Rigid ureteroscopy

By Jerry Rudney, O.R.T.

The introduction of extracorporeal shockwave lithotripsy (ESWL) in the treatment of ureteral calculi has proven to be safe and effective. Even though ESWL has gained acceptance as the primary choice of intervention, there are still many occasions when rigid and/or flexible ureteroscopy is necessary in the treatment of these calculi and other ureteral pathology situations.[1]

Indications

Following ESWL, fragmented stone particles occasionally progress distally down the ureter in partial unity into a narrow or sometimes strictured lower ureter where they become "jammed," thus causing obstruction and other complications. This natural phenomena is called "steinstrasse" (stone street), as the stone particles are held up in a row within the ureter.

The introduction of the rigid long ureteroscope and especially the new shorter "lower end" ureteroscope has proven, in our experience, to be very effective in treating the above-mentioned phenomena. We have found rigid ureteroscopy to be also effective and successful in extracting and/or disrupting those ureteral calculi that are non-opaque. Additionally, these rigid scopes have provided another alternative to open surgery in the treatment of some ureteral strictures, the biopsying of ureteral tumors and in the removal of foreign bodies such as migrating ureteral stents.

Since 1984, rigid ureteroscopy at the Health Sciences Centre in Winnipeg, Manitoba has been mainly performed in treating ureteral calculi. Usually a 11.5 FR. "lower end" or long ureteroscope is utilized. We prefer this size as it permits simultaneous use of a 3.5 FR. basket and an ultrasound probe. These scopes employ a 5° working telescope with a laterally mounted eyepiece **(See slide #6, page 10),** enabling calculi to be disrupted under direct vision.

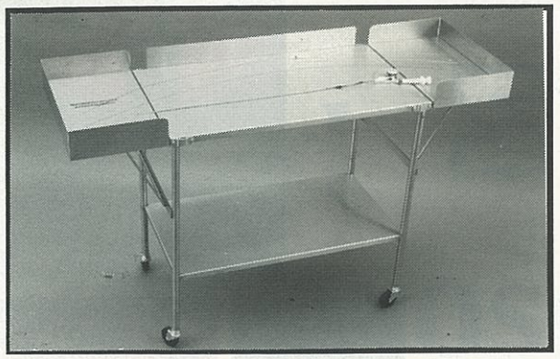
It must be stressed that all of our procedures were carried out in a cysto room that has fluoroscopic capabilities. To accommodate the usage of long 145 cm guide wires, catheters and ureteral ultrasound probes, we have found that the recently marketed Rudney/Hosking variable length endourological table is very practical. **(Slide #1a & 1b)**

As part of the pre-operative preparation, our patients must have a KUB (kidney, ureter, bladder) X-ray one hour before arriving in the O.R. Because this film will verify the most recent location of the stone, it is very important that the x-ray be in the operating room before the procedure begins.

Ureteric dilation

The patient is usually given a general anaesthetic and is placed in the lithotomy position with meticulous attention given to the padding of pressure points. To improve ureteral access, it is important that the leg opposite the involved ureter be abducted as far as possible. After the patient and fluoroscope are draped, cystoscopy is carried out and ureteric dilation is performed.

The dilation of the ureter begins with the insertion of a tip of a 7 FR. 4 cm long ureteral dilation balloon into the ureteric orifice. Contrast is then injected to confirm that the catheter is indeed in the ureter and that the stone is still present. **(See illustration #1)** This step eliminates the need to pass a ureteral catheter. A flexible 0.038 "J" 145 cm long guide wire is passed up the lumen of the ureteric dilating balloon and is advanced up the ureter under fluoroscopic control. **(Illustration #2)**



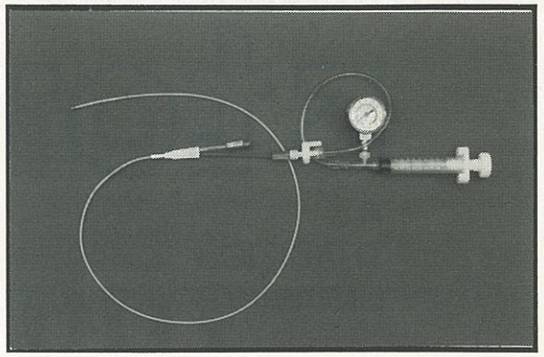
Slide #1a & 1b - The Rudney/Hosking endourological table. Slide 1a (top) shows the drop leaf shelves in place. Slide 1b, shelves are down in storage position.

