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ORIGINAL CONTRIBUTIONS

THE SURGICAL ASPECT OF STONE IN THE KIDNEY*

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In order to meet the demands of this modern civilization, with its airships and wireless telegraphy, things surgical must be lifted from the stratum of guesswork and uncertainty and elevated to a degree wherein accuracy and exactness eliminate all speculation.

In dealing with nephrolithiasis we are brought face to face with a multitude of surgical problems that have long been a baffling puzzle to both physicians and surgeons for many ages. The greatest source of uncertainty, as is common with all human ills, has been found to lie in our inability to make an accurate diagnosis of stone in the kidney .

We have tried hard to interpret the symptomatology and have found that this cannot be done except in the very rare typical cases. We have found that the diagnosis is not "a one man job," and I full agree with Dr. Bevan, that this condition offers the best opportunity for team work. In other words, the surgeon like the surgical part of the work, must come in last.

In the first place, clinical features of the case must be thoroughly studied and analyzed and an effort must be made to comprehend and classify the manifold symptoms that may be present in any individual case. The symptoms presented may be few or many, for be it understood that a stone in the kidney, like stones in its neighbor, the gall bladder, may or may not be productive of symptoms sufficiently pronounced as to invoke medical or surgical aid.

That nephrolithisis does exist as a primary condition wherein the stone formation occurs independent of any apparent pathological changes in the kidney per se or secondarily as a result of a pathological state of the kidney, which has induced the formation of stone, the situation is not materially altered so far as concerns the diagnosis.

The symptomatology enjoys a range of such a widespread nature as to probably place this condition in a class entirely its own, and I might say that in none of its numerous phases can we find an unaltered train of symptoms that could be called fairly pathognomonic, and just here is where the one man worker encounters his Waterloo.

The etiology of renal calculi has never been satisfactorily demonstrated. Beaver (1) is inclined to the opinion that the causative factors are found in a low grade mycotic infection and like gall stones, can be produced from the infections of the typhoid or colon bacilli.

Cunningham and Watson (2) suggest the cause of kidney stone to be due to some of the abnormally performed steps of body metalbolism, following which crystals of some of the urinary salts in excess appear in the urine as formative elements of renal calculi.

One of the difficult problems in the etiology is trying to account for the various differences in the composition of stones. Some are composed mainly of calcium ovalate, some are uric

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acid, some phosphatic and others mixed in various proportions.

Johnson (3) suggests that if an organic nucleus is necessary, such may consist of a single degenerated blood cell or the minutest fragment of mucus.

The symptomatology is interesting and delusive. Pains can be found, caused by renal calculi anywhere from the shoulderblade to the sole of the foot. The anterior crural nerve is frequently affected. Pain in the bladder and in the genitalia, in the groin and in the loin belong to this condition. An acute pain caused by a stone obstructing the ureter may produce shock, nausea and vomiting, with referred pains any or everywhere, similar to a Dietl's crisis. Beaven has concluded that this pain is due to intrarenal pressure, caused by a sudden blocking up of the kidney outlet and not to the passage of the stone through the ureter, which he declares positively causes no pain whatever. In making the differential diagnosis between a renal colic due to an occulsion of the ureter and causing a sudden accumulation of urine in the pelvis of the kidney, we must invoke th eaid of the internist, the microscope and the X-Ray, because the symptoms might be those of many other conditions, particularly where the stone is situated in the right kidney or ureter, it is likely to be confused with or mistaken for an attack of appendicitis. Even a man with broad experience in dealing with these two conditions is not immune from error when it comes to their differentiation, and in some cases the greatest possible caution and care must be exercised and every available means must be brought to bear before an exact separation can be made.

Some patients present only bladder symptoms and in one of my cases referred to me by Dr. A. E. Cox, of Helena, Ark., the patient had been subjected to a supra-pubic cystotomy in the hope of finding a stone present in the bladder before Dr. Cox saw the case. Sometimes the pain is situated in the opposite kidney; sometimes in the knee or in the heel and many times a diagnosis of pleurisy or pneumonia has been made where the pain was situated above the diaphragm.

