

Theory of David Wartinger and Acharya Charaka in the Management of Renal Calculi

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ABSTRACT

Ashmari is one of the most prevalent disease affecting the mutrvaha srotas, Ashma means stone and ari means enemy, acharya Sushruta has included under one among the ashtamahagada i.e difficult to cure, as basti comes under trimarma Sushruta described ashmari as daruna vyadhi. Acharya Charaka (2nd BC) approached special way for removal of renal stones, He mentioned that riding the Horse, Chariaot after drinking Madhya helps in passage of the Renal stones. Last year David wartinger awarded ig Nobel prize in medicine for discovering that ride on roller coaster can help hasten the passage of kidney stones by preparing pyelocalyceal renal model (silicon) validated ureteroscopy surgical simulator.

KEYWORDS: Ashmari, Renal stones, Rollercoaster, pyelocalyceal renal model and ureteroscopy

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INTRODUCTION

Ashmari is one of the most prevalent disease affecting the mutrvaha srotas, Ashma means stone and ari means enemy, Ashmari has described in all the Ayurvedic samhitas, but acharya Sushruta has included under one among the ashtamahagada¹ i.e difficult to cure, as basti comes under trimarma² Sushruta described ashmari as daruna vyadhi³. Ashmari is co-related with urolithiasis, the third most common urinary tract disease exceeding UTI and BPH alone. The prevalence is increasing due to environmental cause and genetic predisposition. On an average 6% woman and 12% men are affected with renal stones. Recurrence rate of nephrolithiasis is 70-80% in males and 47-67% in females with majority 80% of calcium oxalate stones⁴⁻⁵.

According to Ayurveda ashmari in the early stages is treatable by medical management which mainly

includes ghrita, kshara, kashaya, ksheera, uttarabasti⁶. Here drugs which are having bhedana, mutrala properties are used. but in chronic advanced cases surgery is needed, The basic line of treatment for urolithiasis in contemporary science is NSAID'S, antispasmodic and hydration followed by diuretics so if the size of the stone is small it easily comes out through urine, if the size is large then ESWL is the surgical interventions but post surgical complications are quite common.

Acharya Charaka⁷ (2nd BC) approached special way for removal of renal stones, He mentioned that riding the Horse, Chariaot after drinking Madhya helps in passage of the Renal stones. Last year David wartinger awarded ig Nobel prize in medicine for discovering that ride on roller coaster can help hasten the passage of kidney stones.

AYURVEDIC METHOD:

Ayurveda classical texts like Charaka samhita, Ashtanga hridaya stated that patient of ashmari is to take shuddha madhya as madhya is having the property of bhedana, srushta vinmutra, basti shodana. And then made them to sit in chariot or on the horse and go for ride, because of vibration the stone will descend down from kidney to bladder and helps in easily evacuation of the stones through urine.



Figure 1



Figure 2

METHOD FROM CONTEMPORARY SCIENCE:



Figure3 Validated ureteroscopy and renoscopy surgical simulator

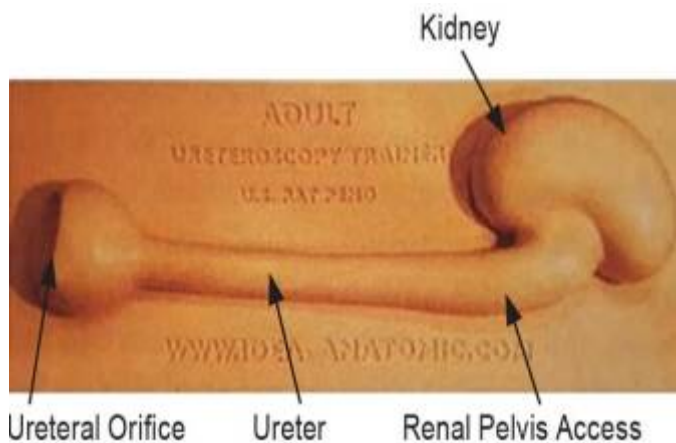


Figure4 Functional pyelocalyceal renal model (silicon) modified from a validated ureteroscopy and renoscopy surgical simulator

A high-fidelity adult ureteroscopy and renoscopy simulator (Ideal Anatomic) was modified and evaluated as a potential patient surrogate to study variables associated with renal calculi passage⁸(figure 1). The behavior of the renal calculi within the pyelocalyceal renal model mimicked the clinical experience and outcomes as reported by patients anecdotally as well as according to the physiologic behavior of renal calculi in the calices. The simulator was adapted by remolding it in clear silicone to create a functional pyelocalyceal renal model able to permit direct inspection of calculi movement within the calyceal system (Figure 2). The ureter and partial bladder components of the Ideal Anatomic simulator were removed during the modification process to facilitate sealing the hollow portion of the renal component. The sealed model contained 3 calcium oxalate calculi with volumes of 4.5 mm, 13.5 mm, or 64.6 mm suspended in urine. The renal calculi used in this study had been spontaneously passed from the patient whose computed tomographic urogram scan was used to create the original pyelocalyceal renal cast model.

