This chapter will discuss peripheral nerve blocks (PNBs) of the lower extremity. There are relatively few reports about complications associated with the use of PNBs in general and also about the mechanisms of injury after nerve blockade and methods to prevent them.

There is a general agreement about the benefits of PNBs, including preservation of consciousness, hemodynamic stability, postsurgery analgesia, early discharge of the patient, and limited sensory and motor blockade. Lower extremity blocks are very useful techniques to be familiar with and apply, because they provide excellent postoperative pain relief and have a very low incidence of complications, varying between 0%–5%.1

A complication is an undesired event subsequent to a medical treatment that may or may not be reversible, has different grades of severity, and is not always preventable. It differs from an adverse reaction, which may be defined as an undesired event ranging from a simple discomfort to damage limiting daily activities of the patient, but generally preventable.

PNBs of the lower extremity have never been as widely taught or used as other techniques of regional anesthesia. This may be attributable to the impossibility of anesthetizing the entire lower extremity with a single injection. Furthermore, injections required to perform a block of the lower extremity are generally deeper than those required for upper extremity block.2

Over the past decade, several developments have led to a growing interest in PNBs of the lower extremity; these changes in clinical practice are mainly the result of reports of new complications associated with central neuraxial techniques, e.g., transient neurologic symptoms associated with spinal anesthesia, an increased risk of epidural hematoma with the introduction of new antithromboembolic prophylaxis regimens, and to the positive effects on rehabilitation outcomes associated with continuous lower extremity PNBs.2 PNBs are often incorrectly blamed for nerve injuries that are more likely caused by tourniquet pressure, surgical intervention, or poor positioning of the patient.

**Epidemiology of Complications of Peripheral Nerve Blocks of the Lower Extremity**

A great deal of literature has been devoted to the techniques of regional anesthesia. The clearest picture of regional anesthesia complications comes from the ASA Closed Claims Project database.3 The ASA Closed Claims analysis permits a structured
evaluation of adverse anesthetic outcomes collected from the closed anesthesia malpractice insurance claim files.

In the 1990s, 308 claims in the United States were associated with regional anesthesia, versus 642 associated with general anesthesia. In this decade, the percentage of claims for patient death (10%) continues its steady decrease from more than 20% in the 1970s to 13% in the 1980s.4

In the same decade, we also observed a significant increase in the percentage of claims arising from pain management in nonoperative settings,5 where anesthetic blocks accounted for 84% of the ASA Closed Claims Project database (neuraxial blocks 55%, sympathetic blocks 16%, axial nerve blocks 15%, other blocks 9%).4

Another study from the ASA Closed Claims Project database evaluated injuries associated with regional anesthesia in the 1980s and 1990s in surgical settings: PNBs accounted for 13% of all regional anesthesia claims; death or brain damage was associated with 11% of peripheral block claims and included mostly interscalene, axillary, and intravenous regional blocks. Damaging events in these claims were related mostly to block technique, wrong dose or wrong drug, inadequate ventilation, delayed absorption of local anesthetic, and difficult intubation. Permanent nerve damage was associated with 29% of PNB claims (according to frequency: brachial plexus damage, median nerve, ulnar, radial, femoral/sciatic) and temporary injury with 58% of claims.4 Auroy et al.7 have studied complications of regional anesthesia over 30 geographical regions, including overseas French departments. Every hospital or private clinic was surveyed during 3 consecutive days, from February 1, 1996 to January 31, 1997. The aim of this survey was to identify three types of information: main characteristics of patients undergoing anesthesia, anesthesia (urgent or elective, starting and ending time, general or regional anesthesia, airway management, pharmacologic agents), and procedure. The annual rate of anesthetic procedures in the whole population was 13.5 anesthesia procedures per 100 inhabitants, and the number of anesthetic procedures for surgery was 9.5/100. Regional anesthesia was performed in 21% of cases, and in 2% of cases a combined technique of regional and general anesthesia with intravenous or volatile agents was performed. Orthopedic surgery was the most common surgery, accounting for the majority of regional anesthesia procedures. The two major findings of this study were that anesthesia has both increased and changed since 1980: the number of anesthetic procedures increased by 120% from 1980 to 1996 in France, and there was a consistent growth in the number of anesthetics performed in the elderly. There was an increase in the number of regional anesthetics performed.

There was a 16-fold increase in the use of plexus/nerve blocks reported since the 1980s. In the French survey from Clergue and colleagues,6 21,278 PNBs were performed in the 5-month period of the study: they estimated the potential for serious complications per 10,000 PNBs and found 0–2.6 deaths, 0.3–4.1 cardiac arrests, 0.5–4.8 neurologic injuries, 3.9–11.2 seizures, and 0.5–4.8 radiculopathy.

In a more recent analysis in 2002 from Auroy et al.,9 of a total of 158,083 regional blocks performed in the 10-month period of the study, anesthesiologists reported 56 serious complications related to regional anesthesia. The study estimated an incidence of major complications after the 394 posterior lumbar plexus blocks higher than expected and higher than that reported with other PNBs (25.4/10,000 cardiac arrests, 50.81/10,000 respiratory failures, 25.4/10,000 seizures, and 25.4/10,000 deaths).

Apart from specific considerations, the study estimated that the total incidence of severe complications after regional blocks to be lower than 5/10,000. It is rare for serious cardiac and neurologic complications to occur in association with regional anesthesia. Published information primarily involves retrospective studies or case reports5; moreover, large numbers of patients are required to compare the incidence and characteristics of serious critical events.

There is a paucity of reports of complications specifically attributable to PNBs of the lower extremity, which is really evident if compared with reports about PNBs of