

The diagnostic value of polynuclear leukocytes is often exaggerated. Scarcely an average urine can be examined without finding definite numbers of free leukocytes, and increased numbers occur from only the mildest irritations of any part of the genito-urinary tract. Little reliance can be placed on leukocytes in the diagnosis of nephritis unless they are incorporated in casts, or else are obtained by catheterization of the ureter.

Mononuclear cells of slightly larger diameter are more likely to come from the kidney; it is not safe to term them "epithelial cells," however, because they are usually wandering cells which occur in large numbers in nephritis.<sup>6</sup> These cells often have dense deeply staining protoplasm, and can be found coming from glomeruli undergoing destruction, which no doubt is only one of a number of sources. By some they are held to be phagocytic.

The process of nephritis probably involves all the structures of the kidney, in no case affecting either the parenchyma or the interstitial tissue alone, however great variations occur in the intensity and duration of the process, and these factors are responsible largely for the different types. The regenerative power of the kidney is great. Restoration follows nephritis of considerable intensity from acute infections; even in more advanced cases there is marked and prolonged power of the kidney to adapt itself to conditions.

In estimating the value of casts, we should bear in mind that the kidney is subject to normal wear and that periods of exaggerated waste of kidney tissue may exist at times without exceeding the limits of repair; also that as age advances slight kidney changes are more apt to occur, these often being focal, or involving only small parts of tissue, such as in the senile and arteriosclerotic kidneys.

Tube-casts give no reliable information as to the functioning power of kidney. It is natural to infer that their presence in the tubules is a hindrance to free excretion, though to what extent this may be the case is yet to be determined. On this point more can be learned by careful continued observation on the excretion of water, chlorids and urea, and on the phenolsulphone-phthalein output which has been estimated by me in series of cases attesting to its usefulness as claimed by the originators.<sup>7</sup>

## PRESENT STANDING OF THE OPERATION OF LITHOLAPAXY \*

ARTHUR T. CABOT, A.M., M.D. •  
BOSTON

To our knowledge of the very perfect operation of litholapaxy I can contribute nothing important. Indeed, I can add but little to what I said about it in 1899 before the Section on Surgery and Anatomy of the American Medical Association<sup>1</sup> at Newport.

At that time I stated my opinion that litholapaxy was the operation of choice for the removal of most stones in the bladder. After a much enlarged experi-

ence I wish to express the belief that litholapaxy is the operation of choice in all uncomplicated cases of stone, and having seen this opinion constantly supported and confirmed by such masters of genito-urinary surgery as M. Guyon, Freyer, Keyes, Keegan, Chismore and others, it has been a source of surprise to me to find the operation imperfectly understood and little practiced among the younger generation of surgeons.

So great has seemed to me the indifference toward this operation even among some of the men who are devoting themselves to the special work of genito-urinary surgery that I am glad of this opportunity to endeavor to bring about a better and more intelligent opinion of this safe and satisfactory operative procedure.

Why do surgeons pass by this operation (litholapaxy) having a mortality of from 1.6 to 6 per cent., according to the age of the patient, and resort to one (suprapubic lithotomy) having a mortality of from 10 to 20 per cent.? It is not because the more dangerous operation has a shorter and easier convalescence, for after suprapubic lithotomy convalescence is more painful and from four to ten times as long as after litholapaxy. Again, litholapaxy interferes less with the functions of the bladder; and in my experience of 219 cases of stone removal there has been more tendency to recurrence after suprapubic cystotomy than after litholapaxy.

The advocate of suprapubic lithotomy will say that when the bladder is opened, unsuspected conditions are sometimes found which require the suprapubic opening for their proper treatment. In the early — what I may call the blind — days of bladder surgery, this had a certain amount of truth and justification in it; but at this time when the cystoscope gives the operator ample opportunity to become acquainted with the interior of the bladder before deciding on the operative procedure, it is no longer justifiable to subject all patients with uncomplicated stone to a more serious and dangerous operation in order to avoid occasionally overlooking some complication.

There is, then, no good reason to be advanced in favor of the suprapubic operation in uncomplicated cases, and yet many men continue to practice it and subject their patients to needless risks and discomforts. This is so, in my opinion, because many surgeons are not provided with the necessary instruments, and they have never taken the trouble to inform themselves and to be instructed in the technic of the crushing operation.

