inflation alone activated a systemic formation of the thrombosis.[54]

In another study, researchers confirmed that cellular interactions that augment blood coagulability were increased in the perioperative period for patients who underwent total knee arthroplasty. They also concluded that these responses were more prominent during tourniquet-assisted total knee procedures.[55]

II.c. The perioperative nurse should collaborate with the surgeon and anesthesia professional to address considerations related to the plan for anesthesia or ischemic preconditioning.[53] *[2: Moderate Evidence]*

The purpose of ischemic preconditioning is to increase the tolerance of tissue to a longer period of ischemia by initiating brief periods of ischemia[56] or influencing skeletal muscle tolerance with anesthetic regimens.[57] Several studies have investigated the correlation between various anesthesia or preconditioning techniques and oxidative stress related to ischemia and reperfusion that occurs after the release of a tourniquet.[42-44,56-64]

To reduce oxidative stress related to tourniquet inflation, preconditioning techniques may be planned to initiate short intervals of temporary ischemia (eg, three cycles of five minutes, followed by five minutes of reperfusion just before tourniquet inflation).[42,44,59,61] Perioperative nurses may participate in activities related to preconditioning (eg, retrieving medications, setting up equipment, coordinating the timing of skin preparation, documenting intervals of inflation). By collaborating with the surgeon and anesthesia professional, the nurse will be better prepared to assist in preconditioning-related activities.[53]

II.d. Before the patient enters the OR, a pneumatic tourniquet cuff should be selected using the following considerations.

- The width of the tourniquet cuff should be as wide as possible without inhibiting surgical site exposure.[50,65]
- Contoured tourniquet cuffs should be used for patient extremities in which there is a tapering of the extremity between the upper and lower edge of the cuff.[23,50,65]
- The length of the tourniquet cuff should be sufficient to provide bladder overlap on the limb and full engagement of the hook-and-loop fasteners.

[2: Moderate Evidence]

Confirming that a tourniquet with the appropriate cuff size and shape is available before the patient enters the OR decreases the risk of using the wrong cuff size or shape or causing a delay to search for the appropriately sized cuff while the patient is under anesthesia.

Improper tourniquet cuff application may lead to skin injuries (eg, pressure necrosis, friction burns).[5] The risk of injury to tissue and nerves increases when more pressure is required for vessel occlusion. The ratio of the cuff width to the limb circumference has an inverse relationship with limb occlusion pressure (eg, wider cuffs require lower tourniquet pressures, narrower cuffs require higher tourniquet pressures).[20] Choosing the wrong cuff size or shape could lead to unnecessarily higher pressures and increase the risk for injury.

Wider cuffs minimize the risk for injury to underlying tissue by dispersing pressure over a greater surface area. In clinical trials, using a wider cuff has been found consistently to occlude blood flow at a lower pressure in adult patients.[50,65-67] Similar results were found using wider cuffs in children.[18] Contoured tourniquet cuffs have been found in clinical trials to occlude arterial flow at lower pressures than straight tourniquet cuffs of equal width. Contoured tourniquet cuffs minimize the risk of excessive pressure on one edge of the cuff, migration of the cuff, and a shearing injury to underlying tissue.[23,50,65]

II.e. A sterile cuff should be used when the cuff will be very close to the sterile field. A single-use cuff should be used when adequate protection of the cuff from contamination cannot be assured. *[3: Limited Evidence]*

Researchers conducted a study at two hospitals to assess microbial colonization on reusable tourniquet cuffs versus sterile single-use disposable tourniquets. They found that 23 of the 34 reusable tourniquet cuffs were contaminated before surgical application. Although they did not follow the patients to find out the incidence of surgical site infection in the 23 patients who had contaminated cuffs applied, the researchers concluded that sterile single-use tourniquet cuffs are preferred to decrease the bacterial load when the cuff is placed in close proximity to the surgical site.[68]

II.f. Potential risks for patient injuries and complications associated with dual-bladder cuffs used for intravenous regional anesthesia should be identified and safe practices should be established. *[3: Limited Evidence]*

Reports indicate that complications associated with intravenous regional anesthesia include local anesthetic toxicity, seizures, cardiac arrests, compartment syndrome, thrombophlebitis, discoloration, or widespread petechiae.[47] When using intravenous regional anesthesia, there is a risk for local anesthetic toxicity caused by accidental tourniquet failure or leakage around the tourniquet due to high venous pressure.[49,69] Complications can also occur that are related to tubings and misconnections (eg, attaching to distal versus proximal cuffs) when using dual cuffs for intravenous regional anesthesia.[70,71]