The Current Therapy of Urinary Calculi in Thailand

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Abstract

The paper analyses the impact of modern therapy of urinary calculi in Thailand since the introduction of ESWL and endourology (PCNL and URS) in 1988. Up to then, conservative and open surgical measures had been the standard procedures. The study covers 12 medical centres in the north, northeast, south and central parts of the country between 1988 and 1997. Approximately 40 ESWL machines have been in use. ESWL was used in 66.1 per cent and 20.8 per cent of patients with renal and ureteric calculi respectively. Only 1.1 per cent of the patients had PCNL. URS was used in 20.8 per cent of patients with ureteric calculi. Open operations were required in 32.6 per cent and 53.6 per cent of patients with renal and ureteric calculi respectively. Nephrectomy was required in 4.8 per cent - 16.0 per cent of patients with renal calculi. Certain considerations have been put forward to appraise the situation concerning urinary stone therapy in Thailand.

Key word : Urinary Calculi, Therapy, ESWL, PCNL, URS, Surgery, Thailand

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Urolithiasis is prevalent in Thailand. A survey of the patients visiting all provincial and other hospitals between 1953 and 1959 indicated that 82 per cent of cases sufferred from vesical calculi. One half of this group belonged to the age group 1-10[1]. Between 1962 and 1984, a study showed that the incidence of idiopathic bladder stone disease decreased from 31.6 per cent to 1.8 per cent while upper tract calculi were more frequently seen[2]. At the present time 100 to 2,000

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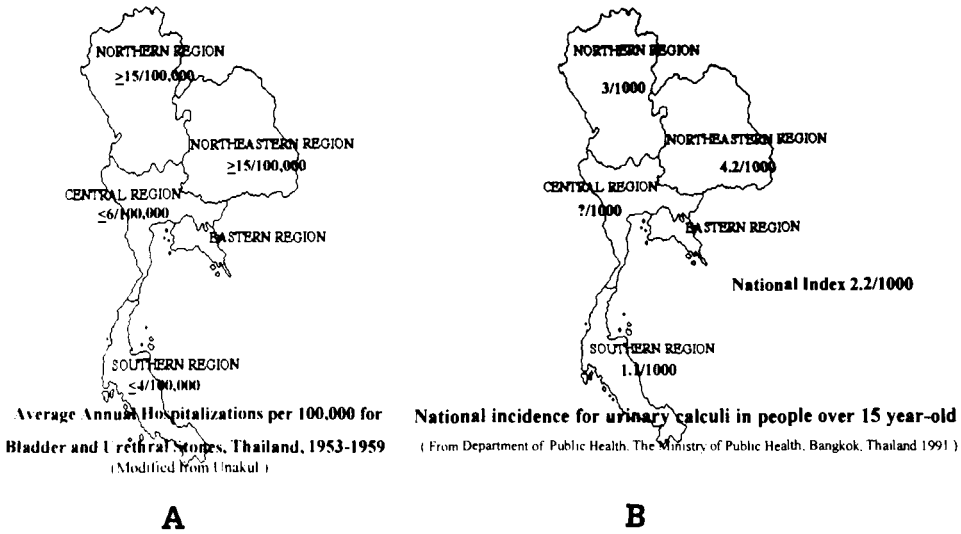

Fig. 1. The changing pattern of urolithiasis in Thailand.
(A) 1953-1959 (Modified from Unakul S.)
(B) Report from ministry of public health (moh) of Thailand, 1991.

patients with mainly upper tract calculi are admitted to hospitals for treatment annually. The Ministry of Public Health indicated in 1991 that the national incidence was 2.2 per 1000. Fig. 1 shows the changing pattern of urolithiasis in Thailand[3].

George McFarland removed several vesical calculi at Siriraj Hospital in 1881[4]. For the next 100 years, the therapeutic options have been conservative treatment involving measures to encourage spontaneous stone passage (80%)[5] or open surgery until 1986 and 1987, when endourologic techniques (PCNL and URS) and ESWL were introduced. It was, therefore, the purpose of this paper to analyse the management policy for urinary calculi focussing on the modern therapeutic options.

MATERIAL AND METHOD

Approximately 40 ESWL units are available in Thailand (Table 1). The European and Chinese models control equal market shares.

Table 2 shows the available services in the selected hospitals and the participating authorities in Thailand.

Table 1. ESWL units distribution in Thailand.