A litholapaxy outfit, while not very expensive, is a considerable addition to a surgeon's armamentarium, and may seem a serious burden to a general surgeon who sees comparatively few cases of stone. When patients with stone go to surgeons not equipped for litholapaxy, the question may be asked how these surgeons meet the situation.

They know that even after suprapubic incision the mortality is not very high and they wish to operate themselves rather than turn the case over to a rival, expert in lithotripsy. They do not make a close enough analysis of the situation fully to realize that by this course they are subjecting their stone patients to a mortality risk fully 10 per cent. higher than is justifiable. From their point of view their position is strengthened and justified by the belief that there is unusual danger attaching to litholapaxy to be overcome only by unusual skill.

This idea of unusual difficulties surrounding litholapaxy is wholly exaggerated and only to be accounted for by lack of familiarity with the operation and its results. As a matter of fact, the skill required in the

6. Cabot: Clinical Examination of the Urine, *THE JOURNAL A. M. A.*, March 18, 1906, p. 837.

7. Rowntree and Geraghty: *Am. Jour. of Pharm. and Exper. Therap.*, July 10, 1911.

\* Dr. Cabot died Nov. 4, 1912.

\* Read in the Symposium on Treatment of Vesical Calculus in the Section on Genito-Urinary Diseases of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

1. Cabot, Arthur T.: The Choice of Operation for Stone in the Bladder, *THE JOURNAL A. M. A.*, Nov. 9, 1899, p. 657.

use of the lithotrite is no greater than that needed in an ordinary cystoscopy, and no surgeon is competent to undertake bladder surgery who is not competent to use a cystoscope. Inexperience adds no more to the danger of litholapaxy than it does to the danger of suprapubic cystotomy. Furthermore, my opportunities for seeing young surgeons undertaking their early litholapaxies have convinced me that a litholapaxy in inexperienced hands is less dangerous to life than a suprapubic cystotomy in the hands of an experienced general surgeon, because the intrinsic dangers of the operation are much less.

The fear felt by inexperienced surgeons for the lithotrite is therefore unfounded. A brief study of any of the more detailed descriptions of the operation will fit a man with any training in urethral manipulations to perform the crushing operation safely. The instruments are simple and any one who uses urethral instruments with gentleness and care can readily manage them.

This is no time or place to discuss at length the fine technical points of the crushing operation. The one thing of importance is that the bladder be moderately distended before the lithotrite is introduced. If this is done it is practically impossible for the bladder wall to be caught between the jaws. The fear of this accident seems wide-spread and yet I never knew of any damage being caused in this way.

Formerly, before the modern treatment of prostatic hypertrophy was developed, it was a common thing in my practice to crush stones behind greatly enlarged prostates. The operation was often carried out in a distorted bladder and the instruments were manipulated through a stiff and tortuous urethra. I have notes of 185 cases in which a formal litholapaxy was done under general anesthesia and I have not included a large number of cases in which small stones or calcareous gravel were pumped out with or without local anesthesia. Notwithstanding the unfavorable conditions under which many of the earlier operations were performed only eight patients died, a mortality of 4.32 per cent.

To understand fully the degree of responsibility of the operation for this mortality it is well to glance a moment at the fatal cases.

CASE 1.—A woman of 62 with extensive tuberculosis of the glands died one month after a combined litholapaxy and curettage of the cervical glands. The bladder had fully recovered. Death resulted from general cachexia.

CASE 2.—A man of 84 died one month after litholapaxy of sudden pulmonary embolism.

CASE 3.—A man of 69, feeble and with a chronic bronchitis, underwent an easy operation. The urine was clear and bladder irritation disappeared the first week. On the tenth day the patient died of pneumonia.

CASE 4.—A man of 70, with complete obstruction in prostate and suppression of urine, was operated on in the country as a desperate effort. The kidneys never resumed work, and death ensued in twenty-four hours.

CASE 5.—A broken-down man of 60 with chronic bronchitis and a weak heart had bladder tenesmus. On account of the patient's wretched general condition he was kept under treatment for almost two months. Pain prevented improvement. A quick litholapaxy was finally done as a desperate measure to give him relief. Difficulty of respiration was greatly increased, and death followed three days later.

