23. BIER BLOCK

INTRODUCTION

Introduced by August Bier in 1908, the Bier block is a technique for intravenous regional anesthesia that can produce total analgesia of either the upper or lower extremity. It is best reserved for short procedures (less than 60 minutes) of the distal extremities. The technique is based on the premise that if circulation to the limb is blocked and local anesthetic is injected into venous vessels distal to the occlusion, the nerves that typically travel with blood vessels will be anesthetized as the drug diffuses into the extravascular space via retrograde flow. The duration of the block depends on the length of occlusion of the vessels.

Figure 23-1

PROCEDURE

Place a double-cuffed tourniquet on the upper arm of the operative extremity (do not inflate). Place an intravenous (IV) catheter in the hand of the operative extremity (a second IV on the nonoperative side should already be present). With the patient lying in the supine position, the operative arm is raised straight over the head for exsanguination (allow at least 1 minute for blood to evacuate). This maneuver is a very important part of the procedure because excess blood remaining in the arm will dilute the injected local anesthetic. While the arm remains raised, wrap an Esmarch elastic bandage from the fingertips proximally up to the tourniquet. This technique will expedite exsanguination (Figure 23-1). If an elastic bandage is not available, continue to hold the operative extremity above the patient's head for at least 4 to 5 minutes. Once the bandage has been placed or the appropriate amount of time has elapsed, inflate the proximal (upper) tourniquet to 250 mm Hg (or 100 mm Hg above the patient's systolic blood pressure), and remove the elastic bandage (Figure 23-2).

Figure 23-2

Place the patient's arm on the table and slowly inject the local anesthetic (Figure 23-3). The patient's skin may appear to blanch in areas; this is normal.

Allow 10 minutes to elapse before the start of surgery. During the surgical procedure, if the patient begins to feel discomfort from the tourniquet (usually after 60 minutes), inflate the distal (lower) tourniquet and then deflate the proximal (upper) tourniquet.

Figure 23-3

Local Anesthetic. In most adults, 30 to 50 mL of 0.5% lidocaine (about 3 mL/kg) is sufficient. Use **nonepinephrine**-containing solution.

Teaching Points. Never deflate the tourniquet sooner than 20 minutes after injection, even if the surgery is shorter than that time period; the lidocaine has been injected intravenously and toxicity can occur with early cuff deflation. Because of the possibility of intravenous injection, epinephrine is not used in the local anesthetic solution. Short-acting, less toxic local anesthetics are employed (lidocaine or prilocaine). Do **not** use ropivacaine or bupivacaine.