เวชศาสตร์ร่วมสมัย
นิพนธ์ต้นฉบับ

Urinary stone : An experience at Kyoto University Hospital

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Aegukkatajit S. Urinary stone : An experience at Kyoto University Hospital. Chula Med J 1996 Apr;40 (4): 327-335

Urinary stone in Japan at Kyoto Prefectural University of Medicine. The number of out patients in the urological clinic at Kyoto Prefectural University of Medicine during the period June-July 1995 was 3,622. Among these were 336 stone patients making an incidence rate of 9.28 %. Among 125 patients who were interviewed there were 88 stone patients and 37 without stones. Among these stone patients there were 80 upper tract and 8 lower tract stone cases.

In a retrospective ultrasound survey of 30,932 Kyoto City factory workers during 1986-1993, 288 urinary stone cases were found, a prevalence rate of 0.93 %. Stone patients in Japan are not all opened surgically. ESWL or endourological technique which is difference from the practical in Thailand where most stone patients had been operated by opened surgery technique. Treatment of vesical stone in this university is usually by microexplosion cystolithotripsy (MEL) technique.

Key word : *Urinary Stones in Japan.*

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Received for publication. March 10, 1996.

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ศิริพงษ์ เอกัคคตาจิต. โรคนิ่วทางเดินปัสสาวะ : ประสบการณ์ในโรงพยาบาลมหาวิทยาลัยแห่งหนึ่งของเมืองเกียวโต. จุฬาลงกรณ์เวชสาร 2539 เมษายน; 40 (4): 327-335

โรคนิ่วทางเดินปัสสาวะในมหาวิทยาลัย Kyoto Prefectural University of Medicine แผนก Urology ที่เมืองเกียวโต ประเทศญี่ปุ่น

สถิติคนไข้นอกแผนก Urology เดือนมิถุนายน-กรกฎาคม 2538 คนไข้ทั้งหมด 3,622 ราย เป็นคนไข้โรคนิ่วทางเดินปัสสาวะ 336 ราย คิดเป็นร้อยละ 9.28 จากแบบสอบถาม คนไข้ 125 ราย เป็นคนไข้โรคนิ่วทางเดินปัสสาวะ 88 ราย คนไข้อื่นๆ ที่ไม่เป็นโรคนิ่วทางเดินปัสสาวะ 37 ราย พบว่าเป็นโรคนิ่วกระเพาะปัสสาวะ 8 ราย คนไข้นิ่วไตและท่อไต 80 รายไม่พบคนไข้นิ่วกระเพาะปัสสาวะในเด็ก จากรายงานการตรวจร่างกายคนงานในโรงงานต่างๆของเมืองเกียวโต โดยใช้เครื่องอุลตร้าซาวด์ ในปี ค.ศ. 1986-1993 จำนวน 30,932 ราย พบโรคนิ่วทางเดินปัสสาวะ 288 ราย อัตราชุกเท่ากับร้อยละ 0.93 การรักษานิ่วทางเดินปัสสาวะที่ไต และท่อไตจะทำ Extracorporeal Shock Wave Lithotripsy (ESWL) หรือ Endourology ไม่ทำ Open Surgery นิ่วในกระเพาะปัสสาวะ จะทำ Microexplosion Cystolithotripsy (MEL)

The author received Takeda Science Foundation's funding to research urinary stones in Japan at the Kyoto Prefecture University of Medicine.

The author arrived at the University on May 30, 1995 and studied urinary stones in the Department of Urology under Professor Hiroki Watanabe. Advisors were Associate Professor Masahito Saitoh, Assistant Professor Mutsumi Uchida and Assistant Professor Munekado Kojima.

The author stayed in the Morita Seisakusho Fushimi Ryo dormitory and came to the university by Keihan Electric electric railway from Chushojima Station to Marutamachi Station. It took time about 45 minutes to get to the university. My study activities were as follows:

Monday - observed most operations especially, those of the urological stone patients such as percutaneous nephrolithotripsy (PNL), transurethral ureterolithotripsy (TUL), electrohydrolithotripsy (EHL), and microexplosion cystolithotripsy (MEL). In the afternoon I attended renal ultrasonography examiations and at 1700 made post-operative rounds.

Tuesday - collected urological stone patient data in the stone clinic with the help of Dr. Hidekazu Uehara, and collected the numbers of patients in the urological clinic to determine the†prevalence of urological stones. This work was helped by nurse Fumie Yamamoto. In the afternoon I attended extracorporeal shock wave lithotripsy (ESWL) treatment.

Wednesday - operations observed until 17.00 and then attended the operation operative conference and post operative rounds.

Thursday - attended the urological clinic with Professor Hiroki Watanabe and in the afternoon attended ESWL treatments.

Friday - attended transrectal prostatic ultrasonography treatments and in the afternoon attended the cases conferences and did the rounds of the wards.