The balloon catheter is then advanced over the wire and positioned in the intramural ureter using radiopaque rings at the balloon ends as helpful aids. Under fluoroscopic control, the balloon is inflated to 15 FR. at 90 lbs. per square inch pressure for a period of approximately two minutes.

A short-tipped balloon catheter is essential as it allows close approach to a ureteral calculus. Ureteral dilation to 15 FR. in our experience eases the passage of the ureteroscope and calculus through the intramural ureter. A high pressure inflation syringe and gauge will provide safe, smooth, accurate and sustained delivery of inflation pressure. **(Slide #2)**

We prefer to dilate the ureter with a balloon catheter as opposed to rigid or flexible dilators. This is because the balloon usually needs to be inserted only once and not several times as is the case with most other non-balloon dilators. The risk of ureteral injury is thus minimized.

Once dilation of the ureter is completed, the appropriate length of rigid ureteroscope is chosen and is passed transurethrally into the bladder. When the dilated orifice is identified, it is usually possible to advance the ureteroscope directly into the intramural ureter. Normal saline is used for an irrigating fluid at a height of 40 cm or more above the patient. If vision is still inadequate, the irrigating fluid may be raised higher. The ureteroscope is then advanced up the ureter under direct vision keeping the lumen in view at all times. **(Illustration #3)**



Slide #2 - Balloon dilator, high pressure syringe and gauge.

If a stricture is encountered, a much smaller 3 FR. ureteroscopy balloon catheter is inserted via the ureteroscope into the stricture and dilated at 150 lbs. per square inch pressure. Once the stone is encountered, water flow may be reduced to avoid displacing the stone. A 3 FR. or 3.5 FR. helical 4-wire stone basket is advanced past the stone and opened. We have found that this particular stone basket, with a blunt tip, is very successful in extracting the vast majority of stones.

Ureteral trauma

Under direct vision, an attempt is made to engage the stone in the basket, and if successful, the stone is manipulated down the ureter. If the stone is impacted or if there is a "hold up" on its way down, the stone is disrupted with a 1.5 mm ureteric ultrasound probe and the subsequent fragments manipulated. Manipulation of multiple fragments may require several passages of the rigid ureteroscope. Occasionally, in such situations, to minimize ureteral trauma, we have employed a Finlayson Ureteral Access Set. It is inserted in retrograde fashion to dilate the ureter and introduce a Peel-Away® radiopaque sheath that stays in place for the duration of the procedure. This sheath serves as a conduit for the ureteroscope, thus reducing the risk of perforation which is associated with multiple passages of the scope. At the end of the procedure , we usually leave a 6 FR whistle tip ureteral catheter in place for 24 to 72 hours to aid in drainage of the kidney. If there is concern about ureteric perforation, a retrograde ureterogram is performed before removing the catheter. In our experience, complications, exclusive of those associated with anaesthesia, include: migration of the stone higher up the ureter, perforation of the ureter with extravasation and inability to reach or remove the stone. Because of the risk of injury to the ureter with a rigid scope, meticulous attention must be paid to gentle technique avoiding any attempt to rush the procedure.

