



WILLIAM S. WILKE, MD, EDITOR

## MANAGEMENT OF KIDNEY STONES: HOW NEW TECHNOLOGY HAS AFFECTED THE INDICATIONS FOR INTERVENTION

**N**ot long ago, patients with kidney stones faced surgical treatment followed by up to 6 weeks of recuperation. In view of this, the standard approach was to wait for the stone to pass spontaneously, unless specific indications for surgery were present, eg, progressive obstruction, intractable pain, associated infection, significant hematuria, stone growth, socioeconomic factors, or a stone too large to pass.

Now that stones can be treated noninvasively on an outpatient basis, it is often less expensive and more humane to intervene than to "wait and see." As our experience grows and the results have improved, new technology has changed the indications for intervention.

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### URETERAL CALCULI

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This is the type of stone that is seen most often, especially in an emergency or primary care situation. The primary physician must determine whether the patient will be able to pass the stone spontaneously or will require intervention. In 1956, Sandegarde estimated that if a stone is 4 mm or less in diameter there is an 81% chance that it will pass spontaneously. Stones between 4 and 7 mm in diameter have a 50% chance of passing, but few stones larger than 7 mm will pass spontaneously.

The traditional indications for intervention are frequently present with ureteral calculi. These stones can certainly cause progressive obstruction. Initial studies almost always show hydronephrosis—in fact, this is the cause of the pain that brings the patient to the emergency department. Though hydronephrosis itself is not an indication for intervention, progressive hydronephrosis on follow-up studies would be. Usually, however, hy-

dronephrosis decreases as the stone makes progress and the ureter dilates to allow more urine to flow around it.

Intractable pain is probably the most important indication for intervention, although most patients, even if admitted to the hospital for parenteral analgesia, can usually be sent home eventually to try to pass the stone. Hematuria and stone growth are usually not factors in ureteral calculi, but associated infections are: these stones can cause acute obstruction, and if there is infection along with it, the obstruction needs to be resolved.

Socioeconomic factors come into play in a patient who may be able to pass a stone eventually, but who has to work, or travel for work, or lives in another country where the newer technology may not be available.

As an example, in February 1984 we saw a patient who had a stone measuring approximately 6 mm by 4 mm in the proximal ureter. The alternatives were explained and he was sent home to try to pass the stone. One month later the stone had moved down a few vertebral bodies. Five months later the stone had advanced to the sacral iliac, and 6 months later the stone had passed. The patient had required several outpatient visits with radiologic studies and had incurred considerable costs in terms of medical care and time away from work. Today this patient would be a candidate for extracorporeal shock-wave lithotripsy (ESWL), the procedure developed in Germany by the Dornier company and the University of Munich. The patient is placed in a water bath and given general anesthesia. Shock waves are focused on the stone, pulverizing it. The patient can go home after the procedure, which is done on an outpatient basis. Some newer machines use ultrasonic instead of fluoroscopic guidance, and they do not require the water bath or general anesthesia.

ESWL is effective in approximately 90% of patients with ureteral stones. For those with impacted

stones in whom lithotripsy is ineffective, laser treatment can be used. The laser is introduced via a ureteroscope after epidural or spinal anesthesia has been administered. Again, the procedure can be done on an outpatient basis.

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#### RENAL PELVIC STONES

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Essentially all renal pelvic stones require intervention, and the new technology has not changed this. These stones usually cause progressive obstruction. Most patients present with pain, though they can also have associated infection and may have a long history of hematuria. These stones are almost always too large to pass spontaneously, but they are usually very amenable to shock-wave treatment.

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#### CALICEAL CALCULI

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Caliceal stones can be symptomatic or asymptomatic. Although only symptomatic stones used to be considered for intervention, asymptomatic ones can be considered for intervention as well. Symptoms often arise from progressive obstruction. Frequently, a patient may see several medical services for vague pain in the abdomen, flank, or back. In the past we may not have treated such a patient because cure required nephrolithotomy. Now, however, new technology makes it almost easier to do the treatment (lithotripsy) as a diagnostic test than to subject the patient to any further extensive evaluation looking for other sources of pain.

Small caliceal stones cause problems because they can move at any time and cause acute obstruction. Therefore, "prophylactic" treatment with ESWL can be beneficial even in an asymptomatic patient to prevent acute episodes in the future.

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#### INFECTION-RELATED CALCULI

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Struvite stones, composed of magnesium-ammonium-phosphate, are always associated with infection. Left untreated, the natural history is progressive pain, infection, and loss of kidney function. They are more common in women than in men. While they break up very well under lithotripsy, because of their size and shape, they usually require percutaneous treatment, or a combination of percutaneous treatment and ESWL. This again requires an anesthetic, but can often be performed with only a short hospital stay.

STEVEN B. STREEM, MD  
Department of Urology  
The Cleveland Clinic Foundation

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#### SUGGESTED READING

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Riehle RA, Fair WR, Vaughan ED, Jr. Extracorporeal shock wave lithotripsy for upper urinary tract calculi: one year's experience at a single center. *JAMA* 1986; 255:2043-2048.

Streem SB. Kidney stones. How new technology has improved management. *Postgrad Med* 1988; 84(8):77-89.

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## ENTEROPATHIC ARTHRITIS

A number of intestinal diseases are associated with arthropathy, particularly ulcerative colitis, Crohn's disease, dysentery, Behçet's syndrome, and Whipple's disease. This may take the form of a peripheral synovitis or spondylitic spinal changes, or both. Previously thought to be variants of rheumatoid arthritis, the arthropathies of these diseases differ from rheumatoid arthritis in their joint distribution, the lack of subcutaneous nodules, the absence of rheumatoid factor in the blood, and involvement of the sacroiliac joints radiologically.

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#### ULCERATIVE COLITIS

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In a study of 269 patients with ulcerative colitis, 15.8% had mouth ulcers, 8.9% had uveitis, 4.5% had skin lesions, and 11.5% had a peripheral synovitis.<sup>1</sup> The synovitis affected mainly large joints of the legs (knees and ankles), occurred more frequently in long-standing and more extensive colitis, and was frequently associated with local complications (such as pseudopolypi and massive hemorrhage) and systemic lesions (such as skin changes and uveitis). Total proctocolectomy abolished the synovitis. Ankylosing spondylitis was found in 12.6% and radiological sacroiliitis in 17%.<sup>2</sup> Whereas peripheral synovitis only came after the ulcerative colitis, spondylitis often preceded bowel symptoms. In a family study of patients with ulcerative colitis, ankylosing spondylitis and sacroiliitis occurred 12 and 5 times more frequently, respectively, among first-degree relatives than among the general population.<sup>3</sup> Inter-