Materials and Methods

1. The author studied the statistics of patients in the urological clinic from June 5 - July 28,1995, a total of 40 week days.
2. The author interviewed the patients in the urological clinic.
3. The author studied the retrospective report of health survey of the worker in the factories of Kyoto city by ultrasound during 1986-1993.
4. The author studied the reports of microexplosion cystolithotripsy in the University during 1981-1988.

Results

The numbers of patients in the urological clinic of the University on week days between June 5, - July 28,1995 were.

Total patients	3,622	cases
Stone patients	336	cases
Average new patients per day	90.55	cases
Average stone patients per day	8.4	cases

Stone patients made up 9.28 % of the total patients. We interviewed 125 patients in the urological clinic. These were 88 stone patients and 37 without stones.

Among the 88 cases stone patients, there were 80 upper tract and 8 lower tract. (Table 1,3.)

The findings the retrospective reports of an ultrasound survey of factory workers in Kyoto City during 1986-1993 are in Table 4. (Table 4.)

There were 130 case treatments of microexplosion cystolithotripsy in the Kyoto University between 1981-1988.[1] The average stone weight was 18 gm. with a range of 1-305 gm. The most common causes were neurogenic bladder and benign prostatic hypertrophy.

There were 2 blasting techniques, external charge blasting and confined blasting. The small fragments of stone in the bladder were removed by stone crushing forceps in a from cystoscope. There was only one complication of extraperitoneal perforation. Stones more than 3 cm. in size should be treated with the confined blasting technique because it was 3 times more powerful than external charge blasting.

Anesthesia methods used were spinal anesthesia in 97 cases (74.6 %),general anesthesia in 28 cases (21.5 %) and local anesthesia in 5 cases (3.9 %).

External charge blasting was used 68 cases (52.3 %).

Confined blasting was used 62 cases (47.7 %.)

There were 107 males patients (82.3 %). The average age was 64.2 years old with a range between 16-91 years old.

There were 23 females patients (17.7 %). The average age 65.2 years old with a range between 4 - 89 years old.

The male to female ratio was 5:1

The average age of all of the patients was 64.4 years with a range between 4 - 91years.

Table 1. Age groups and sex of stone patients.

Age Group (years)	Male	Female	Total (%)
1-10	0	0	0 (0)
11-20	0	0	0 (0)
21-30	2	2	4 (4.5)
31-40	3	6	9 (10.2)
41-50	6	3	9 (10.2)
51-60	8	2	10 (11.4)
61-70	24	6	30 (34.1)
over 70	20	6	26 (29.6)
Totals	63	25	88 (100)

Table 2. Sex and location of stone.

Sex	Location						
	Rt.RC.*	**Lt.RC.***	**Rt.UC.***	**Lt.UC.***	**VC.***	**MIX***	**Total**
Male	11	10	10	8	5	19	63
Female	6	4	3	2	2	8	25
Totals(%)	**17(19.3)**	**14(15.9)**	**13(14.8)**	**10(11.4)**	**7(7.9)**	**27(30.7)**	**88(100)**

* Rt.RC. Right Renal Calculi
Lt.RC. Left Renal Calculi
Rt.UC. Right Ureteric calculi
Lt.UC. Left Ureteric calculi
VC. Vesical Calculi
MIX Multiple Sites of Stone

Table 3. Characteristic of urinary stone patients.

1. Ratio		
Male : Female Ratio		2.5:1
2. Address		
Kyoto	81	(92.0%)
Osaka	4	(4.6%)
Shiga	2	(2.3%)
Fukui	1	(1.1%)
3. Education		
Junior High School	15	(17.0%)
High School	45	(51.1%)
College	7	(8.0%)
University	21	(23.9%)
4. Occupation		
Merchant	8	(9.1%)
Government Officer	8	(9.1%)
Worker	57	(64.8%)
Housewife	10	(11.4%)
Student	1	(1.1%)
Other	4	(4.5%)
5. Type of Rice		
Rice	87	(98.9%)
Bread	1	(1.1%)
6. Type of Meat That the Patient Ate Regulary		
Beef	36	(40.9%)
Pork	2	(9.3%)
Fish	36	(40.9%)
Poultry	6	(6.8%)
Other	8	(9.1%)
7. Amount of Vegetables Eaten		
Much	56	(63.6%)
Little	32	(36.4%)
8. Water That The Patients Drank Regulary		
Tapwater	88	(100.0%)
9. Amount of Water That The Patients Drank Per Day		
< 2,000 ml	73	(83.0%)
2,000-3,000 ml	6	(6.8%)
>3,000 ml	9	(10.2%)

Table 4. Ultrasound survey of urinary stones among factory workers in Kyoto city.