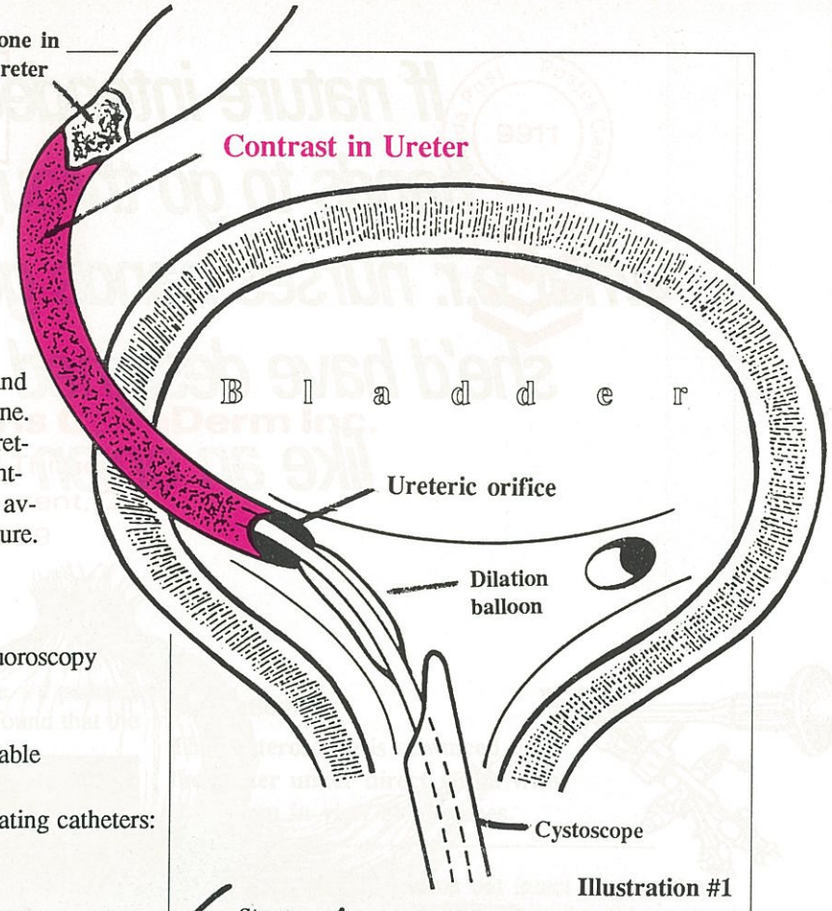


Illustration #1

Contrast being injected into the ureter via balloon dilating catheter

Equipment required

- Cystoscopy table that allows for fluoroscopy
- C-arm fluoroscope
- Sterile fluoroscopy cover
- Rudney/Hosking endourological table
- Cystoscopy set-up
- 7 FR. & 3 FR. ureteral balloon dilating catheters: 65-75 cm long
- 0.038 "J" x 145 cm guide wires
- High pressure 10 cc syringe and gauge
- 6 FR. whistle tip or open end ureteral catheters
- Long and short ureteroscopes
- Long and short ultrasound probes
- Ultrasound generator
- Flexible ureteroscope (if possible)
- Contrast media
- Finlayson Ureteral Access set

Review of cases

To date, at the Health Sciences Centre in Winnipeg, rigid ureteroscopy has been performed on over 200 patients. In a review of the first 139 patients performed by one of our urologists, 101 males and 38 females were treated. **(See slide #3)**

Stone removal was the indication for 116 of these patients while 23 required rigid ureteroscopy for other reasons, such as, evaluation of filling defects, ureteral obstruction, etc. **(See slide #4)**

Of the 116 above-mentioned patients, 91 of them had their stones removed successfully, 48 required disruption by ultrasound,