CASE 6.—The patient was a man of 70 who had suffered with symptoms of stone for fifteen years. After litholapaxy there was good recovery from bladder symptoms. Then hematuria set in and in my absence another surgeon opened the bladder but found nothing. After death the kidneys were found full of stones.

CASE 7.—A man of about 70 was operated on at a hospital in a neighboring city. A catheter was fastened in after the operation, as it was a prostatic case. I had no notice that things were not going well until I accidentally heard of the patient's death.

CASE 8.—A man of 70 underwent an easy operation, but he died and autopsy showed hydronephrosis and pyelonephritis.

Of these eight deaths then, two occurred a month after operation as a result of conditions not connected with the litholapaxy. Two other deaths were caused by pneumonia consequent on the anesthetic in patients with chronic bronchitis, and one patient was in a desperate condition from acute suppression of urine. In view of these facts I think it will be conceded that even the low mortality of 4.3 per cent. was not wholly to be laid at the door of the operation. Among uncomplicated cases of stone there were no deaths.

Modern surgery rightly demands that in cases of prostatic obstruction with secondary stone, treatment shall be given for the obstruction and that the removal of the stone shall be merely an incident in the operation for removal of the prostate. Whether the surgeon elects the perineal route or the suprapubic for the removal of the prostate, the stone is easily removed by either without added danger.

This change in the method of treating secondary stones behind enlarged prostates has taken from the accepted domain of litholapaxy most of the cases of real difficulty in manipulation, the cases among which the slender mortality occurred, and for the crushing operation are left the uncomplicated cases which have practically no mortality and those occasional prostatic patients who shrink from the added risk of a prostatectomy and find themselves comfortable when the stone is removed.

Since Dr. Bigelow published to the world the operation which he named litholapaxy there have been few changes in the technic. Dr. Chismore's evacuating lithotrite is perhaps the most considerable and important innovation which has been brought forward. In the hands of its distinguished inventor the evacuating lithotrite did extraordinarily good work. Dr. Chismore operated usually without general anesthesia and was content to do an operation in several sittings when that was necessary. With a conscious patient the evacuating lithotrite had the distinct advantage that the suction of the pump drew the fragments between the jaws. The lithotrite therefore did not have to be moved about in search of fragments and the operation was consequently less painful.

In my experience with Dr. Chismore's instrument the small size of the evacuating tube has been a decided disadvantage and I have come to use the instrument only occasionally, when the search after a last elusive fragment has been troublesome. The combination of a cystoscope with an evacuating lithotrite is a last refinement devised by Dr. George Walker to facilitate the search for a last fragment.

It must be difficult at the end of a crushing operation to obtain a clear medium in which satisfactory cystoscopic manipulations can be carried out. In all of my series of cases I never had more than a momentary difficulty in seizing the last fragment; this difficulty was met only in sacculated bladders behind enlarged prostates—in cases which are not now selected for litholapaxy.

In this article I have endeavored to indicate the change in the status of the operation of litholapaxy that has come about since my former paper in 1889. We

have seen that modern prostatectomy has taught a better way of disposing of the troublesome class of cases that furnished most of the difficulties met by the early lithotritists. Having emphasized this additional exception in which a cutting operation should be preferred to litholapaxy, I shall close by repeating the assertion made in that earlier paper:

In my opinion, we have in litholapaxy the operation of choice for the removal of most stones. While this is the rule, there are exceptions to it, and the varying conditions surrounding stone in the bladder will now and then lead us to choose some other operation for their safest removal.

The surgeon who best appreciates these varying conditions, and selects in each case the operation which most surely avoids the dangers surrounding "that particular patient," will arrive at better results than any advocate of a special operation, however expert.

1 Marlboro Street.

## SUPRAPUBIC CYSTOTOMY FOR VESICAL CALCULUS

### INDICATIONS AND OPERATIVE PROCEDURE \*

WILLIAM E. LOWER, M.D.  
CLEVELAND

There are but two operative methods now considered practical for the treatment of stone in the urinary bladder. One is the crushing of the stone and the removal of the fragments through the urethra; the other is the opening of the bladder suprapubically and the removal of the stone through the incision.

