Senior Fellows Society Meeting2021, Royal College of Surgeons of England

*SUŚRUTA'*S CYSTOLITHOTOMY

Indications, Technique, Peri-operative Care

(Our translation from the Sanskrit text; our added comments in parentheses)

Indications: Failure of Medication, systemic and local (by bladder irrigation), and persistent and sufficiently severe symptoms, including Retention of Urine.

Even an expert surgeon might not succeed hence surgical operation is the **treatment of last resort**. Especially so in a patient who might otherwise die, when the consent of appropriate authorities should be obtained before operating.

Preoperative Preparation: The patient should have lost some weight (if overweight), and should have had appropriate oleation (treatment by medicated oils internally and externally), and *doṣa* (humor) ameliorating treatment (medication and regimen). The patient should have been given some food, should be otherwise "strong" (absence of inter-current illness), and appropriate religious sacrifices and incantations should have been performed.

The surgeon should ensure the availability of appropriate equipment, and should reassure the patient.

Positioning of Patient: The patient lies supine on a raised, knee-high plank, with the waist elevated on a folded cloth (to make the perineum accessible), and the upper trunk on the lap of a strong person. The flexed knees and elbows are tied (together) by restraining straps (or cords) to the assistant (immobilising the patient's trunk).

Manipulation of the Stone in the Bladder and Removal: The left side of the umbilicus is massaged (with oil) and pressed down (by an assistant) with the clenched fist to push the stone down inside the bladder. The surgeon introduces the well lubricated left(non dominant) index and middle fingers, with the nails trimmed, into the rectum. The fingers are kept in the midline and advanced (down and forwards) towards the perineal raphe at the root of the penis, the pressure straightening out the folds of the bladder (which is distended) so that the stone is palpable and protrudes (in the perineum) like a cyst.

The procedure should be abandoned if the patient faints, his head droops, eyes go blank, or he stops "moving" (? struggling) because he could die (if procedure is continued**). Proceed only in the absence of these signs.**

An incision is made a barley grain's width (about 2-3mm.) to the left of the perineal raphe (over the bulge), parallel to it, and of sufficient size to allow the stone to be removed. For convenience the incision could be made on the right side (in a left handed surgeon). The stone should not be crushed or broken, because even a tiny amount remaining would lead to the stone re-forming, and it is removed by an instrument "curved at the front end" (the text reads *agravakra*).

(Next part, in italics, is ambiguous: different vocabulary and style, probably a different writer, with limited surgical and anatomical knowledge).

In women the uterus is close to the back of the bladder and the incision should be made more superficially in case a urine discharging wound (urinary fistula) develops. A similar discharging wound (fistula) can develop in males if the urethra is injured

A single wound in the bladder, for removal of stone, heals because the procedure complies with ancient texts, but the patient dies from other traumatic wounds of the bladder, or if the bladder is "torn" at more than one place.

Post –Operative Care:

Immediate: The patient is placed in a tub of warm water and is sudated, so that the bladder does not accumulate blood. If blood does fill up, the bladder is douched with a decoction of "milk producing tree" drugs (? Fig tree, and others).

The wound should be anointed with honey and clarified butter (*ghee*)

Diet:

Immediately post-operation: jaggery (unrefined sugar) to "cleanse the urinary tract".

For the first three days: gruel**,** with *ghee* and diuretic drugs.

Next ten days: rice, cooked in a small quantity of milk and plenty of jaggery for "cleansing" (the urine, the blood and the wound).

Next ten days: "aquatic animals" (? fresh water) flesh with acid fruit (e.g.tamarind, green mango, lime).

Wound and General Care:

First ten days: Daily Sudation (sweating) with oily and non-oily techniques. The wound is irrigated with decoction of "milky tree" (Fig and others with a milky sap), other astringents and demulcents, and anointed with a paste made of all of these, in turmeric (infused) oil or *ghee* (clarified butter).

Complications: If urine is still discharging from the wound after seven days the wound should be cauterised. Once urine flows naturally (per urethram) douches of demulcent and astringent drugs are used.

Blood clots (in bladder) should be evacuated by douching.

If seminal concretions or gravel appear in the urethra and obstruct, they should be removed manually (by massaging). If this fails the penis should be incised and stone removed with a hook (text reads *baḍiśa*)

Avoid for One Year: Sexual Intercourse , Riding animals or chariots (to avoid jolting), Climbing hills and trees, Swimming in rivers, (i.e. heavy physical exertion) ,and "Heavy" (? rich) food.

***Injury to Vital Points (marman)*:** *(appears as an addendum, probably by a different writer)*

Avoid injury to Urinary channels, seminal "channels", testicular "channels", urethra, perineal raphe, vagina, rectum and urinary bladder. Death, impotence, sterility, or pain result, if these are injured.