

## EPIDEMIOLOGICAL PROFILE OF URINARY TRACT CALCULI PATIENTS AND CHEMICAL COMPOSITION OF EXTRACTED STONES: A RETROSPECTIVE STUDY

<sup>1</sup>Amandeep Jindal, <sup>2</sup>Gurpreet Singh Gill

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Department of Surgery, Adesh Institute of Medical Sciences and Research, Bathinda, Punjab.

### ABSTRACT

**Background & objectives:** Urolithiasis is one of the most common painful urological disorder. Different chemical compositions of extracted stones has been reported from various parts of our country. The present study was conducted to determine the epidemiological profile of urinary tract calculi patients and chemical compositions of extracted stones in a tertiary care hospital situated at a rural area of Punjab.

**Methods:** Epidemiological profile and chemical composition of extracted stones from 50 operated patients of urinary calculi were checked.

**Results:** Urinary tract stones were observed more in males residing in urban area and the unilateral stones were more common. Pure vegetarians in the 2<sup>nd</sup>-3<sup>rd</sup> decade of life are prone to suffer. The most of renal calculi were composed of calcium oxalate/calcium phosphate.

**Interpretation & Conclusion:** Pure vegetarians Males in urban areas in the 2<sup>nd</sup>-3<sup>rd</sup> decade of life are more prone for Unilateral, Non recurrent calcium oxalate /calcium phosphate stones.

**Key-words:** Renal Stones, Ureteric stones, Bladder Stones, Calcium oxalate /Phosphate Stones

**Corresponding Author: Dr. Gurpreet Singh Gill,** Associate Professor, Department of Surgery, Adesh Institute of Medical Sciences and Research, Bathinda (Mob No:9501002012, Email Id: drgillmd@yahoo.co.in)

### INTRODUCTION

Urolithiasis is one of the most common painful urological disorder involving many parts of the world since antiquity. Scientists have found evidence of kidney stone in Egyptian mummy more than 7000 yrs ago.<sup>1</sup> Every year all over the world around

4-20% of people attend medical services with complain of urolithiasis.<sup>2</sup> Environmental factors like age, sex, diet, social status, industrialisation influence urolithiasis.<sup>4</sup> High incidence of urinary calculi and different chemical compositions of extracted stones has been reported from various parts of our country.<sup>5</sup> The present

study was conducted to determine the epidemiological profile of urinary tract calculi patients and chemical compositions of extracted stones in a tertiary care hospital situated in a rural area of Punjab.

## MATERIAL AND METHODS:

After taking permission from Research Committee and Ethics Committee of the institute, the present retrospective study was conducted on patients of urinary tract calculi (renal, ureter and urinary bladder) in the department of surgery. Total fifty patients were studied in this duration. The patients were categorized according to the age & sex, area, unilateral versus bilateral stones, diet, symptoms, recurrence rate, I.V.P findings and finally chemical composition of extracted stones was carried out. For chemical analysis stones were powdered after thorough wash with normal saline. A little powdered stone was acidified with 15N hydrochloric acid for presence of carbonate. Aliquots of acidified solution were submitted to detect oxalate by adding 20% sodium acetate, Phosphate by adding ammonium molybdate and 1 Amino 2 Nephthol 4 Sulphuric acid solution, Calcium by adding 4-nitrobenzene azoresorcinol, Uric acid by using sodium cyanide, Cystine by using sodium hydroxide and sodium nitroprusside, Ammonia by using Nessler reagent.<sup>6</sup>

