Recommended Practices for Care of Patients Undergoing Pneumatic Tourniquet-Assisted Procedures

The following Recommended Practices for Care of Patients Undergoing Pneumatic Tourniquet-Assisted Procedures have been approved by the AORN Recommended Practices Advisory Board. They were presented as proposed recommendations for comments by members and others. They are effective June 15, 2013. These recommended practices are intended as achievable recommendations representing what is believed to be an optimal level of practice. Policies and procedures will reflect variations in practice settings and/or clinical situations that determine the degree to which the recommended practices can be implemented. AORN recognizes the various settings in which perioperative nurses practice, and as such, these recommended practices are intended as guidelines adaptable to various practice settings. These practice settings include traditional operating rooms (ORs), ambulatory surgery centers, physicians' offices, cardiac catheterization laboratories, endoscopy suites, radiology departments, and all other areas where surgery and other invasive procedures may be performed.

Purpose

Pneumatic tourniquets are used to occlude blood flow, obtain a near bloodless field for extremity surgery, and confine a bolus of anesthetic in an extremity for intravenous regional anesthesia. Serious patient injuries related to the use of pneumatic tourniquets are uncommon, but risk is present. The Norwegian Orthopedic Society conducted a survey of 398 surgeons working in 71 health care organizations who performed an estimated 63,484 procedures involving a pneumatic tourniquet. The response rate was 67% (265 surgeons). The researchers determined the incidence of complications was one in 2,442 procedures. Of the 26 complications reported, 15 were nerve injuries; three were blistering or skin necrosis; six were compartment syndrome or deep vein thrombosis (DVT), although these complications may have related more to the injury or surgical procedure than the tourniquet; and two were excluded from the study because of limited specific information. Specific to nerve injuries, the researchers determined the incidence of complications was one in 6,155 procedures involving tourniquets applied to upper limbs and one in 3,752 procedures involving tourniquets applied to lower limbs.[1]

The Arthroscopy Association of North America conducted a national survey and reported 930 complications in 118,590 arthroscopic procedures (0.8%). Sixty-three of the complications were neurological injuries and 80% of those were related to tourniquet use.[2] Researchers from the University of British Columbia sent an e-mail survey to 1,908 active fellows of the American College of Foot and Ankle Surgeons in the United States and Canada. The response rate was 19% (317 respondents) based on the 1,665 surveys that were successfully delivered. Nerve injury and DVT were listed as the most common concerns of using a tourniquet (ie, cited by 25% of the 73 respondents on tourniquet-related hazards). However, 28 respondents with eight to 31 years of clinical practice commented that complications were rare or had never been encountered (ie, 38% of the 73 respondents on tourniquet-related hazards).[3]

Pain from the tourniquet is one of the most common complications related to pneumatic tourniquet use.[4] Other complications that patients may experience include cardiovascular, respiratory, cerebral circulatory, and hematological effects related to the metabolic changes that result from ischemia caused by the pneumatic tourniquet applied to the extremity during surgery. Temperature changes, prolonged postoperative swelling of the affected limb, and arterial injury are other complications that may occur when a pneumatic tourniquet is used.[4,5]

In reports compiled by the Pennsylvania Patient Safety Authority from December 2004 through December 2009, 140 reported events were associated with pneumatic tourniquet use. The data revealed that 41% of the events were related to limb redness, bruising, or swelling, 19% were related to skin tears or blisters, and more than 40% were related to equipment or safety issues.[6]

These recommended practices are intended to provide guidance to perioperative team members on the use of pneumatic tourniquets. These recommended practices provide information about testing, applying, and cleaning pneumatic tourniquet equipment, and the patient care associated with the safe use of this equipment. Pneumatic tourniquet equipment consists of a pressure regulator with display, connective tubing, and an inflatable cuff. These recommended practices provide general guidelines for developing policies and procedures for safe use of a pneumatic tourniquet in the practice setting. Due to the variety and complexity of pneumatic tourniquet equipment, policies and procedures that reflect considerations for specific pneumatic tourniquet systems are beyond the scope of these recommendations. Finger tourniquets and tourniquets used for phlebotomy or traumatic bleeding are outside the scope of this document.

Evidence Review

A medical librarian conducted searches of the databases MEDLINE®, CINAHL®, Scopus®, and the Cochrane Database of Systematic Reviews for meta-analyses, systematic reviews, randomized controlled and non-randomized trials, guidelines, and case reports. Search terms included *pneumatic tourniquet,*