

PROTOCOL FOR:     Pneumatic Tourniquet Safety

- POLICY:
1. The correct surgical site will be verified prior to final configuration of room set-up and application of a pneumatic tourniquet cuff.
  2. The perioperative nurse will assess the patient preoperatively for risks and report potential contraindications to the surgeon.
  3. The patient's skin integrity at the cuff placement site will be evaluated before and after use; alterations will be documented in the nursing record.
  4. Selection and placement of the tourniquet cuff will be determined by the patient's age, anatomy, and medical condition.
  5. The limb will be exsanguinated prior to inflation of the tourniquet; inflation pressure should be kept to the minimum effective pressure that will achieve hemostasis, as indicated by the patient's blood pressure and as prescribed by the physician.
  6. Pneumatic tourniquet inflation time should be kept to a minimum and deflation managed to minimize risks to the patient. Inflation and deflation time as well as total duration will be documented in the medical record.
  7. Prophylactic antibiotics, when ordered, should be completely infused prior to inflation of the tourniquet cuff.
  8. Core body temperature will be monitored during use of the pneumatic tourniquet. Care will be exercised to avoid overheating the patient while the cuff is inflated, and to minimize decrease in core body temperature post-deflation of a lower limb tourniquet.
  9. Safety alarms will be operational at all times, with volume of audible alarms maintained at a level that will immediately alert staff of any problems.
  10. Only electronic pneumatic tourniquets are to be used; they will be inspected prior to use and removed if damaged or not working properly. If unit fails to work properly during operation, cuff and tubing must accompany the unit to Clinical Engineering.

A DESIRED  
PATIENT  
OUTCOME:

1. The patient will be free from injury to skin integrity related to tourniquet cuff placement.
2. The patient will be free from neuromuscular and vascular compromise at the cuff placement site and in the operative extremity.

CLINICAL  
ASSESSMENT  
AND CARE:

1. Assess skin integrity at widest circumference area of operative extremity.

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2. Determine circumference of widest circumference area of operative limb and select tourniquet cuff of appropriate length and width.
3. Protect skin beneath cuff through proper padding and by maintaining its dryness.
4. Reassess skin integrity at cuff site following removal of cuff.
5. Document cuff site, padding used, cuff size, personnel applying tourniquet, total inflation time, and tourniquet unit used in nursing record. Include cuff site skin assessment in preoperative and postoperative skin assessments, noting any problems.
6. Report to the surgeon any of the following:
  - skin abrasions, redness, burns, or any other sign of altered integrity
  - nerve deficits to affected extremity
  - failure of extremity to revascularize following cuff deflation

EQUIPMENT: Electronic pneumatic tourniquets  
Tourniquet cuffs, disposable and reusable, of varying lengths and widths

PROCEDURE:

<u>Action</u>	<u>Points of Emphasis</u>
1. Inspect the pneumatic tourniquet unit prior to use and confirm that cuffs and tubing are compatible with the tourniquet regulator and any other accessories.	1. Clinical Engineering performs required testing of electronic units, per manufacturer's recommendations.
2. Assess patient for considerations related to tourniquet use, such as: a. planned location of tourniquet cuff; b. relative contraindications (eg, extremity infection, open fracture, tumor distal to tourniquet, sickle cell anemia, impaired circulation, previous revascularization of extremity, extremities with dialysis access, venous thromboembolism, increased intracranial pressure, and acidosis); c. size and shape of extremity; d. condition of skin under and distal to the cuff site; and e. peripheral pulses distal to the tourniquet.	
3. Obtain cuff or selection of cuffs of proper length and width for the	3. As wide a cuff as possible with an overlap of 3" to 6" is ideal to avoid

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<u>Action</u>	<u>Points of Emphasis</u>
operative extremity. Use clean reusable or single-use cuffs. Cuffs and tubing should have no cracks or leaks, and closure mechanisms should be secure.	damage to underlying tissues. Too much overlap causes increased pressure; too small an overlap compromises effective inflation and may result in unexpected release or inadequate constriction. Pediatric cuffs should be used for children.
4. Inspect integrity of cuffs.	4. Discard any damaged cuffs; do not use soiled cuffs.
5. Obtain cast padding for wrapping of extremity beneath cuff site.	5. Cast padding protects skin and prevents maceration.
5. Place the cuff or confirm that the cuff is properly placed prior to performing the skin prep. Protect the cuff and padding from absorbing prep solutions.	5. The cuff should be positioned on the limb at the most proximal point of maximum circumference, in accordance with manufacturer's recommendations. Skin maceration and chemical burns may occur.
6. Assure that cuff is applied securely in its final position. If cuff position change is necessary, completely remove and reapply cuff	6. Moving a cuff while it is applied may cause shearing of underlying tissues and subsequent injury.
7. Position cuff tubing at or near the lateral aspect of the extremity to avoid pressure on nerves and kinking of tubing. Do not coil or kink tourniquet lines from cuff to unit.	7. Coiling and kinking compromise functioning of tourniquet inflation.
8. Place unit so it is clearly visible during inflation and near anesthesia care provider whenever possible.	8. Label cords / units if more than one is being used, to eliminate confusion.
9. Notify surgeon of total inflation times at 60, 90, 105 and 120 minutes. Upon reaching 120 minutes, deflation of the cuff for a minimum of 15 minutes prior to reinflation is desirable.	9. Coordinate deflation and inflation with surgeon. Inflation times for pediatric patients should be less (e.g. 75 minutes maximum).
10. Assess patient's skin integrity after removing and document any alterations or compromises.	10. Postoperative assessments may continue throughout the perioperative phase and beyond, and should include attention to potential damage to nerves and vessels.
11. Include in hand-off reports any information regarding issues or concerns related to pneumatic tourniquet use.	

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APPROVAL:         Nursing Standards Committee

EFFECTIVE DATE:   12/90

REVISION DATES:   5/93, 9/97, 6/03, 2/08, 8/09