All of the authors have agreed upon the infinite value of the X-ray in locating a stone and clearing up the diagnosis. This part should be in the hands of an expert Roentgentologist, who should not only be capable of making a picture of the stone, but who should also be fully prepared to interpret the various gas shadows and other discrepancies that may occur in the skiagraph. Some have suggested that it is even necessary to pass a leaded uretal catheter in order to determine the exact location of the ureter in relation to the stone. as other calcarious deposits near the higher urinary tract may cause confusion. Kelley's waxed tipped catheter may be of use in the hands of a very highly trained cystoscopist. It is pointed out that all of the various stones can be located with the X-ray with much facility with the exception of the pure uric acid stone. This, like gall-stone, does not manifest itself in the picture, but fortunately pure uric acid stones are rarely, if ever found, as they are generally mixed enough with some of the other elements to give at least a faint shadow which has a wonderful meaning to the well trained Roentgentologist.

A competent X-ray man and a competent cystoscopist and microscopist are just as necessary as a competent surgeon in dealing with these conditions and trying to make an accurate diagnosis.

We need all the help we can get, for as Leonard (4) says, the "specialists or diagnostician, so self-centered as to be blind to the worth of other methods and so egotistic as to admit no chance for faults in his own, is the slave of an optimism that robs him of any authority to speak in his own department."

Cystoscopy and X-ray examinations have offered us a great benefit and have made it possible for us to make clear, positive diagnoses in nearly all, if not quite all, of these cases. This is a wonderful step forward and will redound to the good of the sufferers of this terrible and hitherto uncertain malady.

With a positive diagnosis then at our command, we can offer these unfortunates relief by operation and positive assurance of as good results as we can expect in the surgery of any of the other organs.

Where the stone is primary, one of the two principal operations of attacking it may be chosen. If it is of small size the thin pelvic wall of the kidney may be opened and the stone removed without doing damage to the kidney structure. After its removal the rent is closed by carefully applied catgut sutures. If the stone is large, filling up several of the calyces, it cannot be brought out through the small pelvic outlet, in which case pyelotomy is forbidden. The best route of attack for the large stone will perhaps always remain through the nephrolithtomy incision, wherein the kidney is opened on its convex border just a little posterior to Brodel's line. At this point it is said that the kidney structure is the least vascular and offers the best opportunity for incision. This incision, of course, extends through the cortical and medullary substance of the kidney down into the pelvis and may be as long as desirable. In some cases it is necessary to lay the entire kidney well open so as to expose every part of the calyces and pelvis. Of course, if the stone is of secondary origin, that is to say, found in a kidney that is already carcinomatous, sarcomatous or tubercular, the operation of nephrectomy will have to be considered.

It is sometimes indeed surprising to find a very large stone that has been practically symptomless and on the other hand one no larger than an English pea may cause all kinds of suffering and invalidism.

In one of my cases referred by Dr. Jernigan, of Obion, Tenn., the patient, a lady, had been an invalid for a year or more, due to the partial occlusion of the ureter just where it leaves off from the infundibulum of the pelvis. Fortunately the stone was quite small and did not wholly occlude the ureter at all times, yet any effort upon the part of the patient would cause the stone to become tightened in the ureter sufficiently to produce a good deal of pain and thus the patient was made bed-ridden for fear of precipitating an attack upon the slightest exercise. When I opened the kidney I found it to be practically healthy, which showed that the occlusion of the ureter had never been sufficiently long to cause any serious trouble. In trying to get the stone it escaped from me and went on down in the ureter and two days later was passed through the urethra. The patient, however, had no further trouble and has since remained perfectly well.

