



PNEUMATIC TOURNIQUET

Pulmonary emboli have been reported to occur after tourniquet cuff deflation.^{28,124,152-157} Postoperative neurological complications related to tourniquet use also have been reported.^{111,158} Although unusual, compartment syndrome related to tourniquet use has also been reported.¹⁵⁹⁻¹⁶¹

Recommendation VIII

The pneumatic tourniquet and accessories should be cleaned after each use according to the manufacturer's written instructions.

Studies have reported microbial growth after culturing of reusable tourniquet cuffs.¹⁶²⁻¹⁶⁴ In a limited study, researchers cultured 10 reusable tourniquet cuffs and 10 exsanguinators and compared the findings with microbes found in infected fracture wounds. They found that all 10 of the exsanguinators and eight of the tourniquet cuffs grew pathogens. *Staphylococcus aureus* and *Acinetobacter* were among the pathogens that were isolated, and coagulase-negative staphylococcus was the most commonly cultured pathogen. *Staphylococcus epidermidis* was the coagulase-negative pathogen found in two wound site infections out of 24 ankle fractures. Although the researchers found all of the exsanguinators and the majority of the cuffs they cultured to be contaminated, they could not identify evidence linking exsanguinators and tourniquet cuffs to surgical site infections. Despite this, the researchers recommended autoclaving tourniquet cuffs and using a clean exsanguinator for each procedure.¹⁶⁴

VIII.a. After use, personnel should turn off the pneumatic tourniquet and clean and inspect it according to the manufacturer's written instructions. [1: Strong Evidence]

Cleaning between procedures prevents cross contamination.^{165,166} Inspecting equipment after use helps to identify issues that can be handled before the equipment is used again.

VIII.a.1. Single-use cuffs should be discarded in an appropriate receptacle.

VIII.b. Between uses on patients, reusable cuffs and bladders should be cleaned using an Environmental Protection Agency-registered hospital disinfectant and then rinsed and dried.¹⁶²⁻¹⁶⁶ [1: Strong Evidence]

Rinsing removes residue that may cause skin irritation, increase the chance of allergic reaction, and decrease the life of the cuff and bladder.¹²

VIII.b.1. If a reusable cuff is unable to be cleaned adequately, it should be discarded in an appropriate receptacle.

Recommendation IX

Perioperative team members should receive initial and ongoing education and competency verification on the use of the pneu-

matic tourniquet and on their understanding of the physiologic responses that influence the care of a patient undergoing pneumatic tourniquet-assisted operative or invasive procedures.

Health care organizations have a responsibility to provide initial and ongoing education and to evaluate the competency of perioperative team members to deliver safe care to patients undergoing pneumatic tourniquet-assisted operative or invasive procedures.^{53,167} Every nurse is personally accountable for maintaining competency.^{53,168}

Initial and ongoing development of knowledge and skills and documentation of personnel participation is a regulatory and accreditation requirement for both hospitals and ambulatory settings.¹⁶⁹⁻¹⁷⁴

Two studies evaluating the knowledge of perioperative personnel who used tourniquets identified the need for education on the application of tourniquet cuffs and the use of pneumatic tourniquets to prevent injuries and complications.^{164,175} In one study, researchers distributed questionnaires to assistants and orthopedic specialists in the OR from five different hospitals. A total of 54 questionnaires were returned and analyzed. The mean score for the orthopedic specialists was 41.3% (standard deviation 6.85%; range 29.0% to 54.8%). The mean score for the assistants was 46.7% (standard deviation 9.64%; range 23.3% to 62.9%). The researchers concluded that there is a need for standard guidelines on tourniquet use.¹²⁵ In another study, researchers distributed a questionnaire to OR personnel who used exsanguinators and pneumatic tourniquets. A total of 74 questionnaires were returned and analyzed. The respondents included eight porters, 12 nurses, 10 senior house officers, 38 registrars, and six consultants. The nursing group had the highest mean score of 38.8%. The other mean scores were reported as 36.1% for the specialist registrars, 33.6% for the consultants, 32.8% for the registrars, 25.5% for the senior house officers, and 11.9% for the porters. The researchers identified the need for providing education to provide the best patient care.¹⁶⁴

IX.a. Perioperative team members should receive education and competency verification that addresses the care of patients undergoing pneumatic tourniquet-assisted operative or other invasive procedures.¹⁶⁹⁻¹⁷⁴ The education should address

- differentiating indications and contraindications for tourniquet use,
- identifying risks to patients and precautions to minimize these risks,
- selecting appropriate tourniquet cuffs based on patient assessment,
- following specific manufacturers' instructions for use,
- operating the tourniquet regulator according to the manufacturer's recommendations,
- measuring LOP,
- identifying physiologic changes during and after tourniquet use,
- implementing proper care and handling of the tourniquet and its accessories,