Province	Distribution
The North (N)	8
The Northeast (NE)	12
The South (S)	1
The Central (C)	20 (Bangkok 17)

Questionaires were sent to the selected hospitals in the regions to ascertain the therapeutic procedures since the establishment of the modern methods. The regional and nationwide summary are reported. Operative procedures are specified when possible.

RESULTS

Table 3 shows the therapeutic procedures in the 4 regions of the country.

Fig. 2 shows the countrywide management of urinary calculi. The summary reflects the current therapeutic trends.

Table 4 summarises the open operative procedures performed in 13,327 and 4,983 patients

Table 2. Selected hospitals in the 4 provinces.

Province	Hospitals (periods)	Services	Authority
N	Chiang Mai Univ. (1991-1997)	ESWL, PCNL, URS, OPS	S. Vudhikan
NE	Khon Kaen Hosp. (1993-1997)	ESWL,URS, OPS	S. Borwornpadugkitti
	Nakhon Ratchasima Hosp. (1990-1997)	ESWL,URS, OPS	S. Umpao
	Sanprasit Prasong Hosp. (1993-1997)	ESWL, URS, OPS	C. Saithong
S	Prince of Songkla Univ. Hosp. (1993-1997)	ESWL, PCNL, URS, OPS	C. Pripatnanonth
C	Chulalongkorn Univ. Hosp. (1992-1997)	ESWL, PCNL, URS, OPS	P. Boonyaratavej
	Noparat Hosp. (1994-1996)	URS, OPS	S. Jiaramaisilp
	Ratchavithi Hosp. (1989-1997)	ESWL, PCNL, URS, OPS	V. Choonhaklai
	Ramathibodi Hosp. (1987-1998)	ESWL, PCNL, URS, OPS	V. Muangman, V. Visethsindh, K. Ratana-olarn
	Siriraj Hosp. (1988-1996)	ESWL, PCNL, URS, OPS	P. Jitprapai, C. Nualyong, P. Sujijantararat
	Bumrungrat Hosp. (1987-1998)	ESWL, PCNL, URS, OPS	P. Gojaseni**
	Urupong Med. Centre (1988-1997)	ESWL, URS	K. Chindavijak**

* OPS : Operations ** Private services

Table 3. Management of urinary calculi in 4 regions.

Region	Renal Calculi (RC)				Ureteric Calculi (UC)					Bladder Calculi		
	No.	ESWL (%)	PCNL (%)	OPS (%)	No.	ESWL (%)	URS (%)	OPS (%)	BAS (%)	No.	Litho (%)	S.P.Lit (%)
N	3844	2674 (69.6)	5 (0.1)	1165 (30.3)	1425	428 (30.0)	196 (13.7)	801 (56.3)	-	720	617 (85.7)	103 (14.3)
NE	15836	7933 (50.0)	-	7903 (50.0)	3354	473 (14.1)	20 (0.6)	2833 (84.5)	28 (0.8)	1344	666 (49.1)	678 (50.9)
S	616	585 (95.0)	-	31 (50.0)	271	121 (44.7)	129 (47.6)	21 (7.7)	-	119	113 (95.0)	6 (5.0)
C	20581	15917 (77.3)	436 (2.1)	4228 (20.6)	4245	730 (17.2)	2147 (50.6)	1328 (31.3)	40 (0.9)	1092	753 (69.0)	339 (31.0)

No. = number, Bas : Basketing, Litho : Litholapaxy, S.P. Litho : suprapubic cystolithotomy

with renal and ureteric calculi respectively. If the types of operation are not specified, the procedures are unclassified.

Between 1988 and 1997, the analysis shows that 55.3 per cent of patients with renal calculi were treated by ESWL (N 69.6%, NE 50.0%, S 95.0% and C 77.3%). PCNL was perfomed in 1.1 per cent (N 0.1% and C 2.1%). In the renal group, 32.6 per cent required open surgical procedures. The operations were nephrolithotomy and extra or intrasinusoidal pyelolithotomy. It is noteworthy that up to 16.0 per cent required nephrectomy for dysfunctioning kidneys.

