THE IMPACT OF ENDOUROLOGY ON OTHER MODALITIES OF TREATMENT OF URINARY STONES IN SINGAPORE

K H Tung, E C Tan, R Kwok, K T Foo

SING MED J. 1988; 29:38–41

INTRODUCTION

Endourological procedures were popularised in the early 1980's with the introduction of the ureteroscope, nephroscope and the ultrasound lithotriptor. In Singapore these new techniques have made a definite and significant impact on the management of urinary calculi. We have not been left behind in the rapid advancement in medical technology but have kept abreast with these developments and can now offer the patient who has urinary stone disease, all the modalities of therapy available in any advanced country.

In the Department of Surgery, National University of Singapore, the workload or "stone-burden" amounts to about 10% of the general surgical procedures.

In order to assess the impact of endourology in our department, we looked into the pattern of stone management in 3 consecutive years. 1984 was the last year in which stones were managed by open surgery or with plenty of fluids. From late 1984 onward, the ureterorenoscope became available to us and that affected our management of lower ureteric stones. In 1986, we established percutaneous nephrolithotripsy as an alternative to open surgery. In that year also we acquired the use of the Dornier and Edap machines for extracorporeal Shock Wave Lithotripsy.

The data of the various procedures carried out over the 3 years are shown in Figs. 1 & 2. It is quite evident that we are moving towards more endoscopic methods of removal of stones.

EXPERIENCES WITH PERCUTANEOUS NEPHROLITHOTRIPSY

Although percutaneous nephrolithotripsy (PCN) started off in early 1980 as an adjunct to standard stone surgery (2), its place has changed in a few short years and it is now considered a preferred alternative to open surgery. More and more complex stones are now being treated this way and it has been shown to be superior to anatrophic nephrolithotomy for difficult stones (2,3). It is very acceptable in terms of procedure time, success rate, morbidity, mortality and recovery time (5).

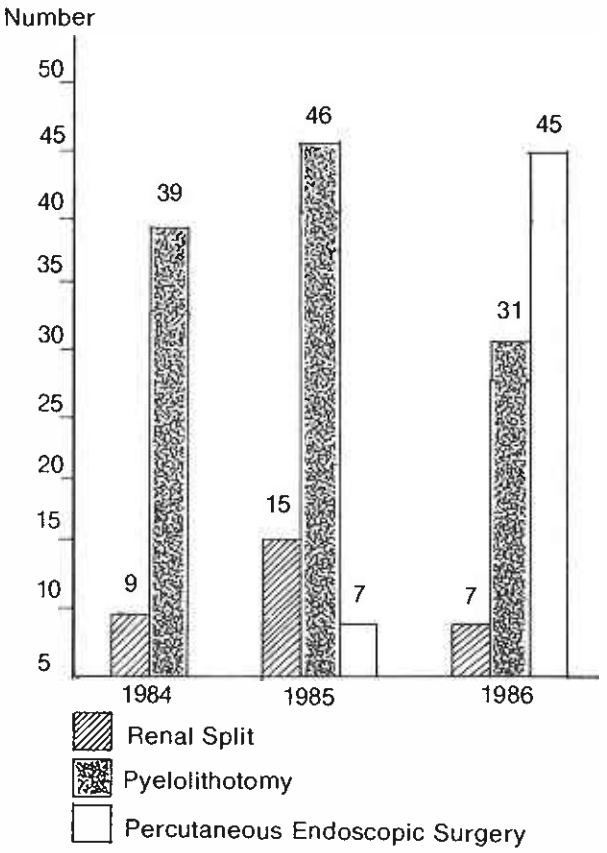

Fig 1. Open *RENAL* Surgery vs Endoscopic Surgery

From January 1986 till September 1986 we have carried out PCN in 38 patients. Our selection consisted of simple stones initially but we are now progressing to more complex stones and are combining PCN with extracorporeal shock wave lithotripsy (ESWL) for the total management of difficult stones. The indications for and technique of PCN in our department have been published.