I had the same experience with another patient referred to me by Dr. Duvall of this city, and the same results were obtained. It is possible that the manipulation accompanied by the relaxation incident to the anesthetic caused these stones to get away from me and descend through the ureter with safety and be finally delivered. I would have been led to hope that these cases might have terminated favorably without an operation owing to the small size of the calculus, had it not been for the fact that one of the patients had, as above stated, been bed-ridden for a year. I mention this to emphasize the fact that we should be very careful not to leave any particle of the stone in the kidney during an operation. The smallest piece may form a nucleus for a large one or without itself becoming larger, may cause just as much pain and discomfort as a stone the size of a hen's egg.

The question of what is best to do with these small stones naturally arises, and I would answer this by saying, that all sorts of medical treatment should be tried before subjecting them to an operation, hoping that the stone might pass. Some have recommended the injection of a little cocaine or its equivalent, immediately below the stone by means of a uretal catheter or perhaps a little sterile olive oil or almond oil would suit some cases better. Turpentine when given by mouth has been found of value in allaying the irritability. Various mineral waters have been recommended. These with strict observations of a diet course

and abstinence from alcoholic and malt liquors, probably offer the best hope of a cure than anything in the medicinal line. Operations should not be postponed unduly, as we must remember that there is always great danger of a complete occlusion with its subsequent evils wrought upon the kidney itself, due to increased intra-renal pressure, followed by atrophy of the kidney in many cases.

My operative experience has been confined to nine cases, all of whom recovered without any apparent calamity to the kidney function. The mortality should be practically nothing, if the usual surgical precautions are observed. Too much care, however, cannot be exercised in arriving at a diagnosis, depending for this largely upon first class X-ray work.

Careful uretal catheterization and accurate microscopical investigation of the urine, and good, safe, sound clinical judgment, coupled with your surgery.

1. The Journal of the American Medical Association, Vol. LIV, No. 9. Arthur Dean Beavan.
2. Cunningham & Watson, Genito-Urinary Diseases, Vol. 2.
3. Johnson's Surgical Diagnosis, Vol. 2.
4. Chas. Lester Leonard, The Journal of The American Medical Association, Vol. XLIX, No. 13.

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TUMORS OF THE URINARY BLADDER.*

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Tumors of the bladder are rare, but when they do occur they are so fatal with or without attention that the early diagnosis and radical treatment becomes one of unusual interest. Kuster says that about one-fourth of one per cent of all tumor work is for tumors of the urinary bladder, and Alberan tells us that Necker found four per cent in genito-urinary surgical cases.

They are most frequently seen between the ages of fifty and sixty years, but may appear in infancy or in old age. They are five times as frequent in the male as in the female.

The etiology is no better understood than tumors located elsewhere. The chemical irritation theory has been adhered to by many writers as a large per cent has been noted among workers in aniline and other dyes. The particular phase of this question, however, which is most interesting to us is whether or not mechanical irritation, such as the introduction of sounds and catheters is a causative factor. After going over the literature thoroughly I find that it is universally believed that such irritation, or preceding diseases of the bladder, the presence of stone or retention, does not predispose to tumor, except chronic ulcers and where a malignancy is secondary to some primary focus, such as cancer of the prostate. The relationship between stone and tumor has not been settled. Some authorities claim that the presence of stone is a predisposing cause; others claim that tumor predisposes to stone.

Rosenow says the etiological relationship between calculus and tumor cannot be denied altogether and that calculus seems to favor the development of tumor in a larger percentage of cases than tumor favors the development of stone. However, Guyon, Alberan, Nitze and Lincoln Davis all claim that stone in the bladder is not an etiological factor of importance. But the fact that tumor does favor the development of stone in many cases cannot be denied, as the secondary changes in the bladder which inevitably sooner or later develop in the presence of tumor furnishes the very conditions which are most favorable to the formation of stone. The well-known frequency of calcareous incrustation of tumor is unmistakable evidence of this fact. Cases have been reported where stone has been found

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