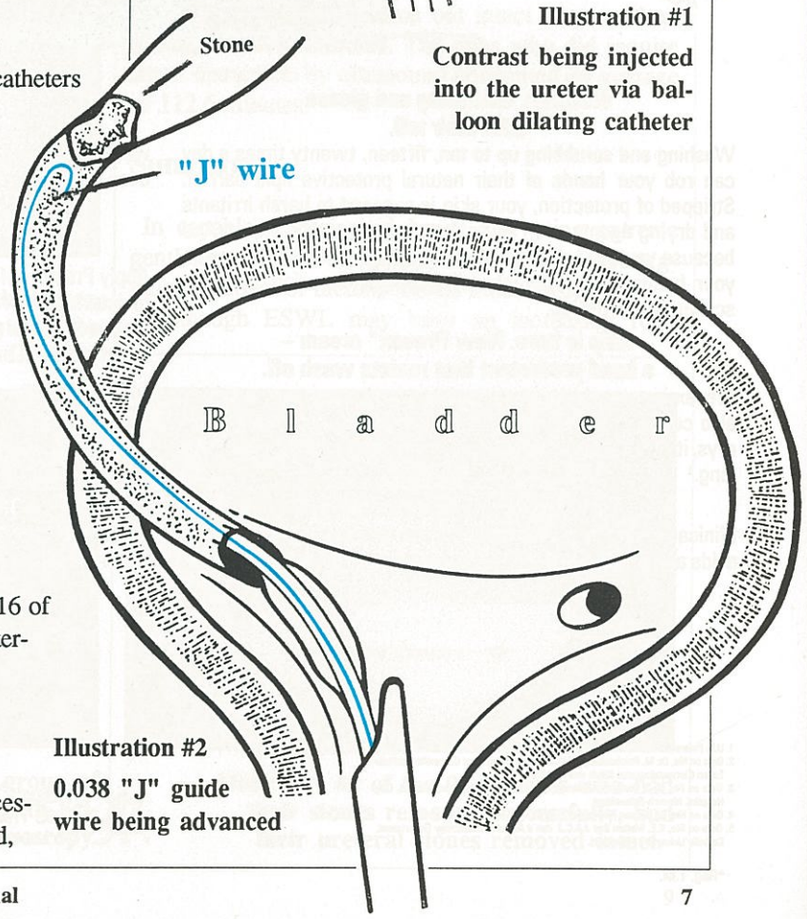


Illustration #2

0.038 "J" guide wire being advanced

If nature intended hands to go through what o.r. nurses hands go through she'd have designed them like an onion

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Washing, scrubbing and gloves take their toll.

Washing and scrubbing up to ten, fifteen, twenty times a day can rob your hands of their natural protective lipid barrier. Stripped of protection, your skin is exposed to harsh irritants and drying agents such as antiseptics, soaps and water. And because you can't peel off layers of ravaged skin like an onion, your hands may suffer chronic dryness, fissuring, redness, scaling and irritation.

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Prevex resists wash-off and protects against irritants.

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Prevex*
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1. U.S. Patent No. 4,355,046.
2. Data on file, Dr. M. Reichenberger, Universitatsklinikum der Gesamthochschule Essen (Dermatologische Klinik und Poliklinik).
3. Data on file, H.-J. Bandmann (Dermatology and Allergology Department, City Hospital, Munich-Schwabing).
4. Data on file, Bj. Hausen (University Skin Clinic, Hamburg Eppendorf).
5. Data on file, K.E. Malten and J.A.C.J. den d Arend (Dermatology Department, Catholic University, Nijmegen).

*Reg. T.M.

T C D

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one by electrohydraulic lithotripsy and 42 of them had their stones removed intact. **(See slide #5)**

In 18 patients the stones were displaced into the renal pelvis to be later treated by ESWL or percutaneous lithotripsy. In the seven remaining patients, we were unable to reach the stone. When we reviewed the 49 patients who required disruption, 19 of them experienced ureteral perforation. In the group of 42 patients whose stones were removed intact, only 8 ureters were perforated. Obviously, risk of perforation increased with stone disruption. **(Slide #7)**

The patients who were perforated averaged 4.8 days of post-operative hospital stay. The ones who were not perforated averaged 2.7 days. When one considers operating room time, of the 91 patients who had their stones removed, it was found that the patients whose stones came out intact consumed an average of 68.4 minutes. The ones who did require stone disruption by ultrasound consumed an average of 112.6 minutes.