ESWL was employed in 18.8 per cent of patients with proximal and distal ureteric calculi (N 30.0%, NE 14.1%, S 44.7% and C 17.2%). URS was used to treat 32.6 per cent of patients with distal, middle and a few proximal ureteric calculi

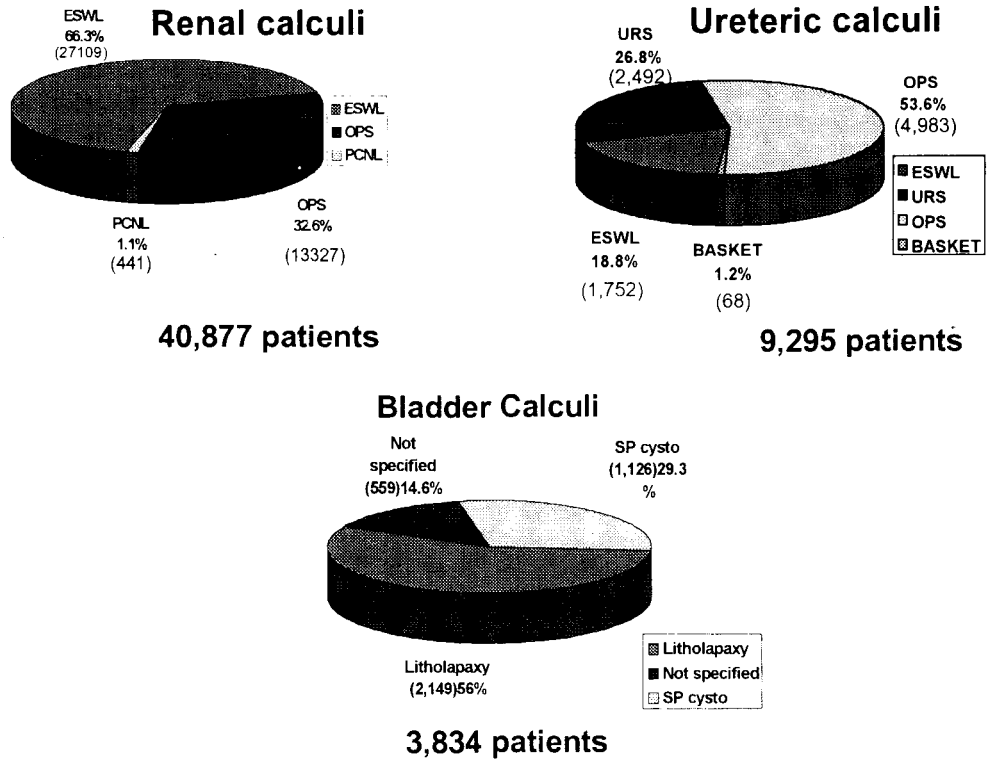

Fig. 2 Management trends between 1988 and 1997 (countrywide).

Table 4. Open operative procedures.

Region	RC					UC			
	No.	Nephro (%)	Pyelo (%)	Nephrec (%)	Uncl (%)	No.	Urete (%)	Nephrec (%)	Uncl (%)
N	1165	838 (71.9)	186 (16.0)	141 (12.1)	- -	801	790 (98.6)	11 (1.14)	- -
NE	7903	809 (10.2)	171 (2.2)	381 (4.8)	6542 (82.8)	2833	2800 (98.85)	33 (1.2)	- -
S	31	31 (100)	- -	- -	- -	21	21 (199)	- -	- -
C	4288	1714 (40.6)	1837 (43.4)	677 (16.0)	- -	1328	1295 (97.5)	33 (2.5)	- -

Nephro : nephrolithotomy, Pyelo : pyelolithotomy, Nephrec : nephrectomy, Uncl : unclassified, Urete : ureterolithotomy

(N 13.8%, NE 0.6%, S 47.6% and C 50.6%). Ureterolithotomy was performed in 53.6 per cent of the patients (N 56.3%, NE 84.5%, S 7.7% and C 31.3%). Up to 2.5 per cent of the patients in this group required nephrectomy. Only 0.8 per cent had stone basketing (NE 0.8% and C 0.9%).

There were only 50 reported cases of bladder stone disease in children. The treatment methods were SP cystolithotomy, percutaneous cystolithotomy under cystoscope, ultrasound and electrohydraulic cystolithotomy (S = 6 cases). Most of the bladder calculi were in adults associated with BPH or some lower tract obstruction. These calculi were treated by litholapaxy (56.0%) and SP cystolithotomy (29.3%), with prostatectomy or other operative procedures to relieve urinary tract obstruction.

DISCUSSION

Currently, it is a consensus of opinion that ESWL can eliminate 80 per cent of renal calculi with a diameter less than 3.0 cm effectively[6,7]. The monotherapy has been expanded to treat more complicated calculi such as the staghorn. A double J stent provides a useful component for relieving possible ureteric obstruction from fragmented debris. However, a complete clearance of a large calculus requires multiple sessions[7]. PCNL can virtually eliminate most renal calculi. Combined ESWL and PCNL can effectively treat staghorn calculi[9-12]. The non-invasive ESWL and semi-invasive PCNL have marginalised open surgery to less than 2-3 per cent. A calculus in a dilated intrarenal collecting system or associated with congenital anomaly such as PUJ obstruction still requires an open surgical procedure.