## RESULTS:

Out of 50 cases, 19 were renal, 14 were ureter and 21 were bladder stones. In 4 cases, stones were present at more than one site. 47 cases were Males and 7 were females (Table 1). There was higher incidence of renal calculi in urban area as compared to rural area (Table 2). Only 3

patients were with bilateral stones. Amongst the unilateral stones 16 were in the kidney and 14 in the ureter (Table 3). 20 cases, which were non-vegetarian were occasionally non-vegetarian. Rest 34 were pure vegetarian (Table 4). The majority of the cases were in the 2<sup>nd</sup> and 3<sup>rd</sup> decade of their life (Table 5). Colicky Pain and Burning Micturition were the common presenting features in renal and ureter calculi patients. However bladder stone patients presented with burning micturition and hematuria (Table 6). Six patients had recurrence over a period of one year at same or the other site (Table 7). Out of 29 patients on which I.V.P was done, only 7 had hydronephrosis and 19 were normal. Rest 21 cases were of pure bladder stones (Table 8). In our study most of renal calculi were composed of calcium oxalate / calcium phosphate. 1 case showed pure uric acid calculi.

**Table – 1 : Gender Wise Distribution of Cases**

Gender	Renal	Ureter	Bladder	Total
Male	15	14	18	47
Female	4	0	3	7

**Table – 2 : Area wise Distribution of Cases**

Site	Rural	Urban	Total
Renal	5	14	19
Ureter	0	14	14
Bladder	12	9	21
Total	17	37	54

**Table – 3 : Unilateral or bilateral Distribution**

	Unilateral	Bilateral
<b>Renal</b>	16	3
<b>Ureter</b>	14	0
<b>Bladder</b>	21	0

**Table - 4 : Vegetarian or non- vegetarian Diet pattern**

Site	Vegetarian	Non vegetarian
<b>Renal</b>	12	7
<b>Ureter</b>	6	8
<b>Bladder</b>	16	5
<b>Total no of cases</b>	34	20

**Table - 5 : Age Wise Distribution of Cases**

Age group in Yrs	Number	Renal	Ureter	Bladder
1-10	1	-	-	1
11-20	6	1	2	4
21-30	17	7	6	5
31-40	12	7	3	3
41-50	7	3	1	3
50+	7	1	2	5

**Table – 6 : Symptoms wise Distribution of Cases**

Site	Colicy Pain	Burning micturition	Haematuria	Retention
Renal	19	19	4	1
Ureter	14	12	1	0
Bladder	2	21	20	6

**Table – 7 : Recurrence of cases (12 %)**

	Number
Renal	1
Ureter	2
Bladder	2
Combination	1

**Table – 8 : I.V.P Findings**

	Number
Hydronephrosis	7
Delayed Function	2
Non-Functioning	1
Normal	19
<b>Total</b>	<b>29</b>

**Table – 9 : Composition of Renal Calculi**

Chemical Composition	No of Cases
Calcium Oxalate	28
Triple Phosphate (Struvite)	11
Mixed	9
Pure Calcium	1
Pure Phosphate	0
Pure Uric acid	1

## DISCUSSION

Urolithiasis is an extremely common condition. The incidence of renal calculi appears to be rising with improving standards of life suggesting the fact that renal calculi are more common in urban. Also high intake of refined carbohydrate, decreased physical activity, decreased intake of dietary fibres are also responsible for higher incidence of renal calculi in urban areas. The risk of stone formation is increased in exercise due to : 1) decreased urinary volume. 2) increased propensity for crystallisation of calcium oxalate. 3) decrease in urinary pH which will cause an increase in saturation level of uric acid. Calcium oxalate stones may be due to hypercalcaemic condition (which may be due to hyperthyroidism, hyperparathyroidism, Vit.D intoxication<sup>7</sup> and thiazide diuretic therapy), low urinary citrate, hyperoxaluria and hyperuricosuria.<sup>8-9</sup>

The higher incidence of urinary calculi in males<sup>10</sup> can be explained on the basis of increased level of serum testosterone level,<sup>11</sup> which predisposes to oxalate stone formation. The kidneys were protected from renal calculi due to higher urinary citrate concentration. The most common stones detected in our study are of calcium oxalate followed by struvite stones, which are similar to other studies.<sup>5,12</sup>

## CONCLUSION

Calcium oxalate stones were the commonest type of calculi. Urban and vegetarian population are more prone for stones and incidence is more in males. Mostly stones are unilateral and highest in 2<sup>nd</sup> -3<sup>rd</sup> decade of life.

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