ORIGINAL RESEARCH PAPER

Volume-7 | Issue-5 | May-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# A STUDY OF RENAL STONE: A TOMBSTONE OF BACTERIA BURIED WITHIN:

Urology

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## ABSTRACT

**Background:** The incidence of bacteria isolated from calculi has been reported to be only 8-16 % in western literature. Septic events after endoscopic procedures for retrieval of renal stone are alarmingly at a rise recently. The rate of post PCNL sepsis and the organisms isolated in pre - operative urine culture of these patients does not correspond. This study puts in a sincere effort to analyse the bacterial culture and sensitivity analysis of stone fragments received during surgery.

## KEYWORDS

Renal Stone, Tombstone, Bacteria, Infection.

**Introduction:**

The incidence of bacteria isolated from calculi has been reported to be only 8-16 % in western literature. Septic events after endoscopic procedures for retrieval of renal stone are alarmingly at a rise recently. The rate of post PCNL sepsis and the organisms isolated in pre - operative urine culture of these patients does not correspond. To combat the sepsis related complications of upper tract stone procedures, higher spectrum of antibiotics have to be used which results in prolonged hospital stay, escalation of treatment cost and emergence of Extended Spectrum Beta Lactamases (ESBL) resistant strains. Approximately 10% of people will have a urinary stone during their lifetime (1). The United States health care burden from renal calculi disease is immense with 185,000 hospitalizations, 2 million outpatient visits and 2.1 billion dollars expended annually for management (2-4). Historically, a key component in urinary stone formation is supersaturation, a process by which the concentration of substances in urine, such as calcium and oxalate, exceed the limits of their solubility (5). However, considerable overlap in urine chemistries exists between individuals with and without renal calculi disease(6-8). Furthermore, supersaturation with calcium oxalate (CaOx) or calcium phosphate (CaPhos) is not different in recurrent renal calculi disease patients compared to controls (9). Thus, although supersaturated urine is a risk factor, alone it is insufficient for stone formation. This conclusion is supported by the knowledge that treatment with dietary modifications, increased fluid intake, citrate salts and/or thiazide diuretics to reduce urine CaOx supersaturation only moderately improves recurrence rates (10-12). Despite these treatment strategies, renal calculi disease prevalence in US adults and children has recently increased by 40% and 23%, respectively (13,14). Identification of other factors that contribute to CaOx and/or CaPhos stone formation (lithogenesis) is a critical need. The bacterial contribution to renal calculi disease formation has long been recognized. Magnesium-ammonium-phosphate (struvite) stones (a conglomeration of bacteria, crystals and protein matrix) form due to urinary tract infection (UTI) with urease-producing bacteria (15). This study puts in a sincere effort to analyse the bacterial culture and sensitivity analysis of stone fragments received during surgery.

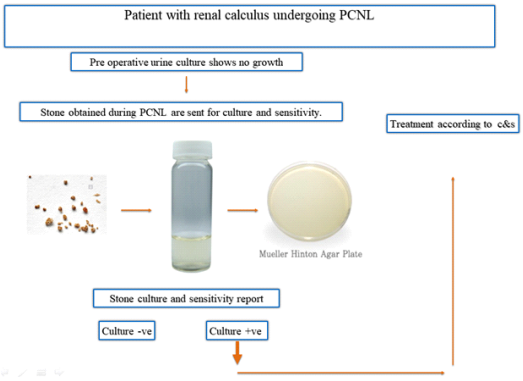
**Objectives**

To identify renal stone as a nidus of septic focus we conducted a study to analyse the bacterial culture and sensitivity analysis of stone fragments received during surgery at K.S.Hegde Medical Academy, Mangalore.

To identify the bacterial isolates within the renal calculi and study the sensitivity patterns

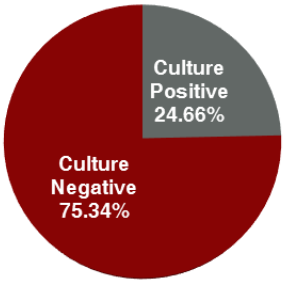
**Methods**

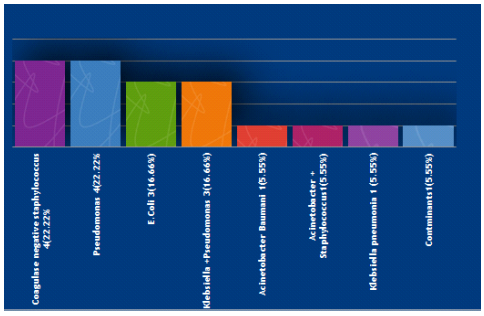
- A total of 73 patients who underwent PCNL during the period of January 2017 to August 2017 were included in the study.
- Inclusion Criteria: Only patients with negative preoperative urine culture and sensitivity were included in the study.
- The stone fragments retrieved during the procedure were sent for culture analysis using Broth(Nutrient broth) and processed in (Moeller-Hinton-Agar) and results are analysed.
- Exclusion criteria: Positive pre operative urine culture and sensitivity, patient already on antibiotic treatment, bilateral renal calculus, patient with indwelling DJ stent in situ




**Results**

**Image 1: Culture Positive Vs Culture Negative**




**Antibiotic Sensitivity**

- Most of the bacterial isolates from stone were sensitive to Aminoglycosides and Third generation Cephalosporins.

