RAPID LITHOTRITY.

BY DR. HENRY H. MUDD,

ST. LOUIS, MO.

[Read before the Tri-State Medical Society at Indianapolis, Sept. 19, 1883.]

[*Reprinted from the "Weekly Medical Review" of October 20, 1883.*]

Published by J. H. CHAMBERS & Co.,
CHICAGO, ILL. AND ST. LOUIS, MO.

RAPID

LITHOTRITY.

BY DR. HENRY H. MUDD,

ST. LOUIS, MO.

[Read before the Tri-State Medical Society at Indianapolis, Sept. 19, 1883.]

[*Reprinted from the "Weekly Medical Review" of October 20, 1883.*]

Published by J. H. CHAMBERS & Co.,
CHICAGO, ILL. AND ST. LOUIS, MO.


COMMERCIAL
PRINTING Co.
ST. LOUIS

RAPID LITHOTRITY.

BY DR. HENRY H. MUDD, ST. LOUIS, MO.

It is not my object to review the history of the various operative procedures for the removal of stone, but to inquire concerning the best method of treating such cases as may be presented to us at the present time.

Lithotomy and lithotrity have brought to surgeons much repute and honor, but unfortunately the very causes that have surrounded the operators with renown have tended to develop in the laity a profound dread of the operation, hence we not infrequently meet with patients who vainly hope to escape the surgeon's attention.

Such cases illustrate the tolerance of the bladder and the power of hygienic care and lithontriptics to mitigate suffering and prolong life.

Rest, diet, habit of body, and prompt treatment of the recurring so-called "attacks of stone," go far toward rendering endurable the suffering of these timid patients, who shrink from one of the safest and most gratifying operations in the province of surgery.

Solvents are of course for internal administration, and will aid at least in keeping the bladder in the best possible condition while subject to the irritant action of a foreign body, and may in some cases diminish the size of the stone.

Pure water in large quantity is the most potent solvent of urinary calculi. If the calculus is of uric acid, the lithia, or potash salts, are an aid to

the solvent action of the water. Benzoic acid, or some of its congeners, are more suitable if the calculus is phosphatic.

Injections into the bladder, given with a view of dissolving stone, have now nothing to commend them, for they demand as much and as severe mechanical treatment as the more prompt and efficient "rapid lithotrity." They have no redeeming feature to justify their use. In illustration of the influence of such care, and of the tolerance of the bladder to such irritation, I append brief histories of the two following cases:

B. L., a German, aged thirty years, sustained a compound comminuted fracture of both legs in 1870. He made a slow but good recovery. In 1872, in consequence of long confinement and suppuration, he suffered from lithiasis and passed a number of small stones. His bladder has since continued to give him trouble. In 1879, I sounded for stone and found one the size of a large walnut. He would not submit to an operation and tried various domestic remedies with the view of dissolving the stone, oak bark, rosemary, columbine, etc., etc. He was a grocer, but retired from business to care for himself. So successful was he that he wished to resume business at the end of two years, and, with bladder less irritable, and general health much improved, he is now at work and lives in comparative comfort, although he still carries his stone.

In another case in which the stone, when finally removed by Dr. Hodgen, weighed twenty-two ounces, the patient had carried it for many years, yet was able to attend to business until within a few weeks of death, having carried a daily mail a distance of twelve miles and return.

In a discussion provoked by a paper presented by Sir Henry Thompson to the Royal Medico Chirurgical Society, in March, 1878, the province of lithotrity was in a manner defined and its limits somewhat rigidly outlined by its opponents, while

its advocates admitted its usefulness to be restricted, and applicable only to carefully selected and favorable cases.

In January, 1878, in the American Journal of Medical Science, there appeared an article by Henry J. Bigelow, of Boston, announcing his discovery of the tolerance of the bladder to prolonged instrumentation, demonstrating the feasibility of using large evacuating tubes, and defining the principles of litholapaxy, or, "rapid lithotrity." I had been accustomed to see such good results from lithotomy in the practice of my associate, Dr. Hodgen, that I thought there was little to be desired in the way of improvement on the lateral operation. I had learned to regard it as one of the safest and most uniformly successful of the so-called capital operations. It was only when Bigelow's paper appeared that my attention, in common with that of the majority of surgeons, was turned with renewed interest to lithotrity, an operation which was supposed to have found its limit in the restricted province defined by carefully selected cases in the hands of few surgeons.

