Ankle-block Anesthesia for Foot Surgery

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Regional ankle-block anesthesia in foot surgery has the potential for decreasing anesthetic mortality and morbidity while simplifying surgical treatment. Regional anesthesia for foot surgery, as presented here, is not an original concept, but has not achieved the widespread popularity it deserves. The reason for the present in-depth description is to popularize this procedure by detailing its methods and presenting our experiences with it.

MATERIALS AND METHODS

Precordication includes a drug such as diazepam to decrease potential lidocaine toxicity and to alleviate anxiety. The patient is placed supine on the operating table, with a bolster temporarily placed under the calf to facilitate preparation.

The ankle is cleansed and the regional anesthesia is applied using 0.5 or 1.0 per cent lidocaine without epinephrine. Lidocaine, 5 ml, is injected in a fan-like manner into the posterior tibial nerve, which is approximately one fingerbreadth posterior to the medial malleolus (figs. 1, 5–7). Next, lidocaine, 3 ml, is injected into the deep peroneal nerve just proximal to the level of the tibial tuberosity (figs. 2, 5–7). Block of the sural nerve, just posterior to the distal fibula, is performed likewise (figs. 3, 5–7). Ordinarily, the saphenous nerve need not be given special attention.

After injection of lidocaine into these nerves, a subcuticular injection of 0.5 per cent lidocaine without epinephrine is made around the complete circumference of the ankle joint, just proximal to the malleoli. This anesthetizes many small but significant sensory nerves (figs. 4–7) and anesthetizes the area where the tourniquet will be applied. It has not proven important to locate the nerve precisely by production of paresthesias with the injecting needle when the individual nerve blocks are performed. With an approximate knowledge of where these nerves are, lidocaine, 3–5 ml, in each area is sufficient when given in a fan-like distribution down to the region of the periosteum. If both feet are to be operated on, the injections may be performed simultaneously in both ankles.

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FIG. 1 (above, left). Posterior tibial nerve is injected in a fan-like manner.

FIG. 2 (above, right). Anterior tibial nerve is injected at the level of the tibiotalar joint.

FIG. 3 (below, left). Sural nerve is injected just posterior to the distal fibula.

FIG. 4 (below, right). Subcuticular injection is made around the complete circumference of the ankle joint.

or the second block may be performed near the end of the procedure on the first foot. Because the success of the block is so predictable, it has not been necessary to wait for the appearance of anesthesia after completing the injections. After a ten-minute surgical cleansing of the foot and ankle region above the level of the local block, the foot is draped in the usual fashion and the distribution and effectiveness of the block tested with a needle. If the entire foot is not anesthetized, waiting a few additional minutes is usually all that is necessary.

Prior to the surgical incision, a tourniquet is applied by wrapping the foot with a Martin bandage, starting at the toes and ending at the site of the block in the ankle region. It is wrapped around the ankle three to five consecutive times, and looped under itself to prevent unwinding. The distal wrap of the Martin bandage is removed by unwinding it back to the ankle—this prepares a bloodless foot with an effective tourniquet. The tourniquet may be partly over an area proximal to the anesthetic block; this, however, has never caused discomfort. The tourniquet may be removed either before or after closing the wound.

Our postoperative management is different only in that we are more inclined to discharge a patient directly home from the operating room because of the absence of postanesthetic complications.

RESULTS

During the past two years, all patients undergoing foot surgery on our service at the Stanford University Medical Center were operated on using the regional ankle-block
anesthesia just described. Within that time, 40 patients, including 49 feet (nine bilateral operations) underwent operative procedures. The procedures included various types of bunionectomies, hammer-toe procedures, resections of the metatarsal head, sesmoidectomy, plantar neurectomy, bunionette resection, ganglion excision, great-toe amputation, removal of foreign body, excisions of navicular and accessory navicular exostoses and gouty tophus, major scar revision, and repair of a complicated lawnmower injury.

The youngest patient was a 20-year-old woman undergoing a Mitchell bunionectomy and the oldest a 93-year-old woman undergoing a simple bunionectomy. The elderly patient was operated on as an outpatient, and several hours after anesthesia was able to walk on her own from the recovery room to the car.

Periods of hospitalization of these patients ranged from none to three weeks. Eleven were operated on as outpatients, and seven were admitted the day of operation and discharged within 24 hours. One patient undergoing bilateral metatarsal-head resections of all ten rays was kept in the hospital for three weeks. He was brought into the hospital several days early because of severe bilateral peripheral edema associated with chronic venous insufficiency and numerous failed forefoot operations, including previous secondary osteomyelitis. He was kept in the hospital postoperatively because he lived alone, and because we wanted to keep his feet elevated until the wounds healed.

There were two complications from these operations. The first occurred in the patient mentioned above, who developed a superficial infection in the incision. It resolved unevent-
fully with antibiotics. The other complication was a sterile foot drainage that lasted ten days in a woman undergoing Mitchell bunionectomies. Lidocaine with epinephrine was used on only one occasion, in a man undergoing removal of his tibial sesamoid. There was no complication in this case, but the block lasted 12 hours. Paresthesias of the posterior tibial nerve lasted six weeks in one patient before spontaneously subsiding.

**DISCUSSION**

Ankle-block injections cause only minimal discomfort to the patients, about the same as that involved in administration of an intravenous medication. Patients have been uniformly pleased by this method of anesthesia; no patient felt any foot discomfort during the operation. Postoperative pain appeared to be reduced, and the return to walking was easier.

Because the patient is awake and not paralyzed he is able to defend himself against many complications that might otherwise develop. In one study, nonfatal complications of general and spinal anesthesia occurred in 4.7 per cent of 513 patients. These complications, listed in the order of frequency, included: vomiting, bruises, sore throats, backaches, pain and lacerations. They did not
occur in the small group of patients herein described. Vomiting is an almost nonexistent complication of lidocaine anesthesia, and use of diazepam as a premedication reduces the potential for vomiting or convulsions.

We prefer this method of anesthesia to the Bier block because it avoids intravenous administration of lidocaine. The ankle block, in comparison with the Bier block, avoids both early tourniquet pain and the delayed pain frequently arising from prolonged use of the tourniquet. Because ankle-block anesthesia wears off slowly, the patient recovers from the operation and adjusts to pain gradually outside the operating room.

In summary, during a two-year period, 40 patients (aged 29 to 93 years) undergoing foot surgery were operated on using ankle-block anesthesia. Patient acceptance of the ankle block was excellent, with only one in this study preferring general anesthesia. The use of an ankle tourniquet allowed the anesthesia to last as long as the operation required, and, unlike the Bier block, avoided both early tourniquet pain and the delayed pain arising from prolonged tourniquet use.

REFERENCES
2. Labat G: Regional Anesthesia. Philadelphia, W.B. Saunders, 1926