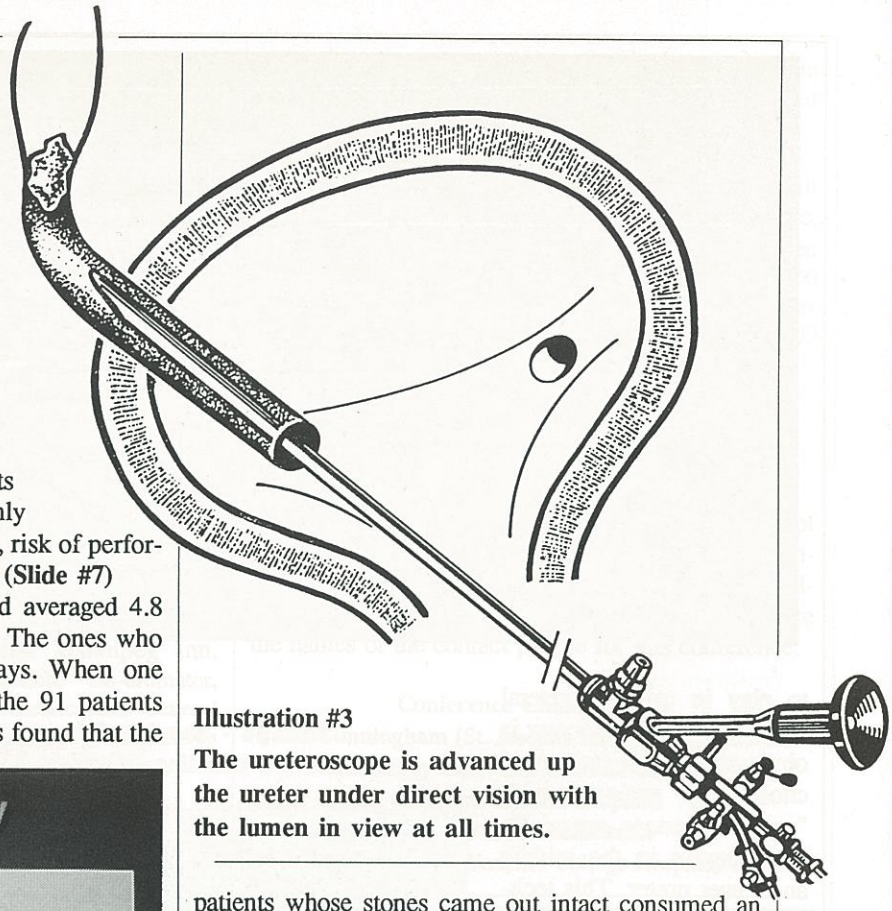
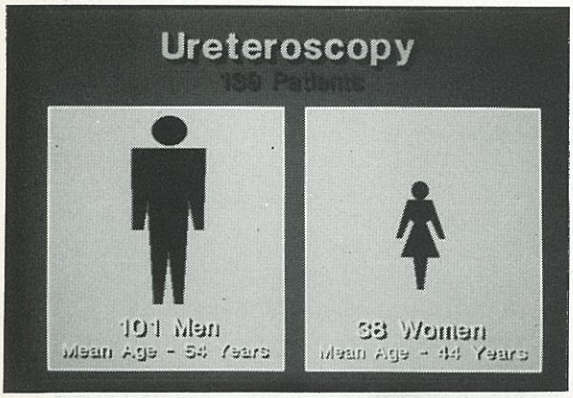


Illustration #3

The ureteroscope is advanced up the ureter under direct vision with the lumen in view at all times.

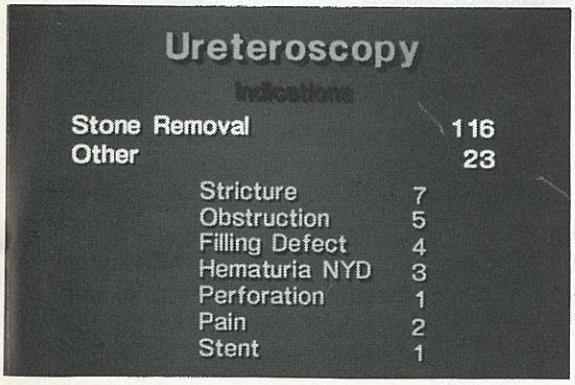


Slide #3 - Rigid Ureteroscopy has been performed on over 200 patients at the Winnipeg Health Sciences Centre.

