

Perioperative Drug Update

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Comprehensive management of the podiatric surgical patient is not limited to the lower extremity of the patient's body. The surgeon must bear in mind that the entire individual is being treated. This treatment includes the use of perioperative drugs, whether as an adjunct to surgery, for patient protection, or maintenance of preexisting conditions.

The purpose of this paper is to review some of the more commonly used perioperative drugs, including their indications, contraindications, and doses. The agents will be presented in the following categories: Antibiotics, Antiemetics, Anxiolytics, Steroids, and Miscellaneous drugs.

ANTIBIOTICS

The use of prophylactic antibiotics in the perioperative period has been shown to decrease the risk of infection when internal fixation is used. Podiatric surgeons frequently have questions about indications, agent selection and treatment length. Patients undergoing podiatric surgery at the author's institution generally receive prophylaxis according to the following protocol:

- Surgery greater than two hours long
- Surgery involving extensive dissection
- Surgery involving the implantation of permanent internal fixation
- Surgery secondary to trauma
- Revisional surgery
- Surgery in immuno-compromised patients

The most likely causative organisms of postoperative infections in clean podiatric surgery are *Staphylococcus* and *Streptococcus*. It is appropriate, therefore, to choose an agent specific for these two organisms. For this reason, Cefazolin (Ancef, Kefzol), a first generation cephalosporin, is commonly used. Cefazolin is commonly administered 30 minutes preoperatively in an intravenous one or two gram dose (for adults). It can be continued postoperatively, however the manufacturer recommends that the dose not be continued for more

than 24 hours if the risk of infection is not severe.

Cefuroxime (Zinacef), another cephalosporin, is also used for perioperative prophylaxis. Like Cefazolin, Cefuroxime has good *Staphylococcal* and *Streptococcal* coverage, while providing additional gram negative coverage. In adults, Cefuroxime is commonly dosed at 750 mg IV 30 minutes preoperatively.

In patients where the use of a cephalosporin is contraindicated, Clindamycin (Cleocin), a macrolide, is an acceptable alternative. In addition to gram positive and gram negative coverage, Clindamycin is also effective against some anaerobes. In healthy adults, Clindamycin is administered preoperatively at an intravenous dose of 900 mg.

Vancomycin (Vancocin), an aminoglycoside, is not as commonly used as a cephalosporin alternative in hypersensitive patients. In part, this is due to the fact that more appropriate alternatives are available. Vancomycin can also cause the "red man" syndrome due to incorrect infusion leading to rapid histamine release. Therefore, it must be administered slowly over one and a half hours.

ANTIEMETICS

Antiemetics are used in the postoperative period to counteract the nausea and vomiting associated with anesthesia. Two drugs commonly used as antiemetics also possess sedative properties. These are Droperidol (Inapsine) and Dimenhydrinate (Dramamine). Droperidol, dosed at 1.25 to 2.5 milligrams, can be given IM or IV every three to six hours as needed. It produces an antiemetic effect via its action as a CNS depressant. It can also be given as an adjunct to anesthesia and can decrease the incidence of nausea and vomiting during the surgical procedure. Dimenhydrinate's precise mechanism of action is unknown. However, it does have a depressant action on hyperstimulated labyrinthine function. Dimenhydrinate, when used as an antiemetic in adults, is dosed at 25 to 50 milligrams IM or IV every 4 hours.

Another antiemetic commonly used at the author's institution is Metoclopramide (Reglan). Metoclopramide has three actions as an antiemetic: (1) stimulation of upper gastrointestinal motility, (2) increase in tone and amplitude of gastrointestinal contractions and relaxation of the pyloric sphincter, and (3) inhibition of the stimulation of the Chemostatic Triggerzone (CTZ) by dopamine. Metoclopramide is generally dosed at five to ten milligrams every four to six hours as needed.