Year	Survey samples			Stone patients			Prevalence rate (%)
	Male	Female	Total	Male	Female	Total	
1986	1,315	345	1,660	4	0	4	0.24
1987	1,912	449	2,361	19	4	23	0.98
1988	2,231	321	2,552	23	2	25	0.98
1989	2,830	585	3,415	22	4	26	0.76
1990	2,710	795	3,505	42	8	50	1.43
1991	4,187	1,423	5,610	66	12	78	1.39
1992	4,367	1,472	5,839	35	14	49	0.84
1993	4,411	1,579	5,990	27	6	33	0.55
Total	**23,963**	**6,969**	**30,932**	**238**	**50**	**288**	**0.93**

The total prevalence rate of urinary stone cases was 0.93%.

The male to female ratio of urinary stone cases was 2.8:1

Discussion

Upper tract urinary stone disease was still a significant health problem in Japan while I studied there. The author found 5 - 10 new stone patients in the clinic every week. The stone patients were not all opened surgically but ESWL or endourological surgery techniques were also used. This is different from Thailand where most stone patients have open surgery.

Bladder stones among children was very rare in Japan. This is probably because of the general good health and nutrition of the people. In Thailand we still have bladder stones in children but not so frequently as ten years ago.

The composition of the stones was: calcium phosphate and oxalate 34.6% ,uric acid 29.2 % , struvite 28.5 % and mixed 6.9 %

O.Yoshida and Y.Okada at Kyoto University had previously reported the composition of stones as determined by infrared in 69,949 cases during 1978 -1987 : calcium phosphate and oxalate 79.4 % , struvite 7.4 % ,uric acid 5.2 % ,cystine 1 %, and Other 7 % [2]

Ramathibodi Hospital has reported pure stone composition in 391 cases : calcime oxalate in 246 cases (62.9 %), calcium phosphate in 10 cases (2.6 %), uric acid/urate in 102 cases (26.1 %), magnesium ammonium phosphate (MAP) in 30 cases (7.6 %), cystine in 2 cases (0.5 %), and calcium carbonate in 1 case (0.3 %).

Mixed stone composition in 290 cases was reported as follows:

calcium phosphate + MAP 14 in cases (4.8 %)

calcium oxalate + calcium phosphate in 200 cases (69.0 %)

calcium oxalate + MAP in 8 cases (2.8 %)

calcium oxalate + calcium phosphate + MAP in 18 cases (6.2 %)

uric acid + MAP in 8 cases (2.8 %)

uric acid + calcium phosphate in 1 cases (0.3 %)

uric acid + calcium phosphate + MAP in 2 cases (0.7 %)

calcium oxalate + uric acid in 28 cases (9.6 %)

calcium oxalate + calcium phosphate + uric acid in 6 cases (2.1 %)

calcium oxalate + MAP + uric acid in 2 cases (0.7 %)

calcium oxalate + calcium phosphate + MAP + uric acid in 3 cases (1.0 %)

Most of stone composition were calcium oxalate and phosphate the same as Thailand.

Microexplosion cystolithotripsy for bladder stone not many cases in children. I think that it can used in others developping country which bladder stone still more problem such as Lao, Burma but the JICA will help the fund for this program of using MEL in those country and used Rajavithi Hospital in Thailand for the center of collabolation.

The total prevalence rate of urinary stone was 0.93% lesser than Thailand that we survey in Buriram province for 2 years in 1993-1994 the total prevalence rate was 4.3% [3,4]

The risk factors were not definitely about meat, vegetable,rice and water that the patients ate regularly.

Acknowledgments

To Dr Pramote Suchinpram, Dr.Anant Ariyachaipanish, Dr.Damrongpant Watanachote, Pro.Dr.Hiroki Watanabe, Pro.Dr.Osamu Yoshida, Associate Pro.Dr.Masahito Saitoh, Associate Pro.Dr.Yusaku Okada, Assistant Pro.Dr. Mutsumi Uchida, Assistant Pro.Dr.Munekado Kojima , Dr.Akihiro Kawauchi, Dr.Hidekazu Uehara, Dr.Yoshizo Itoh, Assistant Pro.Dr.Suchart Chaimaungrah, and Mrs. Fumie Yamamoto for providing material and assistance for this project.

This research received funding from Takeda Science Foundation and was supported by residents from the Morita Company.

Referances

1. Uchida M, Watanabe H,Nakagawa Y,et al. Microexplosion cystolithotripsy in 130 cases. Japanese Journal of Endourology and ESWL 1988;1(2):

2.Yoshida O,Okada Y. Epidemiology of urolithiasis in Japan:A chronological and Geographical study.Urol Int 1990;45:104-11

3. Aegukkatajit S,Nuhung R,Sinturt R,et al. A study of the prevalence of urinary stone in Amphur Maung and Ging Amphur Huarat using portable ultrasound. Siriraj hosp Gaz 1994;46:609-5

4. Aegukkatajit S,Promsing C,Lovorapong S. Study urinary stone in Buri Ram province by portable ultrasound. J Med Ass Thai 1995;78:305-9