Office-Based Stone Management

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KEYWORDS

• Kidney stone • Anesthetic • Sedation • Endoscopy • Surgery • Lithotripsy

KEY POINTS

- A working knowledge of local anesthetics and conscious sedation protocols is important, as many surgical kidney-stone procedures can be performed without general anesthetic.
- Preoperative urinalysis and culture should be routine for patients undergoing genitourinary surgical manipulation, and overt urinary tract infections should receive a full treatment course of culture-specific antibiotics.
- Shockwave lithotripsy can be performed effectively with conscious sedation.
- If a fragment is known to be left behind or is detected on imaging, knowing its significance will help guide management.
- Postoperative protocols for imaging and second-look nephroscopy are surgeon specific, and can range from no imaging/intervention to routine computed tomography and/or nephroscopy.
- Ureteroscopy has become an indispensable tool for the urologist for both the diagnosis and treatment of benign and malignant urologic conditions.
- Patient selection remains a critically important consideration when determining whether to proceed with ureteroscopy and laser lithotripsy under conscious sedation in an ambulatory setting.

As hospital resources are becoming strained, ambulatory surgical centers and day hospitals are being increasingly utilized. For the urologist, a working knowledge of local anesthetics and conscious sedation protocols are important, as many surgical kidney-stone procedures can be performed without general anesthesia (GA). With any anesthesia, the key goal is to maximize patient comfort while minimizing respiratory depression and avoiding prolonged sedation. When using these medications, a working knowledge of emergency reversal, ventilation (bag mask/laryngeal mask airway/intubation), and cardiopulmonary resuscitation is recommended.

GENERAL CONSIDERATIONS

Endoscopic procedures are typically considered to cause mild to moderate pain when performed under local or sedative anesthetic. Modern rigid and flexible endoscopic equipment is more user friendly and better tolerated by patients. A study from Jeong and colleagues[1] compares various modalities of stone surgery under local anesthetic using a 10-point visual analog scale (VAS). Shock-wave lithotripsy (SWL) reported the most pain (6.62/10); retrograde stenting with rigid cystoscopy (4.48/10), semirigid ureteroscopy + lithotripsy (with preprocedural intramuscular midazolam) (3.18/10), and rigid cystoscopy (3.08/10) all

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caused mild to moderate pain scores. As such, short-acting intravenous opiates and benzodiazepines can be used; however, with proper preoperative counseling, many patients can tolerate selected stone surgery without GA.

Covered in more detail elsewhere, the protocol of the authors' center involves a 6-hour preoperative fast (2 hours for clear fluids) for most procedures that would be considered moderate sedation/analgesia. At this level patients can purposefully respond to verbal commands while maintaining airway patency and spontaneous respirations. Vital signs are taken before, and every 10 minutes (or less) during the procedure in conjunction with continuous oxygen saturations and respiratory-rate measurements, and electrocardiogram tracings (if cardiac risk factors are present). Commonly used medications include benzodiazepines, and short-acting opioids are given parentally. Intravenous access is established for each patient, and bolus doses are preferred, titrating to the level of discomfort and anxiety.

Postprocedural observation is mandatory for a minimum of 60 minutes, and dedicated nursing staff assesses vital signs, sedation, and pain scores before discharge. Patients are instructed in advance that they will not be able to drive and that someone must be present with them at home over the following 24 hours.

Selection for conscious sedation requires a careful assessment of the patient's medical history and surgical issues. Severe systemic disease, chronic obstructive pulmonary disease, coronary artery disease, congestive heart failure, or difficult airways should all trigger anesthesia's involvement in any planned procedure. The patient's pain tolerance, history of narcotic use, anxiety levels, and specific anatomy should be weighed during consideration for a procedure under sedation. Movement secondary to pain during extracorporeal SWL (ESWL) may reduce efficacy. Similarly, movement during ureteroscopy (URS) could lead to a ureteric perforation, resulting in significant morbidities.

Antibiotics

Preoperative urinalysis and culture should be routine for patients undergoing genitourinary (GU) surgical manipulation. Overt urinary tract infections should receive a full treatment course of culture-specific antibiotics and, if possible, procedures should be delayed until urine cultures are negative.

According to the American Urological Association (AUA) recommendations for preprocedural antibiotics, cystoscopy with GU manipulation warrants prophylaxis for 24 hours or less, or it should be tailored to risk factors. Fluoroquinolones or trimethoprim/sulfamethoxazole as first-line recommendations are well suited for ambulatory surgery; prescriptions given in advance allow oral doses to be taken by patients 60 minutes preprocedure. Alternative antimicrobials are aminoglycosides with or without ampicillin, first-generation or second-generation cephalosporins, or amoxicillin/clavulanate. Percutaneous surgery also warrants antibiotic prophylaxis of up to 24 hours, with first-line antibiotics including first-generation or second-generation cephalosporins and aminoglycosides (with metronidazole or clindamycin). Second-line agents include ampicillin/sulbactam or fluoroquinolones. Updated in 2008, endocarditis guidelines by the American Heart Association state that prophylaxis for routine GU procedures is not necessary.[2]

The 2008 AUA recommendation for prophylaxis for all patients undergoing ESWL was recently revisited.[3] A meta-analysis of 9 randomized controlled trials involving 1364 patients failed to demonstrate reductions in positive urine cultures, urinary tract infections, or febrile episodes.[4] A large prospective trial analyzing 389 patients (with only 2% receiving prophylaxis) identified 1 post-SWL urinary tract infection, no cases of urosepsis, and 11 (2.8%) patients with asymptomatic positive urine cultures.[5] Therefore, with little evidence of benefit, only those with risk factors (advanced age, anatomic abnormalities, poor nutritional status, smoking history, steroid use, immunodeficiency, externalized catheters, colonized urine, distant coexistent infection, and prolonged hospitalization) are now recommended for routine prophylaxis.

CYSTOSCOPY AND STENT INSERTION

Ambulatory cystoscopy can be performed in various settings, including regular procedure beds or dedicated cystoscopy suites with lithotomy-positioning aids with fluoroscopic units and monitors. Undertaken for both the diagnosis and treatment of urolithiasis, procedures can be performed under local anesthetic, regional blocks, or conscious sedation. Flexible cystoscopy, or rigid cystoscopy in women, is considered the least bothersome, and is typically carried out with only topical xylocaine jelly.

Ambulatory ureteral studies can be performed under local or sedative anesthetic, because retrograde/antegrade contrast studies and ureteral stent insertions or changes are procedurally similar to performance under GA. This procedure