgical treatment of rest, applied to this viscus by the artificial vesico-vaginal fistula as devised by the late Dr. Sims and still to a certain degree popular, may have a narrow range of usefulness; but to condemn a patient deliberately to complete incontinence of urine for a space of six months or longer is, for the time at least, a doubtful exchange of suffering, and the secondary closure of the fistula, except in the hands of a few experts, is an operation of doubtful outcome. I cannot help thinking the primal causes of cystitis are in great measure overlooked. Normal urine is acid and free from ferment. It is a familiar experiment, and often a satisfactory test of condition, to pass the urine directly into an aseptic flask and stop with sterilized cotton. If normal, it will undergo no change so long as it remains thus protected from atmospheric germs. Thus it is with the urine in the healthy bladder; and even after the introduction of septic material into the bladder, often it will fail to germinate. If it grows, the cystitis resulting, as a rule, passes off in a few days as an acute attack and the patient is again well. The fortunate outcome results because the ferment is placed under conditions unfavorable to growth. The bladder walls are intact with its unbroken pavement of epithelium, and the healthy urine furnishes little food for bacterial development.

The germ bearing catheter, however, is rarely introduced under conditions so favorable. Let the bladder be over-distended and the protective layers of epithelium become disturbed or broken, and the vascularization and nutrition of the organ changed. Again, in the familiar instance of the over-distended bladder in parturition, where injury has been caused by uterine contractions and the vascularity normally greatly increased. Now introduce the catheter, ven-

erable in the service of a score of cases of cystitis and never properly cleansed, or a clean catheter with all the becoming delicacy of our early teaching, "never to expose a woman," smeared after a few misdirected efforts with septic vaginal secretions, and note results.

The soil of our new field is now well prepared for the sowing, and the harvest is sure. Although it does not possess the danger of a septic uterus, the result is none the less certain. The bladder, under these conditions, proves an excellent culture chamber, and the bacteriological ferment grows with marvellous reproductive power. The lymphoid cells of low vitalization are easily destroyed, the epithelium and albuminates are readily assimilated, the urine is no longer acid, chemical changes result in new and irritating compounds, and these mischief-makers, although so long overlooked because of their diminutive size, are potent to cause irreparable damage. They are destroyed with difficulty, since the contractions of the bladder in the effort to expel its irritating contents only press the ferment into each infraction of surface and the mucous glands become new centres of colonization, and it is easy to follow the secondary and marked changes so long painfully familiar to the profession.

In 1881 I had the honor of contributing to this Association a paper upon the treatment of cystitis and, as the result of a long period of experimentation, I then presented a series of double rubber tubes for the injection and irrigation of the bladder. These catheters are of various sizes, ranging from No. 18 to 25 F., and the efferent tube is three times longer than the direct, and thus over-distension of the organ is prevented. The double tube was of course no novelty, but they had never been made of *soft* rubber, and many months of experimentation elapsed before the perfection of the tubes. As now made by Tiemann & Co., of New York, they leave little to be desired and are as perfect in finish as the best of soft catheters. The exquisite finish of the surface and eyelet is secured by curing at high temperature in molds of very hard annealed glass.

The relief sought is not a simple disinfection. For reasons already referred to the cleansing of the bladder is attained with much difficulty and, on this account, the hot douche proves of the greatest service. I have been for years in the habit, in chronic cases of cystitis, of directing the water to be used as hot as comfortable and to be continued for half an hour morning and evening. The result is comparable with the hot water vaginal douche, not only to wash away the mucus and decomposing urine with ferments, but especially to lessen the vascularization of the bladder and aid in the reparation of the epithelial protective layers of cells. A long series of experiments were undertaken to ascertain the antiseptics best suited to be used in the bladder, and the intolerance of germicides in the bladder is most remarkable. Generally a 1 to 5,000 mercuric bichloride solution is followed by severe pain and tenesmus, often lasting for some hours. A 1 to 10,000 solution has been used more often than the weaker solutions, and it is very effective in this strength, but not sel-

dom have I been obliged to suspend its use entirely, or substitute a much weaker solution. Only recently a case has been reported to me where a 1 to 80,000 could not be continued because of the pain. The better way is to cleanse first the bladder with warm water; then use the antiseptic as strong as judged best. After its retention for a few minutes allow it to escape, and follow immediately with the prolonged hot water douche. By so doing, the good result of destruction of ferment is accomplished by the use of a comparatively strong solution, and the deleterious secondary result prevented by lessening the blood supply, nerve irritation, etc. It is always well to remember that the water should be boiled water, cooled to the proper temperature. In the city this is ever at hand in the water from the hot faucet, as this has always been carried to a high temperature before reaching the boiler.

The bladder tolerates iodoform well, and the treatment is finished by injecting a few grains in suspension which is allowed to remain. This soon settles to the base of the bladder and is not easily expelled. It dissolves less readily in the bladder than in most parts of the body. I examined recently a specimen of urine voided at will which contained a large amount of iodoform. In reply to my inquiries I found the patient, a man, had for some time taken a teaspoonful of iodoform in suspension as an injection daily without inconvenience.

The treatment outlined above is repeated night and morning, until the urine is free from bacteria, then daily for a period, and often twice or once a week until sure of cure. The bladder tolerates hot water singularly well. In a very troublesome case of cystitis in an old man with a greatly enlarged prostate, the injections were continued for a long time at hourly sittings. The 4-quart rubber bag makes the most convenient receptacle for the water. When properly adjusted the fluid flows in an unbroken stream into and out from the bladder with very little inconvenience; often with distinct comfort to the patient.

In one case of vesical hæmorrhage, resisting all other measures, the patient in extreme danger from the loss of blood, I continued the flow of hot water through the bladder uninterruptedly for forty-eight hours, followed by cure without any return of hæmorrhage.