- Those resistant strains showed sensitivity to Piperacillin or Carbapenems

| Study | Number of Patient | Positive Stone Cultures N (%) | Most Common Organisms Isolated (%) |
|---|---|---|---|
| Korets R et al (J Urol. 2011;186:1899–1903) | 198 | 33 (16) | E coli — 9 (23),Enterococcus — 9 (23),Klebsiella — 7 (18) |
| Gault MH et al (J Urol. 1995;153:1164–1170) | 207 | 12 (5.8) | Pseudomonas — 4 (33),Coagulase-negative Staphylococcus — 2 (17),E coli — 1 (8.3),Proteus — 1 (8.3) |
| Dajani and Shehabi et al (1983;21:351–353) | 122 | 20 (16) | E coli — 6 (30),Pseudomonas — 5 (25),Coagulase-positive Staphylococcus — 3 (25) |

**Relevance of this study**

The incidence of bacteria isolated from calculi is 24.65% which has been reported to be only 8-16 % in western literature. Antibiotic prophylactic protocol recommendation by American Urological Association (AUA) and European Association of Urology(EAU) may not be relevant in indian population. Stone culture not recommended by western literature in their scenario can be an important tool in treating indian population.

**Conclusions:**

There is a higher than initially reported incidence of bacteria (24.65%) within the stone fragments of patients who never had any evidence of Urinary tract infection due to calculus disease.

Being renal stone a septic focus due to the bacteria buried within, a routine culture analysis of its fragments is a good diagnostic tool and helps in antibiotic selection in upper tract endourological procedure for stones.

**References:**


1. Pak CY. Kidney stones. Lancet 1998;351:1797-801.
2. Kozak LJ, Hall MJ, Owings MF. National Hospital Discharge Survey: 2000 annual summary with detailed diagnosis and procedure data. Vital Health Stat 13 2002;(153):1-194.
3. DeFrances CJ, Hall MJ. 2005 National Hospital Discharge Survey. Adv Data 2007;(385):1- 19.
4. Dickson KA, Haigis MC, Raines RT. Ribonuclease inhibitor: structure and function. Prog Nucleic Acid Res Mol Biol 2005;80:349-74. 10.1016/S0079-6603(05)80009-1
5. Coe FL, Parks JH, Asplin JR. The pathogenesis and treatment of kidney stones. N Engl J Med1992;327:1141-52. 10.1056/NEJM199210153271607
6. Lande MB, Varade W, Erkan E, et al. Role of urinary supersaturation in the evaluation of children with urolithiasis. Pediatr Nephrol 2005;20:491-4.
7. Lemann J, Jr, Pleuss JA, Worcester EM, et al. Urinary oxalate excretion increases with body size and decreases with increasing dietary calcium intake among healthy adults. Kidney Int 1996;49:200-8.
8. Curhan GC, Willett WC, Speizer FE, et al. Twenty-four-hour urine chemistries and the risk of kidney stones among women and men. Kidney Int 2001;59:2290-8.
9. Borghi L, Guerra A, Meschi T, et al. Relationship between supersaturation and calcium oxalate crystallization in normals and idiopathic calcium oxalate stone formers. Kidney Int 1999;55:1041-50.
10. Borghi L, Meschi T, Amato F, et al. Urinary volume, water and recurrences in idiopathic calcium nephrolithiasis: a 5-year randomized prospective study. J Urol 1996;155:839-43.
11. Tekin A, Tekgul S, Atsu N, et al. Oral potassium citrate treatment for idiopathic hypocituria in children with calcium urolithiasis. J Urol 2002;168:2572-4.
12. Fernández-Rodríguez A, Arrabal-Martín M, García-Ruiz MJ, et al. The role of thiazides in the prophylaxis of recurrent calcium lithiasis. Actas Urol Esp
13. Stamatelou KK, Francis ME, Jones CA, et al. Time trends in reported prevalence of kidney stones in the United States: 1976-1994. Kidney Int 2003;63:1817-23.
14. Sas DJ, Hulsey TC, Shatat IF, et al. Increasing incidence of kidney stones in children evaluated in the emergency department. J Pediatr 2010;157:132-7.
15. Flannigan R, Choy WH, Chew B, et al. Renal struvite stones--pathogenesis, microbiology, and management strategies. Nat Rev Urol 2014;11:333-41.
16. Korets R et al Risk Factors of Infectious Complications after Flexible Ureterorenoscopy with laser lithotripsy J Urol. 2011;186:1899–1903
17. Gault MH, Longerich LL, Crane G, et al. Bacteriology of urinary tract stones. J Urol. 1995;153:1164 1170
18. Dajani AM, Shehabi AA (1983) Bacteriology and composition of infected stones. Urology 21:351–353