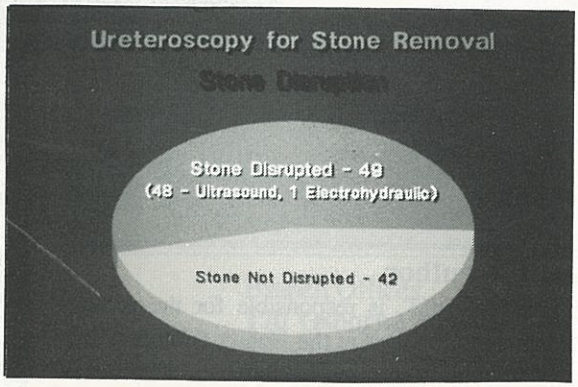
Summary

In capable, experienced hands and using extreme gentleness, rigid ureteroscopy has made the disintegration/removal of ureteral stones much easier.[2]

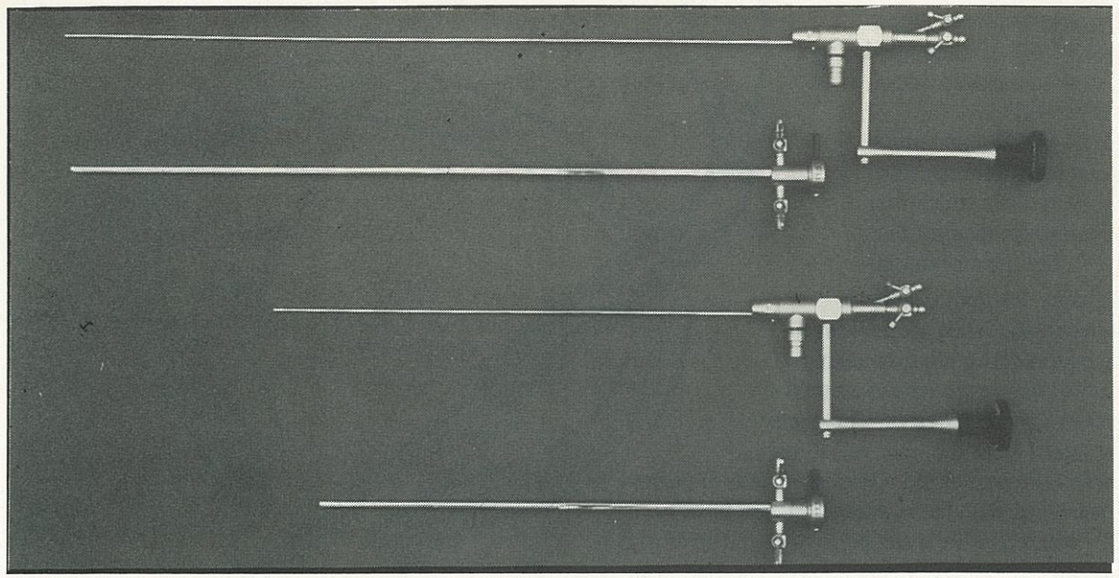
Although ESWL may have an increasing role



Slide #4 - Reasons why 23 of a group of 139 patients at the Winnipeg Health Sciences Centre required rigid ureteroscopy.

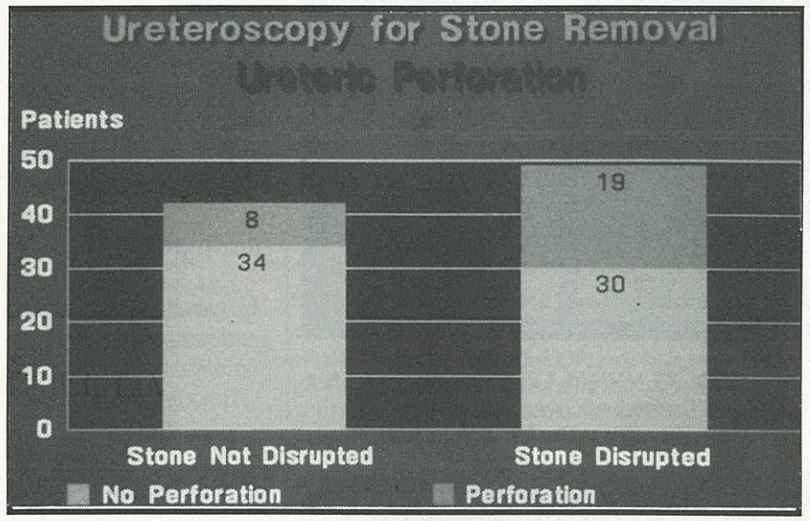


Slide #5 - 42 of the 91 patients who had their stones removed successfully, had their ureteral stones removed intact.