Another approach to prevent postoperative nausea and vomiting is to address it preoperatively. One method of doing this is with transdermal scopolamine (Transderm-Scop). Transderm-Scop initially gained popularity as a preventative for motion sickness. It is a transdermal patch placed behind either ear, which delivers 0.5 milligrams of scopolamine over the three day life of the patch. Scopolamine is believed to have a direct effect on the vomiting center within the reticular formation of the brain stem. Transderm-Scop can be chosen as an adjunct for nausea and vomiting prevention in patients with a well-defined history of postoperative nausea and vomiting.

Another method of preoperative nausea and vomiting prevention is through the use of Metoclopramide and Ranitidine (Zantac). This regimen is chosen for patients at risk of aspiration during anesthesia. The protocol used at the author's institution is Metoclopramide 10 milligrams and Zantac 300 milligrams: one tablet of each the night before surgery and one tablet of each two to three hours before surgery with a small sip of water.

ANXIOLYTICS

The most commonly used drugs for perioperative anxiety are the benzodiazepines. Benzodiazepines are CNS depressants that induce sedation.

By far the most commonly used agent for preoperative induction is Midazolam (Versed). Midazolam is indicated for preoperative sedation via the IM or IV routes. The benefits of Midazolam are its rapid onset of action, short duration, and reversibility. Midazolam is generally dosed at two to four milligrams in the preoperative period. Its sedative properties take effect in three to five minutes, and it also produces an amnestic effect.

Prior to the availability of Midazolam,

Diazepam (Valium) was commonly used. However, its use as a preoperative sedative has been greatly reduced due to its longer duration of action.

STEROIDS

On occasion, a patient presents for podiatric surgery who has recently or is currently taking steroids for management of medical problems such as rheumatoid arthritis or systemic lupus. The patient is considered to have adrenocortical insufficiency, and may not have adequate endogenous levels needed for a stress response.

When a patient presents on maintenance steroids, it is generally recommended they do not take their dose the day of surgery. The patient is preoperatively supplemented with 100 milligrams of Hydrocortisone (Solu-Cortef) IM or IV preoperatively.

The postoperative treatment is variable, and ranges from starting patients back on their maintenance dose, to continuing IM or IV hydrocortisone every eight hours for up to 24 hours. The postoperative treatment is dependant on several factors including patient coherence, or ability to tolerate oral medications. If the patient is not to be continued on maintenance oral steroids, then the dose must be tapered over two to four days, IM or IV.

MISCELLANEOUS

For patients with a prior history of gout or a urate level greater than nine milligrams per deciliter, prophylaxis is indicated. Oral colchicine, 0.6 milligrams twice daily, for three days prior to surgery may prevent a postoperative gouty attack. Other sources suggest oral dosing at one tablet three times daily for three days both preoperatively and postoperatively. Intravenous colchicine may be used prophylactically as a one milligram single dose preoperatively, followed by 0.5 milligrams IV every six hours for 24 hours. One must be aware that severe local tissue irritation can occur from extravasation of colchicine.

The use of Heparin in the perioperative period for the prevention of deep vein thrombosis and pulmonary embolism is well documented. When Heparin is used for this purpose, it is administered subcutaneously at a dose of 5000 units two hours preoperatively, and 5000 units every 12

hours postoperatively until the patient is ambulatory. Heparin prophylaxis is not the same as heparinization (used for treatment of DVT), and therefore does not require monitoring via prothrombin times.

Heparin prophylaxis is generally chosen for patients undergoing prolonged surgical procedures with prolonged recovery periods. Heparin may also be beneficial in the patient who, for other reasons, is at risk of developing thromboembolic disease.

CONCLUSION

In the perioperative management of a patient, the surgeon should not underestimate the value of input from other medical personnel involved in the case. Their knowledge, background, and insight will help make the surgery uneventful for both the patient and the surgeon. However, this should not relinquish the surgeon of the need to be cognizant of the perioperative management of the patient's medications.

Furthermore, the surgeon's liability is not limited to the surgical procedure performed on the patient. It encompasses all aspects of the patient's care, both pre- and postoperatively.

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