In earlier years, I often felt it necessary to dilate the urethra, as a measure also of much value in order to lessen the irritation and tenesmus. It has been supposed that, in order to be of value, there must be a fissure in the neck of the bladder, and this method of treatment appears to have been based upon the remarkable results in fissure of the rectum after forcible dilatation. It at least, in a measure, paralyzes for a time the muscular fibres which surround the entire urethra. This gives an easy outflow to the urine with little pain or spasm for some days, and thus relieves the continued tension of the bladder. I have certainly seen some remarkable cures follow this treatment. There is no rule for guidance in the selection of cases, but it would appear unwise and ill-chosen unless there was some organic lesion of

the urethra. With the modern means of examination, there can be no reason and should be no excuse for not knowing the condition of the entire urethra. Dilatation is not without some danger of ill result; hæmorrhage may be excessive and troublesome. Paralysis and incontinence may follow even when care is exercised and the surgeon fully competent.

One of our prominent modern authors¹ states "that the relation of cystitis to the formation of vesical calculus cannot be passed by without further notice. That a certain degree of irritation, if not of inflammation, is a constant factor in stone production there can be but little doubt. Let us observe what follows the excitation of inflammation of a moderate amount in the bladder, by the introduction into it of an extraneous substance. A piece of bougie may thus become accidentally lodged; cystitis is produced, the urine is rendered alkaline and phosphates are thrown down in abundance and aggregated around the foreign body." Here, as with all authors, almost without exception, it is referred to the "irritation or inflammation" produced by the foreign body, as the cause of all the mischief, without a hint that the something beside the bougie, namely: the bacterial ferment, was the real cause of rendering the urine alkaline and that, on this account, the subsequent chemical changes took place, resulting in phosphatic concretions.

Dr. Bigelow's lithopaxy has clearly taught the lesson, too little emphasized, that the "irritation or inflammation" resulting from an hour's operation within the bladder, itself seriously diseased, is less to be feared, if the organ is left *clean*, than many minor surgical operations done without aseptic conditions.

In a variety of ways, the gonococcus of gonorrhœa may and actually does find its way into and reproduces in the bladder, giving rise to severe cystitis. Here the common cause is the introduction of the bougie, or sound, either carrying with it the ferment already growing in the urethra, or introducing it into the bladder by a contaminated, unclean catheter. Ferment thus introduced is by far the most common of all causes of cystitis. The vagina is never free from actively growing organisms, and the one invariable rule of catheterization is an aseptic instrument, introduced into a surgically clean urethra. As ordinarily used, an instrument for each patient means but little. Let the catheter be constantly kept in a solution of mercuric bichloride, 1 to 1,000, and carefully cleansed with the same before its introduction.

I have felt it a duty to enforce the above lesson, not because it presents any especial discovery or, at this date, real novelty in practice, but rather as the practical deduction of the normal evolution of the rôle of the ferments developing in this important organ; deductions based upon years of observation and a large experience in private and hospital practice; all the more important since, I am constrained to believe, care as above described is prevention, and measures so simple and effective in cure are yet the exception to the rule of treatment.

¹ R. Harrison, Liverpool. *Encyclopædia of Surgery*, vol. vi, p. 344.

AFTER-TREATMENT OF CATARACT EXTRACTION.

Read in the Section on Ophthalmology, Otology and Laryngology, at the Thirty-Eighth Annual Meeting of the American Medical Association, June, 1887.

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Some of the gentlemen now present, will remember a brief discussion of the after-treatment of cataract extraction and iridectomy, introduced before this Section one year ago, by Dr. Chisolm, of Baltimore. The doctor promised to give trial to the after-treatment of extraction and iridectomy without the dark room, with more freedom and less bandaging, and report the result. We all know how soon and how well he fulfilled his promise. I stated in the discussion one year ago, that for six months previous, it had been my custom to permit cataract patients to leave their beds the third day after extraction, and the fourth or fifth day to substitute the green shade or smoked glasses for the bandage, and with better results than when I had kept the patient in bed in a dark room for from one to three weeks. I continued to treat my cataract patients as I then indicated, until Dr. Chisolm's first report appeared. After reading that report, the question as to whether or not it is necessary to put the patient to bed at all after cataract extraction, suggested itself to my mind. As I could see no urgent reason why they should be, I determined to try a more liberal treatment even than that outlined by Dr. Chisolm.

Since June 22, of last year, I have made twenty extractions, twelve infirm and eight private cases, and with two exceptions all have been treated as follows: Von Graefe's linear operation under cocaine was made in every case. Only the eye operated on was bandaged, and the patient was put in a quiet, moderately lighted room and permitted to sit in a chair, walk about the room or lie on his bed as he felt inclined. The only precautions to the patient was to avoid violent exertion or sudden jar. The dressing was not disturbed until the third day unless the patient complained of pain or the bandage became displaced. The third day the dressings were changed, the eye bathed, and a 1 per cent. solution of atropia sulph. instilled between the lids. In all but three of the cases the bandage was left off the fourth or fifth day, and the shade or colored glasses substituted, and the patient permitted to go to his meals and walk about the house. The exceptions were two cases in which the vitreous presented, and it was necessary to introduce the spoon to remove the lens. These patients were put to bed and the eyes kept bandaged until the reaction, which was severe in each case, had subsided. A third case in which the bandage was necessary for a longer time, was one in which there was extensive choroidal degeneration, and although the corneal wound healed readily, repeated hæmorrhages into the eye occurred. The patient in whom this occurred had cataract in both eyes, and extensive posterior staphyloma, with barely perception of light in either. I made extraction on both eyes at different times against my better judgment, but at the earnest