to play in treating ureteral stones, rigid ureteroscopy is obviously the treatment of choice in patients with "problem" stones, especially those stones in the middle and lower ureter. This technique has proven itself to be useful in establishing ureteral diagnosis where etiology is unknown and has been used to treat certain ureteral pathology. Therefore, rigid ureteroscopy obviously has a place in the effective treatment of selective urological patients. ■

Slide #6 - Short and long ureteroscopes employ a working telescope enabling calculi to be disrupted under direct vision.



Slide #7 - The figures on this slide suggest that the risk of ureteric perforation increases with stone disruption.

Acknowledgement

The author wishes to acknowledge the technical support of Faculty Graphics Winnipeg

References

1. & 2. Hosking, D.H. and Ramsey, E.W., "Rigid Transurethral Ureteroscopy," British Journal of Urology, Number 56, 602-603.

About the author

Jerry Rudney, ORT, is responsible for the urology operating room theatres at the Health Sciences Centre in Winnipeg, Manitoba. He has over 25 years of OR experience and has been at the forefront in the development of the ureteroscopy program, the ultrasonic percutaneous lithotrispy program and the retrograde nephrostomy program at the Winnipeg centre. Mr. Rudney was the winner of the' 85 Surgikos Editorial Award (Drake-Thompson Memorial Award) for his submission on percutaneous lithotripsy ("Ultrasonic percutaneous lithotripsy," *Canadian Operating Room Nursing Journal,* Volume 3, Number 1, 1985).

Calendar of Events

February 19 - 24, 1989, Anaheim, California: 36th Annual AORN Congress, Anaheim Convention Centre. (Contact Sylvia Rottman, Director of Meeting Services, AORN, 10170 East Mississippi Ave., Denver, Colorado 80231 USA).

April 23 - 26, 1989, Toronto, Ontario: First Provincial Conference, Operating Room Nurses Association of Ontario, Constellation Hotel, Dixon Road). (Details, Hilda Gatchell, Convenor, Publicity, 208 Oshawa Blvd. North, Oshawa, Ont. L1G 5S9).

June 11 - 13, 1989, Winnipeg, Manitoba: Third Biennial Conference of the Manitoba Operating Room Nurses Association, Delta Winnipeg Inn. (For details contact Bev Popowich, Co-ordinator, O.R. P.A.R. and Day Surgery, Misericordia General Hospital, 99 Cornish Ave., Winnipeg, Manitoba R3M 1E2 (204) 774-6581).

August 28 - September 1, 1989, Vienna, Austria: VI World Conference of Operating Room Nurses, Austria Centre, Vienna. (For more details, write to AORN Meeting Services Department, 10170 East Mississippi Ave., Denver, Colorado 80231).

April 2 - 6, 1990, Toronto, Ontario: 11th National Operating Room Nurses Conference, Harbour Castle (Westin) Hotel. (Delegates contact: Audrey MacDonald, OR, Mount Sinai Hospital, 600 University Ave., Toronto, Ont. M5G 1X5. Exhibitors contact Valerie Shirreff, OR, Mississauga Hospital, 100 Queensway West, Mississauga, Ontario L5B 1B8).

Preparations well underway for Ontario's provincial OR conference

The Operating Room Nurses Association of Ontario (ORNAO) will hold its first Provincial Conference from April 23 to 26, 1989 at the Constellation Hotel on Airport Road in Toronto. Below are the names of the contact people for this conference:

Conference Chairperson...
Jean Cunningham (St. Joseph's Health Centre) Toronto
Publicity Convenor... Hilda Gatchell
(Oshawa General Hospital)
Exhibitors Committee...
Donna Kaufmann (Women's College Hospital) Toronto