

Urinary Stone Disease in Arabian Medicine

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URINARY STONE DISEASE IN ARABIAN MEDICINE

ABSTRACT

Urinary stone disease (urolithiasis) was discussed in great detail in Arabian Medicine. Explanations given by Ibn Qurrah, Al Razi, Ibn Sina and Al Zahrawi about the formation and growth of urinary stones do not basically differ from our modern concepts. Pain and findings on uroscopy were carefully discussed and explained. Differential diagnosis between colitis and kidney stone, and between kidney and bladder stones was very clearly made. Some operations on bladder stones were described and the first lithotripter to break an obstructing urethral stone was invented by the great Muslim surgeon Al-Zahrawi. To prevent recurrence of stones they advised diuretics and plenty of fluids, avoiding heavy foods and in particular dairy products. Finally, Arabian Medicine pharmacology and pharmacopeia are rich in drugs and compounds prescribed for the treatment and breaking of urinary stones. **Includes 2 figures, 3 tables and 12 references**

Introduction

Urinary stone disease had been known in the Middle East since time immortal. A stone was found in an Egyptian mummy ⁽¹⁾ and Elliot Smith discovered a stone in the pelvis of a skeleton at El Amarah in Egypt more than 7,000 years old ⁽²⁾. Description of stone disease and operations on bladder stones appeared in Hindu civilisation in the form of great poems called Vedas or Samhitas ⁽¹⁾. More advanced and documented material is found in Greco-Roman medicine and Galen tops the list of the physicians of that period.

Muslim and Arabian physicians studied the treasures of ancient medicine, especially the Greek legacies, and by diligent work they added their own observations, experiments and deductions. During the golden age of Islamic civilisation (9th-12th C), medicine and health sciences flourished. It was during that period that the great physicians of Arabian medicine had lived and their well-documented studies about urinary stone disease had appeared.

Aetiology of stones: The explanations given by Ibn Qurrah (d.901), Al Razi (Rhazes, d.932), Ibn Sina (Avicenna, d.1037) and Ibn Zuhr (Avezoar, d.1162) about the formation of stones, were all basically similar. All agreed that heavy food stuffs, dairy products and poor kidney function could be a cause ^(3,4,5,6). In his Al-Qanun Ibn Sina ⁽⁵⁾ explains "A stone is formed by both a sticky stuff 'mucus, pus or blood'... and an active force 'fever'.., the precipitates are caught together within whatever reaches from the filtrate... The inflammatory process petrifies the precipitate into a stone" ⁽⁵⁾. They thought outflow obstruction was also a cause, and that there was a familial tendency ⁽⁵⁾. All these explanations are similar to what we know nowadays.

Describing urine of a stone-former, they said... "there may be a lot of deposit, reddish or yellowish gravel, the clearer it is and the less is the deposit, the harder is the stone" ⁽⁵⁾... the patient passes blood with large or coarse stone, but not with the small and soft one. Dysuria is more with the small one because it may obstruct the mouth of the bladder" ⁽⁴⁾ and "the patient may urinate unconsciously... and rubs the tip of his penis... and likes to urinate again because the bladder is irritated." ^(4,5). Retention of urine... "precedes filling if due to a urethral stone, while with bladder obstruction it occurs after filling" ⁽⁴⁾ Muslim physicians

excelled in differential diagnosis. **Table I** shows the differentiation between kidney and bladder stones, and (**Table II**) shows the differences between colitis and renal pain.

Graziani ⁽⁷⁾ thought that Ibn Jazlah (d.1080) had carried out research on kidney diseases at Al Adudi Hospital in Baghdad. He dried up, weighed and examined the constitution of different stones. "A stone weighed more than 33 Dirhams i.e. 100.61 gm when removed from the bladder, three days later when it was dry, it weighed 4.46 gms."

Treatment of stone disease: Muslim physicians differentiated between treatment of pain by analgesics and the definitive treatment by drugs which disintegrate stones or facilitate their passage... Arabian pharmacopia is rich in drugs, single or compound, used for treatment of stones (**Table III**).