Our overall success rate is 95%. 6 patients (15.8%) required 2 or more sessions to clear their stones but this is easily achieved as the nephrostomy tract would then be mature and second stage procedures have been carried out under local anaesthesia in some cases.

Dept of Surgery
National University Hospital
Lower Kent Ridge Road
Singapore 0511

K H Tung, Sr Lecturer & Consultant Surgeon

E C Tan, Sr Lecturer & Consultant Surgeon

K T Foo, Assoc Professor

Dept of Diagnostic Radiology
National University Hospital

R Kwok, Radiologist

Paper presented at the symposium "Endourology and Extracorporeal Shock Wave Lithotripsy", 6th Bienniel General Scientific Meeting, Association of Surgeons of South East Asia. Thailand, February 1987.

Most of the complications encountered were minor such as mild haematuria and post procedural fever. These usually settled rapidly within a couple of days. In 3 patients, the collecting system was perforated during the procedure resulting in excessive extravasation of the urirrigating fluid. However, with a proper nephrostomy tube drainage, and lasix therapy, the extravasated fluid was rapidly absorbed and excreted within 24 to 48 hours. The most serious complication we have encountered was in an elderly man who developed severe haemorrhage and sepsis and a nephrectomy had to be carried out for him. There was no mortality in this group of patients.

CASE REPORT

L K is a lady with bilateral Staghorn calculi who had been treated for recurrent urinary tract infection (Fig 3). She had been offered open surgery elsewhere but refused. We carried out PCN for her left renal stones. After the first session (Fig 4), although the pelvic part of the stone was cleared off, a large bulk of calyceal stones remained. This required a second nephrostomy tract via the upper pole calyx. The stones were cleared off after 3 sessions via 2 nephrostomy tracts (Fig 5).