ESWL is effective in fragmenting distal ureteric calculi below the iliac bones. No more than 60 per cent of proximal ureteric calculi can be eliminated by ESWL *in situ*. However, up to 70 per cent of the proximal ureteric calculi can be fragmented if "a push and bang" or by-passing technique is employed. ESWL treatment to the calculi in mid-ureter overlying the iliac bone is difficult. Currently, URS can virtually eliminate all ureteric calculi maximizing the endourologic amamentarium to include flexible, rigid ureteroscopes and PCNL, rendering ureterolithotomy necessary in only 1-2 per cent[13,14].

Although the management of urinary calculi in Thailand over the past decade has changed

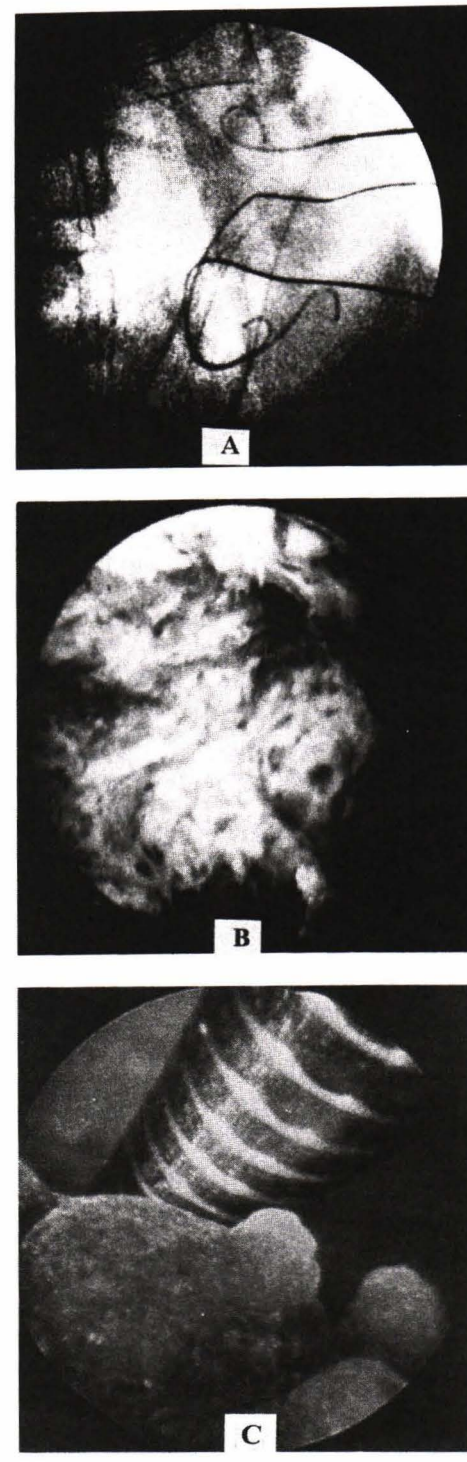

Fig. 3. PCNL
A) PCNL, note multiple ports of entry for right staghorn calculus
B) Nephroscopic view of a renal calculus
C) Ureteroscopic view of a ureteric calculus (URS)

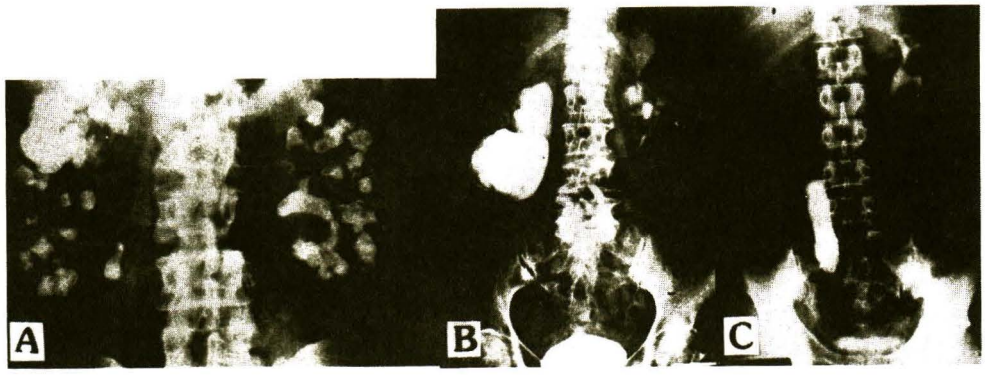

Fig. 4. Complicated urinary calculi
A) Bilateral staghorn calculi
B) Rt. renal calculi
C) Rt. ureteric calculus

considerably, a third and a half of patients with renal and ureteric calculi respectively still require open operations. There are possibly three factors which might influence the management trends.