We failed to find any description of surgical treatment of kidney stones, though the discouragement by Ibn Sina to operate may indicate that some sort of surgery was practised. However, Wickham and Miller ⁽⁸⁾ quoted Wolfgang Gosche (1556) attributing the first operation of PCNL to the Arabian physician Ibn Serabion who...(is said to have removed a kidney stone by pushing a red hot iron bar into the loin of a patient and delivered the kidney stone out through the tract) ⁽⁸⁾.

According to Ibn al Quff ⁽⁹⁾, surgical treatment of large bladder stones was easier than that of small ones because the large one either stops in the urethra or is always in the cavity of the bladder.., and it can be more easily felt.

In case of retention by bladder stones Ibn Sina ⁽⁵⁾ explains "If the patient lies on his back and his buttocks are raised and he was shaken, the stone moves away from the passageway... urine streams out, it may also be easy to push away the stone by a finger in the rectum... If that does not work, use a catheter to push the stone back... If it was difficult to be passed do not push hard." This is quite similar to how modern urologists handle an obstructing posterior urethral stone. They push it back either by a catheter or endoscopically.

Al Zahrawi ⁽¹⁰⁾ (d.1013), otherwise known as Alzahravius or Albacasis, according to Springle ⁽¹¹⁾ was the first to perform transvaginal cystolithotomy. He devoted Chapter LX and Chapter LXI of his great book (Al Tasreef) for removal of stones. However, the operation to remove bladder stones or "The Lesser Operation" (Apparatus Minor) as it was called in the Middle Ages which he described was essentially similar to the one in the Sushruta Samhita in Hindu Medicine. Both Al Razi and Al Zahrawi stressed that the inner incision should be smaller than the external one to prevent leakage of urine; the stones should not be pulled out but extracted by forceps, and the big one should be broken and then delivered out bit by bit. This demonstrates their care to avoid damage to the tissues, excessive bleeding and formation of urinary fistula, most likely following the advice of Hindu Medicine; and to prevent its reformation every piece should be removed (...because even if one is left it will increase in size) ⁽⁴⁾, an advice we stress upon nowadays!

Ibn Al Quff ⁽⁹⁾ the Jordanian-born surgeon, pointed out the difficulty of surgery in a woman "because she may be a virgin, or shy, and a finger cannot be pushed into her vagina in search of the stone, or a big incision may be needed... and that is dangerous, or she may be pregnant and surgery will endanger her pregnancy."

Al Zahrawi devised an instrument "Al Meshaab" (**Figure 1**) for crushing an obstructing urethral stone: He describes "take a steel rod with a triangular sharp end ...tie a thread proximal to the stone lest it slips back. Introduce it gently 'till it reaches the stone, turn it round to perforate it.... urine comes out immediately, press on the stone from outside and crush it by your finger, it breaks and comes out with urine. If you do not succeed then do cutting." Commenting on this, Lewis and Spink ⁽¹²⁾ describes the originality of the instrument "This device of Albucasis does seem to have been in a manner a true lithotripter many centuries earlier than the modern era and completely lost sight of and not even mentioned by the great middle-era surgeons Franco and Pare' nor by Fre're Come the doyen of genitourinary surgery." Ibn Zuhr ⁽⁶⁾ (**Figure 2**) improved on that device by fixing a diamond at the end of the steel rod ⁽⁶⁾. In addition to the Meshaab, Al Zahrawi manufactured a knife to perform cystolithotomy (**Figure 2**).



Figure 1: The Mibthaa (scalpel) for bladder stones.

