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Q/ Ureteral calculi: What should you consider before intervening?

EVIDENCE-BASED ANSWER

A/ **THE SIZE OF THE CALCULI,** their location, and complicating factors such as infection should all be considered.

Most ureteral calculi smaller than 5 mm pass spontaneously, as do approximately half of calculi between 5 and 10 mm. Calculi larger than 10 mm are unlikely to pass without intervention. Distal calculi are more likely to pass spontaneously than calculi in mid- or proximal ureteral locations; most spontaneous passage occurs within 4 to 6 weeks (strength of recommendation [SOR]: **A**, prospective cohort studies).

All patients with calculi complicated by such factors as obstruction, infection, renal injury, or a single kidney require surgical consultation (SOR: **C**, expert opinion).

Medical expulsion therapy with alpha-blockers (usually tamsulosin) and nifedipine improves passage rates, including for some calculi larger than 10 mm (SOR: **A**, meta-analysis of prospective cohort studies).

Evidence summary

A meta-analysis of 5 prospective cohort studies evaluated the rate of spontaneous passage of ureteral calculi according to size. Calculi smaller than 5 mm passed spontaneously in 68% of patients (5 studies, N=224). Calculi between 5 and 10 mm passed spontaneously in 47% of patients (3 studies, N=104).[1]

A prospective cohort study evaluated spontaneous passage rates of ureteral calculi by size in 172 patients who were diagnosed by unenhanced helical computed tomography.[2] Investigators found spontaneous passage rates of 87% for 1-mm calculi, 76% for 2- to 4-mm calculi, 60% for 5- to 7-mm calculi, 48% for 7- to 9-mm calculi, and 25% for calculi larger than 9 mm.

Spontaneous passage rates differed significantly for calculi 1 to 4 mm in size compared with calculi 5 to 7 mm in size ($P<.001$) and for calculi 5 to 7 mm in size compared with calculi 8 mm or larger ($P<.001$). Calculi in either the distal ureter or ureterovesicular junction were more likely to pass that those in the mid- or proximal ureter (75% to 79% vs 48% to 60%; $P<.001$).

Most smaller calculi pass in 4 to 6 weeks

Another prospective cohort study (N=75) found that most calculi pass spontaneously within 4 to 6 weeks. In 95% of patients, calculi passed within 31 days (2 mm or smaller), 40 days (2-4 mm), or 39 days (4-6 mm).[3]

Some cases require prompt surgery

The American Urological Association (AUA) expert panel recommends early surgical intervention, regardless of calculus size, under the following circumstances: obstruction with high-grade hydronephrosis, infection, impending renal deterioration, intractable pain, nausea and vomiting, or obstruction in a solitary or transplanted kidney.[1]

Medical expulsion therapy trumps waiting for distal calculi to pass

A meta-analysis comparing rates of calculus passage found that medical expulsion therapy was more effective than expectant management for patients with distal ureteral calculi. Sixteen RCTs (N=1235) evaluated alpha-antagonists (mostly tamsulosin), and 9 RCTs (N=686) evaluated nifedipine. Treat-

ment periods for medical expulsion therapy ranged from 30 to 60 days.

Alpha-antagonists increased expulsion rates over expectant management for calculi ranging in size from 3 to 18 mm with a mean diameter greater than 5 mm (relative risk [RR]=1.59; 95% confidence interval [CI], 1.44-1.75; number needed to treat [NNT]=3). The mean time until passage ranged from 2.7 to 14.2 days. Nifedipine also increased expulsion rates for calculi with a mean diameter larger than 5 mm, ranging in size from 3.9 to 12.8 mm (RR=1.50; 95% CI, 1.34-1.68; NNT=4).[4]

Recommendations

The Joint European Association of Urology/AUA Nephrolithiasis Guideline Panel recommends observation with periodic evaluation for patients newly diagnosed with ureteral calculi smaller than 10 mm.[1] Patients may be offered medical expulsion therapy to facilitate calculus passage. Surveillance should be maintained until calculi pass; intervention should be considered if calculi don't pass spontaneously within about 30 days.

The Panel states that patients with ureteral calculi larger than 10 mm could be observed (with or without medical expulsion therapy); however, most cases will require surgical intervention.[1] JFP

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