Lithotrity (where no single sitting was for more than five minutes) was limited to the removal of small stones of the size of a chestnut, possibly one ounce in weight, occurring in adult males, where cystitis was slight, where the patient was able to bide his time and wait for the slow subsidence of the inflammatory action produced by the sharp fragments resulting from a short sitting and the timidity of the surgeon's action. This operation, where the patient was forced to take the chance of being able to pass the fragments through the unprotected urethra, was suddenly developed into the vastly improved and widely useful operation of "rapid lithotrity" or litholapaxy. So well satisfied was I of its utility that I have since that date found that the great majority of patients were amenable to this much less severe operation.

Rapid lithotrity has revolutionized the treatment of stone in the bladder, for the author grasped in its widest significance the fact that prolonged instrumentation (an hour or two hours, not five ten minutes) was less harmful than the continued presence of ragged, sharp foreign bodies in the bladder—the fragments of a partially crushed stone. He pushed his thought to its legitimate conclusion, and demonstrated that it was safe to crush large stones if the fragments were immediately removed.

He supplemented this discovery by using large evacuating tubes, so large that it was no longer necessary to pulverize the stone. Complete evacuation, even if obtained at the expense of two or more hours continuous work, is preferable to an incomplete operation, no matter how carefully it may have been done. Rapid lithotrity has left but few patients over sixteen years of age for lithotomy, and it may be that much younger patients may with propriety be subjected to this operation. The age of the patient should impose a limit only where the bladder or urethra is deficient in size, and this deficiency will, I think, be harder to overcome in the urethra than in the bladder, for the bladder of a child three and a half years old, when moderately distended, will hold about three and a half or four ounces, sufficient to give room for the use of a small lithotrite. The youngest patient on whom I have made lithotrity was in his fifteenth year, but I believe that we shall find that much younger patients are amenable to this operation. The proportion of cases fitted for lithotrity will vary in the hands of different operators. Out of nine successive cases coming under my observation during the past fifteen months, only two in my judgment demanded lithotomy. The oldest patient subjected to lithotrity was sixty-two years of age. The largest stone weighed 720 grains.

There are but few essential conditions necessary

to make success probable, presuming ordinary manual dexterity in the operator, and care and moderate practice in the use of instruments.

We need first, a free urethra; second, a bladder capable of moderate distension—sufficient to make room for the free movements of the lithotrite. The first condition may be made evident very generally by the operation of sounding; the second, I think, is not quite so readily determined.

In the fall of '79 I made some experiments concerning the amount of pressure necessary to distend the bladder in the cadaver, and reported them to the State Medical Association in 1880, at Carthage, Mo. A bladder may be generally thickened, or it may be thin and weak at certain points of dilatation. How are we to know the very essential fact that the bladder is regular in outline, normal in its distensibility, and with walls not so seriously diseased as to make unsafe the requisite distention and manipulation for litholapaxy. Any change in the structure of the bladder-wall by inflammatory thickening, by ulceration or by sacculation would almost certainly interfere with its distensibility, except in the abnormal dilatation of the bladder, which is associated with retention, a condition not often accompanying stone. Dr. Harry Hodgen, now assistant physician at the City Hospital, made some experiments on the cadaver during August, 1883, to determine the force necessary to inject six and eight ounces in the normal bladder. I think these experiments fairly show the slight force required to inject the living healthy bladder, when the patient is under the influence of anæsthetics.

In a series of fifteen consecutive experiments on the cadaver, it was found that the average pressure required to inject through a catheter and rubber tube six ounces, was represented by a column of water 12.8 inches in height from the level of the table on which the body lay. The extremes of pressure required were represented by columns of

water respectively six inches and twenty-seven inches in height from the level of the table.

In a series of fourteen consecutive experiments, it was found that to inject eight ounces required an average pressure represented by a column of water 15.2 inches in height from the level of the table on which the body lay.

More pressure than this is unnecessary, and if required should be regarded at least as a note of warning, which if heeded may save the patient's life. Lithotritists have recognized the possible danger of rupture of the distended bladder, by the violent muscular contractions of vomiting; so it may, when diseased be ruptured by forcible injection.

Surely in an operation of so much importance, too much care and attention cannot be exercised in the search for possible danger from pathological changes in the wall of the bladder.

Little else beside free working room is required. Capability of the bladder to hold six ounces of fluid without undue distention, is the one prime factor always necessary to a safe lithotrity. In many cases this can be determined only after full anæsthesia is established, by injecting with this very slight pressure the quantity desired. The column of water 12.80 or 15.2 inches high would represent a pressure greater by at least six inches in height of column than is necessary, for the pubes which is a guide to the position of the bladder is about six inches above the level of the table.