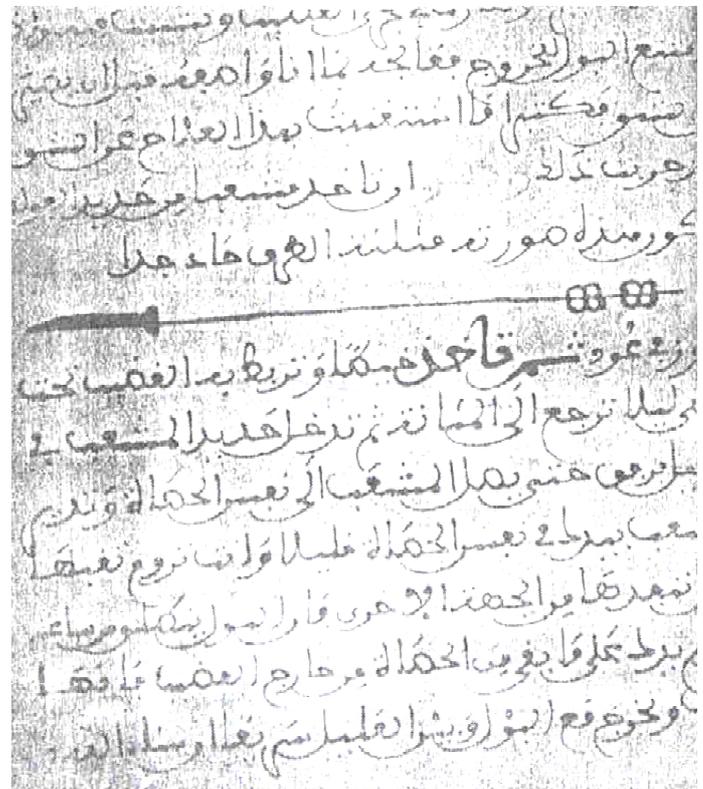


Figure 2: The Meshaab for breaking an obstructing urethral stone.

Both Al Zahrawi and Al Razi advised pulling the skin forward before incising over a urethral stone... preventing the formation of a fistula, and advised meatotomy for a stone stuck at the tip... avoiding forceful extraction ...to avoid stricture formation.

Prevention of recurrence: Arabian physicians advised against eating heavy and rich foods and thick heavy drinks. As we do nowadays they advised drinking plenty of fluids and diuretics.

Closing remarks

This review of some of the contributions of Arabian Medicine to urinary stone disease is far from being complete and is a small part of the voluminous works of Muslim and Arabian physicians. We believe that civilisation had developed and advanced and is progressing by the continuous contributions of the different nations and races.

Table 1
Differentiation between kidney stone and bladder stone

	Kidney stone	Bladder stone
Description	Softer, smaller, reddish	Harder, larger, grey-greyish white, coarse, maybe small particles, may be multiple. Difficult to break.
Patient	Obese, elderly	Usually thin (boys), Infancy - adolescence
Pain	Worse during formation or migration to bladder. Radiation to groin means migration, stops when in bladder	Less, unless causing retention. itching and pain along the penis and its base, the child plays with his penis. Pain in hypogastrium.
Urine	Turbid, clears later, or remains turbid with deposit	Lighter colour, deposit, may contain gravel. Bloody if stone is big/coarse. Frequency+dysuria with small one (at neck).
Associated complaint	Parsthesias over hpsilateral thigh and testis	Prolapse of rectum?

Table 2
Differentiation between colonic pain and renal plain

	Colonic	Renal
Severity	Severe	Little, pricking like thorns
Site	Begins down on the right, extends up to the left, more in front and lower abdomen	Begins high in the back, with difficult urination, extends slightly downwards, pain in ipsilateral testicle
Time	Sudden, worse with food, eases on defecation	Gradual, sever at the end, may become worse on defecation
Radiation	To any part of the abdomen	Steady in its place
Chills	Absent	Frequent
Medicines to fragment stones and fluids	No effect	May help
Stools	Hard scybala, or like dung of cows	May be no constipation
Accompanying complaint: Pain-lower limbs & back Anorexia, bikiary vomit, drowsiness Relief by vomiting Borborygmi/Constipation Turbid urine	Less More More Precede	More Less Less Precedes, present
Causes:	Diet and overeating	Dehydration

Table 3
Herbs and plants used by Muslim Physicians

Diuretics	Disintegration of stones	Dribbling of urine	Dysuria	To increase sperms
Artemesia absenthium	Solidago vira Aurea	Juglans regia	Matricaria chamomlla	Phoenix dactylifer
Ammoniacum resina	Cucumis melo			
Cucumis melo var. flexuosus (seeds)	Anethum graveolens			
Ficus carica	Water of chick peas			
Oppanax	Prunus amygdalis			
Eroca sativa Mill	Prunus mahaleb			
Ceratonia siliqua	Capparis			
Punica grantum	Alkekenge			
Crocus sp. Andropogon nardus	rubus sanctus			
Sagapenum				
Fumaria officinalis				
Alkekenge				
Struthium				
Malva sylvestris				
Apium graveolen				
Cuminum syminum				

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