Firstly, many patients are in the lower income group and cannot afford to pay the expense of ESWL. Urinary stone disease is prevalent in this community. The public health free service has been continually overloaded.

Secondly, a complete armamentarium of ESWL, PCNL and URS is mandatory to fulfill the modern goals. The advantage of ESWL over open surgery is obvious. Although PCNL and URS have their risk and morbidity, a myriad of results shows that they are methods of choice when ESWL alone is not applicable. PCNL is not widely practised in Thailand. To be efficient in the technique, one requires a learning curve to acquire the necessary experience and proficiency. Training units are obligatory. The above discussion also applies to URS (Fig. 3).

Thirdly, many patients require open operations because of complicated renal calculi (Fig. 4). Intrarenal pathological changes also need open operative correction. Compounded with the high prevalence of urinary stone disease and the lack of modern facilities in many areas of Thailand, the number of open operations remains high (RC 32.6%, UC 53.6%). It is noteworthy that nephrectomy was required in 4.8 per cent-16.0 per cent of patients with renal calculi.

An effort to achieve modern goals will require investment and dedication, which will be compensated for by a high social benefit. Health policy makers consider the cost of a project in association with the cost of the instruments and treatment expense. We should enlarge our perspective to include the cost associated with a long period of disability and convalescence after open surgery, treatment of possible recurrence, end-stage renal failure and premature death. Therefore, a redefinition of the therapeutic policy for urinary calculi in Thailand is a logical appraisal.

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แนวการรักษาโรคนิ่วทางเดินปัสสาวะในประเทศไทย

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โรคนิ่วในทางเดินปัสสาวะเป็นโรคที่พบได้บ่อยในประเทศไทย ในอดีตมีการสำรวจอุบัติการณ์ของโรคนิ่วจากโรงพยาบาลจังหวัดและโรงพยาบาลอื่น ๆ ในประเทศไทยระหว่างปี พ.ศ. 2496–2502 พบว่าร้อยละ 82 เป็นนิ่วที่กระเพาะปัสสาวะ โดยประมาณครึ่งหนึ่งของคนไข้เหล่านี้มีอายุระหว่าง 1–10 ปี ในช่วงปี พ.ศ. 2505–2527 พบว่าอุบัติการณ์ของนิ่วกระเพาะปัสสาวะลดลงจากร้อยละ 31.6 เหลือเพียงร้อยละ 1.8 โดยพบเป็นนิ่วของระบบทางเดินปัสสาวะส่วนบนเพิ่มขึ้น ข้อมูลของกระทรวงสาธารณสุขในปี พ.ศ. 2534 รายงานว่าอุบัติการณ์ของโรคนิ่วในประเทศไทยเท่ากับ 2.2 ต่อ 1 ราย

นับตั้งแต่ George Mcfarland ได้ทำการผ่าตัดนิ่วในกระเพาะปัสสาวะที่โรงพยาบาลศิริราช เป็นรายแรกในปีพ.ศ. 2524 ในช่วง 100 ปีที่ผ่านมา การรักษานิ่วมีวิธีการรักษาแบบประคับประคองหรือเปิดผ่าตัดจนกระทั่งปีพ.ศ. 2525–2526 ได้มีการนำการรักษาด้วยวิธี endourologic techniques มาใช้ได้แก่ การสลายนิ่ว การทำ ureterorenoscopy และการทำ percutaneous nephrostolithotomy รายงานฉบับนี้มีจุดประสงค์เพื่อที่จะวิเคราะห์แนวโน้มกลยุทธของการรักษาโรคนิ่วที่มีการเปลี่ยนแปลงตลอดมา โดยจะเน้นถึงวิธีการรักษาชนิดใหม่ ๆ ในปัจจุบันนี้

คำสำคัญ : นิ่วทางเดินปัสสาวะ, การรักษา, การสลายนิ่ว, การเจาะไต สลายนิ่ว, การคล้องนิ่ว, การผ่าตัด, ประเทศไทย

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