There may be serious changes in the bladder that will be difficult or impossible to definitely determine before operation, but a constant remembrance of the very slight pressure necessary to distend a normal bladder, when muscular resistance is absent, will prevent disaster by the use of any undue pressure in injecting the bladder, and compel the surgeon to abandon lithotrity for the then safer lithotomy.

The details of the operation are well described in the many articles that have appeared in our journals. All call attention to many minor details of great practical importance. Some profit may be gained by considering the causes of death in lithotomy, as shown in the case book of Dr. Hodgen and myself. Some of these sources of danger will not pertain to lithotrity.

Our case book gives a record of (85) eighty-five lithotomies, of which (80) eighty were made by the late Dr. John T. Hodgen, and (5) five by myself. Three of these were secondary operations made on children under the age of puberty for the recurrence of stone. In one of these vesico-rectal fistula remained. It first followed an operation by Dr. Chas. A. Pope, and remained after secondary operation by Dr. Hodgen.

Deaths occurred in (12) twelve cases, of which (4) four are properly chargeable, not to the operation, but to conditions which would have resulted fatally under any operative procedure or without any interference. Of these (4) four cases one died of chloroform in 1869; two others, aged respectively 64 and 62 years, one with thirty-five stones, the other with twenty-one stones, died of uræmia, while the fourth, aged 21, died of hæmatemesis. Of the remaining (8) eight, three died of peritonitis, one of cellulitis, one of pyæmia, and three of uræmia, conditions which may supervene after either operation, but pyæmia, cellulitis and peritonitis are not so likely to result from lithotrity as they are to follow lithotomy.

Considering only adult patients, we may fairly eliminate from the list of dangers attending rapid lithotrity phlebitis, erysipelas, and pelvic cellulitis, while acute peritonitis will occur only in case great injury is done to the bladder by more or less complete rupture.

Anæsthesia is an essential part of rapid lithotrity, where the operation is prolonged, and the

danger from this agent is greater than in lithotomy, because the time for its influence is prolonged and the impression demanded no less profound.

Cystitis is more likely to follow lithotrity, since drainage is not so perfect or continuous as in lithotomy, and the bladder is not left in a condition to be at as perfect rest as after lithotomy. Cystitis is much less likely to follow the modern lithotrity than it was to remain after the operation as performed before Bigelow's advance. Cystitis is however sometimes well treated by the incision as made for a lateral lithotomy.

In the absence of ulceration the absorption of decomposing urine is less apt to occur than in lithotomy, where the prostatic urethra is cut and bruised and the cellular tissue exposed.

Hæmorrhage is less liklely to be troublesome, and it is hardly possible that it should be dangerous in its results. The greatest danger would be in the distress occasioned by its coagulation in, and distention of the bladder, but we have at hand the evacuating tube and bulb of Bigelow, which are most efficient and safe in their action. I have repeatedly cleansed the bladder of clotted blood by their use, in cases of hæmorrhage from an hypertrophied prostate.

Pyelitis and suppression of urine are not likely to follow in either case, unless there is serious disease of the kidney, and in this case the less severe operation without cut or abrasion, as in rapid lithotrity, is not so likely to provoke disturbance as the more severe operation of lithotomy.

Urinary infiltration and abscess occasionally occur in lithotomy, but not in rapid lithotrity, for there is no laceration of the urethra by passing fragments, nor is there a cut in membrano-prostatic urethra.

Again, the shock from lithotrity, except it results from prolonged anæsthesia, is not likely to be more severe than from the passage of a large ~~stone~~ sound.

and is much less severe than from lithotomy, and when suppression of urine results, it comes, I suspect, from this anæsthesia rather than from the manipulation of the operation.

The period of confinement and restraint in the sick-room is lessened by at least three-fourths. I have had patients at their work in three days after lithotrity.

The recurrence of stone after the modern rapid lithotrity will, I venture to assert, be much less frequent than after the *old* lithotrity, and not more frequent than after lithotomy, for I suspect it is very rare that any considerable fragment will remain in the bladder; since one of the most efficient means of sounding for small stones, stones that are apt to escape the ordinary sound, by reason of their small size, or by concealment in pockets, or folds of the bladder, is found in the use of the evacuating tube and bulb, after moderately filling the bladder with water. The fragment, unless so small as to be represented by the merest grain, adherent to the soft and vascular surface of the bladder, will be dislodged from its pocket by the distention of the bladder, and the current of water when drawn into the tube and bulb will carry the stone against the tube with an audible click, or into the bulb—thus making the exploratory operation one of radical relief.

American surgeons may well be proud to boast that one of their number possessed the boldness and discrimination to demonstrate the feasibility of rapid lithotrity, and to popularize the operation; for it is one of the greatest advances of modern surgery.