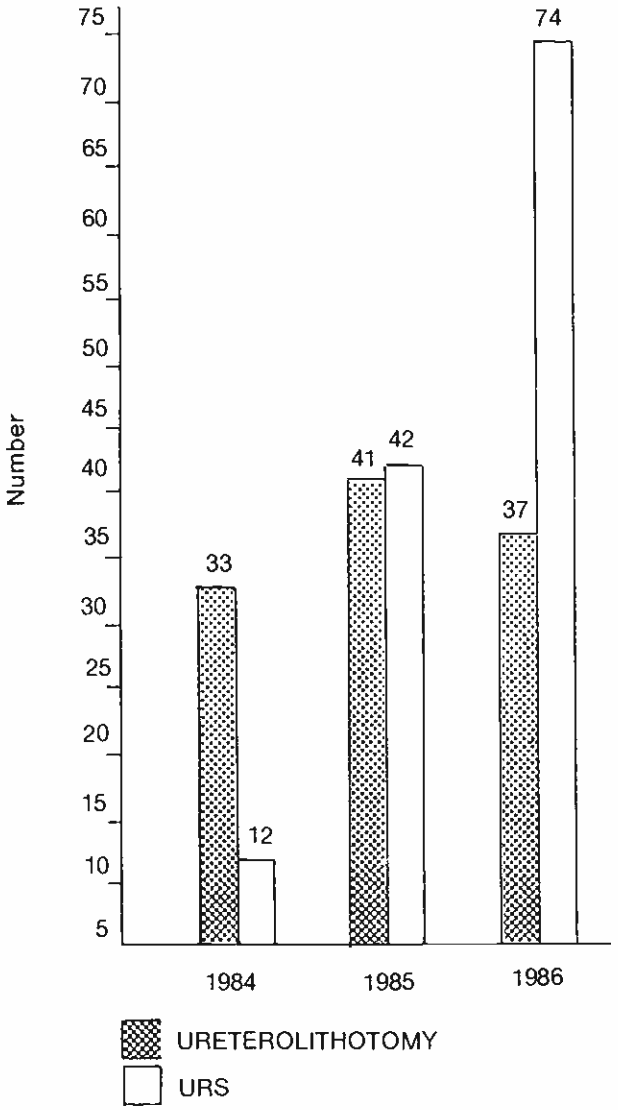

Fig 2 Open *Ureter* Surgery vs Endoscopic Surgery

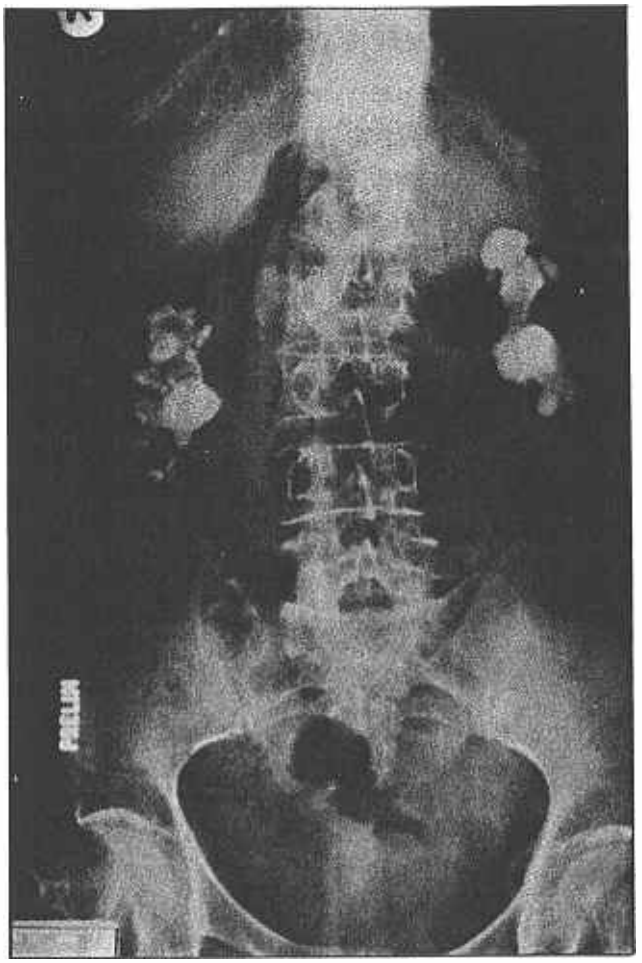

Fig. 3 Bilateral Staghorn Calculi before treatment

This case serves to illustrate that even large renal stones can be dealt with without recourse to open surgery.

It is quite clear that PCN is superior in many aspects to open surgery in the management especially of uncomplicated stones.

But what about its role when ESWL is available. There is no doubt that more and more stones will be treated by ESWL. It is estimated that over 70% of stone bearing patients are amenable to treatment by ESWL. This demands a reassessment of the role of endourological lithotripsy (6).

We believe that PUL still has a definite place in stone management. In our practice, we are subjecting patients with stones more than 2.5 to 3cm diameter to PUL. In our analysis of cases treated by ESWL, we have found that in patients with stones more than 2.5cm, problems can still arise. 4 out of 19 patients treated required secondary procedures (2 open surgery, 1 PCN and 1 ureterorenoscopy). Also in patients with obstruction distal to the stone, ESWL will be unsuitable as patients have to pass out the stone fragments. In such a situation, PCN would still be the procedure of choice. Endourological procedures may be required after ESWL therapy in about 10% to 15% of patients to deal with impacted stone fragment (7).

These 2 modalities, ie. PCN and ESWL, should be considered complimentary to each other and in patients with a large stone mass, for example, those with Staghorn stones, we would first debulk the stones using PCN and then use ESWL for any remnant stones. The experiences in most centres indicate that this is the best approach for patients with a large stone mass (8,9).