He would be obdurate indeed who did not acknowledge the wonderful invention of the lithotrite and the achievements accomplished by its inventor. At a time when any cutting operation carried with it such a high mortality and the convalescence was so prolonged in those who survived, the lithotrite, with the skilful touch of Bigelow, was truly a blessing; but the conditions that prevailed then with regard to the cutting operation no longer exist to-day. Little advancement, if any, has been made for the crushing operation, while each year brings a better record for the suprapubic operation.

To say that either operation should be used to the exclusion of the other for all cases of stone in the bladder would be ill-advised; but the cases generally recommended for the use of the lithotrite by the advocates of litholapaxy are, as a rule, selected cases and naturally would have a lower mortality-rate, no matter what kind of operation. Surgery is rapidly turning from the dark to the light, and blind operations or those depending entirely on the sensation of indirect touch must be replaced, wherever possible, by operations conducted by inspection of the field or by the direct aid of the fingers. We all know that it is possible by large experience to become fairly accurate by indirect palpation, but it can never be so nearly exact a method as that which depends on seeing or direct feeling.

The opportunities for any one person in this country to acquire a large experience with the lithotrite within any reasonable time are very limited; material in clinics is not sufficient to give the student the practical experience necessary to do a successful litholapaxy, and certainly no one would recommend its use by the untrained;

while the opportunities for teaching suprapubic opening of the bladder are quite common, there being many other conditions besides stone for teaching this technic. In India where so large a proportion of natives have vesical calculi, an extensive experience may be acquired in a comparatively short time; as most statistics for the lithotrite come from India, the comparison is hardly fair.

Most advocates of litholapaxy admit that the stone should be freely movable, that there should be sufficient bladder capacity, and that the urethra should be of sufficient size; also that a very large prostate, an encysted stone or a stone with a foreign body as a nucleus are all contra-indications to the successful use of the lithotrite. For these more or less difficult cases suprapubic cystotomy is recommended. If, then, the mortality-rate should be somewhat higher for the cutting operation would the comparison be fair?

Among the causes mentioned as being responsible for deaths in suprapubic operations is peritonitis. This should no longer occur, for with better aseptic methods and better technic the dangers of peritonitis are reduced to a minimum. Better local and general anesthetics have reduced the danger of shock from the operation; and better methods of dealing with the wound have shortened the period of convalescence and reduced the complications to a minimum!

The complications and mishaps of the lithotrite, when they do occur, are nearly always serious. I am treating now a most persistent stricture resulting from the use of the lithotrite by a colleague. In this case there had been an extensive laceration of the urethra.

### INDICATIONS FOR SUPRAPUBIC CYSTOTOMY

Overenthusiastic exponents of litholapaxy may make the statement that they have never seen a stone too large or too hard to be grasped by the lithotrite, but their experience is scarcely borne out by the experience of other surgeons or by the many reported cases in medical literature. Even in the special stone number of the *Indian Medical Gazette* expert operators confess that this condition does exist. The case reported by Richards<sup>12</sup> is a good illustration. The stone weighed 2 pounds; lithotripsy failed; perineal incision failed because the stone had to be chiseled; and the stone was finally removed suprapubically, the wound healing readily. In my own practice there have been eight cases with large hard stones which I feel could not have been removed without great difficulty by any other than the suprapubic route. The patients made quick recoveries without complications.

The operative treatment of encysted or adherent calculi is always the high incision, as the many published cases prove. Inspection is absolutely necessary here. I have had three such cases; in one a stone about 2 cm. in diameter was enucleated from a pocket in the region of the trigonum, only the very tip showing. In another the stone was firmly adherent behind the prostate. In the third case cystoscopy showed a calculus embedded in the mucous membrane over the right half of the trigonum. This case is of further interest in that the patient returned in six months complaining of the old trouble; cystoscopy showed the diverticulum at the site of the former stone. Again suprapubic incision was made, several soft stony deposits removed and the diverticulum dilated, since which time the patient has been in good health.

Where multiple stones are present the superiority of the suprapubic method is hardly to be doubted, for

\* Read in the Symposium on Treatment of Vesical Calculus in the Section on Genito-Urinary Diseases of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

\* This article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

12. Richards: *Lancet*, London, 11, 230