The roller coaster had twin tubular steel rails and it did not go upside-down. The maximum speed was 35mph, and the model was subjected to sharp turn and quick drops during the ride, which lasted 2 minutes and 30 seconds. The roller coaster was made up of a railway train engine with no passenger seating and 5 passenger cars with 3rows of seats and 2 to 3 passengers abreast in each car. While riding on the roller coaster, the pyelocalyceal renal model was seated in an anatomic position inside a padded backpack held against the back of the seat at renal height between the researchers.

The renal calculi were loaded into the calyceal system of the clear functional pyelocalyceal renal model and their positions were documented. After each ride, the

position of each stone was recorded and renal calculi were repositioned as needed. The renal calculi were positioned into their calyceal locations using rotation, external compression of the functional pyelocalyceal renal model, and direct percutaneous needle manipulation.

A renal calculus was recorded as passed if it moved from a starting location in a renal calyx into the trap at the level of the ureteropelvic junction. The pyelocalyceal renal model containing 3 calculi was taken for 20 rides on the roller coaster during the

2008 amusement park season. Seat assignment on the roller coaster was random and determined as a function of place in the waiting line. Stone distribution within the model was allocated so a renal calculus occupied each calyx during the trial. Care was taken to protect and preserve the enjoyment of the other guests at the park. Before the park's Guest Services consented to our research project, researchers agreed to abide by the park's tenets of safety, show, courtesy, and efficiency

Table 1 Passage of renal calculi in a functional pyelocalyceal Renal model placed in front section of roller coaster

Calculi volume				
Location of calculi in calyx	4.5mm ³	13.5mm ³	64.6mm ³	Overall passage
Upper	0/1(0)	0/1(0)	2/7(28.6)	2/9(22.2)
Middle	0/4(0)	1/2(50.0)	...	1/6(16.7)
Lower	1/3(33.3)	0/5(0)	0/1(0)	1/9(11.1)
Total	1/8(12.5)	1/8(12.5)	2/8(25.0)	4/24(16.7)

* Data are given as No.passed/No. Of attempts(%)

Table 2 Passage of renal calculi in a functional pyelocalyceal Renal model placed in rear section of roller coaster

Calculi volume				
Location of calculi in calyx	4.5mm ³	13.5mm ³	64.6mm ³	Overall passage
Upper	4/4(100)	4/4(100)	4/4(100)	12/12(100)
Middle	3/3(100)	1/4(25.0)	1/2(50.0)	5/9(55.6)
Lower	1/5(20.0)	2/4(50.0)	3/6(50.0)	6/15(40.0)
Total	8/12(66.7)	7/12(58.3)	8/12(66.7)	23/36(63.9)

* Data are given as No.passed/No. Of attempts(%)

DISCUSSION:

Many people experienced within a few hours drive of an amusement park containing roller coaster with features capable of dislodging calyceal renal calculi. This made the group of reserchers in michigan state university to prepare tge ideal anatomic ureteroscopy and renoscopy surgical simulator was succcefully modifiedfor use as a patient surrogate in the study of factors responsible renal calculi passage. The pyelocalcyceal renal model was sensitive to changes in its location on the roller coaster due to its sharp turns and quick drops during the ride, manifested with differential renal calculi passage and awarded ig Nobel prize.

In our ancient indian classicals texts like Charaka samhita and Ashtanga Hridaya has dealt similar concept for dislodgement of the renal calculi by riding on horse or chariaot after taking the shuddha madhya due to sudden jurkey movements make the dislodgment of the stones.

CONCLUSION:

As contemporary science developed the functional pyelocalyceal renal model serves as a functional patient to evaluate activities that facilitate calyceal renal calculi passage in the roller coaster ride is similar to that of riding on the horse or chariaot as told by our classical texts.

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