Fig. 4 Bilateral Staghorn Calculi following PCN

Fig. 5 X-ray following completion of treatment with PCN

EXPERIENCES WITH URETEROSCOPIC ULTRASONIC LITHOTRIPSY

From August 1984, till September 1986, we have carried out ureterorenoscopy with the aim of removing stones in 85 cases.

Although we attempted the procedure for mid and lower ureteric stones initially, we very rapidly realised that it was not suitable for ureteric stones located above the bony pelvic brim. It was difficult to reach these stones especially in male patients. We presently confine ureteroscopic ultrasonic lithotripsy to patients with lower ureteric stones. These include patients with stones more than 5mm in transverse diameter, stones causing moderate or severe obstruction and stones that have remained static for more than 3 months.

We have successfully removed stones in 89% of 85 patients on whom the procedure was carried out. 10 patients required 2 or more sessions to remove their stones.

The most serious complication we have encountered is an avulsion of the ureter in a patient with tuberculosis of the urinary tract. This required a reimplantation of the ureter into the bladder. In 4 patients, the ureter was perforated during the procedure and had to be stented with double-J stents. 2 other patients have developed a narrowing of the ureter on follow-up intravenous urogram. These have been managed by dilatation and stenting.

Ureteroscopic ultrasonic lithotripsy has become our choice for the management of lower ureteric stones. Once the technique is mastered, the difficulties and complication encountered are few (10,11).

Our experience with ESWL for lower ureteric stones is still very initial and early. But based on the experiences of others, success rates of around 60 to 70% have been reported.

CONCLUSION

These recent advances in endoscopic stone removal as well as ESWL have become popular only in the last few years. It is not surprising, therefore, that there is still a lot of argument as to how best to manage a patient with a stone.

We are still in the learning stage and until we have acquired enough experiences in all the modalities available, we would rather not be dogmatic in our views. Ideally, non-invasive methods should be tried first.

Also we would consider these modalites complimentary to each other and in certain cases, they should be used in combination in the patient management.

REFERENCES

1. Perz C E, Mertibery P J A: Transurethral ureteroscopy: A current urological procedure. Aoch Esp Urol 1980; 33:445.
2. Marberger M, Stackl W, Hruby W: Percutaneous litholapaxy of renal calculi with ultrasound. Eur Urol, 1982; 8:236–42.
3. Preminger G M, Clayman R V, Hardeman S W, Franklin J Curry T, Peters P C: Percutaneous nephrostolithotomy vs open surgery for renal calculi. J A M A 1986; 256:27–31.
4. Snyder J A Smith A D: Staghorn calculi: Percutaneous extraction versus anatrophic nephrolithotomy. J Urol 1986; 136(2):351–4.
5. Brown M W, Carson C C, Dunnid N R Weinerth J L: Comparison of costs and morbidity of percutaneous and open flank procedures. J Urol 1986; 135:1150–2.
6. Riekle R A, Naslund E B Fair W, Vaughan E D: Impact of shockwave lithotripsy on upper urinary tract calculi. Urology. 1986; 28(4):261–9.
7. Brannen G E: Endourology in Perspective. Urology 1986; 28(3):161–172.
8. Kahnoski R J, Lingeman E, Coury T A, Steele R E, Mosbaugh P G: Combined percutaneous and extracorporeal shock wave lithotripsy for Staghorn calculi: Alternative to anatrophic nephrolithotripsy. J Urol 1986; 135:)4):679–881.
9. Schulze H, Hertle L, Graff J, Funke P J, Senge T: Combined treatment of branched calculi by percutaneous nephrolithotomy and extracorporeal shock wave lithotripsy. J Urol 1986; 135:(6):1138–41.
10. Kahn R I: Endourological treatment of ureteral calculi. J Urol 1986; 135(2):239–43.
11. Lingeman J E, Sonda L P, Kahnoski R J, et al: Ureteral stone management, emerging concepts. J Urol 1986; 135(6):1172–4.