



Performance Standard		7305
Effective April 1, 2018	Expires March 31, 2019	
Category I Skill – Low Frequency/High Risk: Needle Chest Decompression	Approval: Medical Director Reza Vaezazizi, MD	Signed
Applies To: PM, MICN, BHP, EMS System	Approval: REMSA Director Bruce Barton	Signed

Terminal Performance Objective

Relieve intrathoracic pressure due to tension pneumothorax to improve cardiac output, ventilation and oxygenation.

Prior to Needle Chest Decompression

Assess the patient

- Be suspicious of tension pneumothorax in the context of known or suspected torso trauma
- Be suspicious of spontaneous tension pneumothorax
- Be suspicious of tension pneumothorax during prolonged artificial ventilation
- Must have signs of compromised cardiac output (i.e. hypotension, hypoxemia, etc.)

Recognize and differentiate the signs and symptoms of tension pneumothorax:

- Hypotension
- Chest pain
- Air hunger
- Respiratory distress
- Tachycardia
- Neck vein distension
- Tracheal deviation away from the side of the injury
- Unilateral absence of breath sounds
- Elevated hemithorax without respiratory movement
- Cyanosis (late manifestation)

Treat hypoxemia and inadequate ventilation:

- Position the patient as clinically indicated to meet physiologic requirements
- Assist breathing as clinically indicated:
 - Give only sufficient volume to cause chest rise
 - Monitor the manometer during bag-valve-mask (BVM) ventilation
- Use minimum titratable oxygen to reach 95% SpO₂

Recognize and correct confounding factors:

- Occlusive dressing of open pneumothorax
- Misplaced endotracheal tube

Confirm the indication for unilateral needle chest decompression:

- Signs and symptoms of tension pneumothorax with compromised cardiac output AND rapidly progressing respiratory distress unrelieved by less invasive means

Confirm one of the indications for bilateral needle chest decompression:

- Cardiac arrest with known/suspected torso trauma
- Cardiac arrest with a presentation suggesting spontaneous pneumothorax

Assemble equipment required for needle chest decompression

Identify and aseptically mark the appropriate side(s), approach(es), and insertion site(s):

- Left, right, or bilateral
 - The side(s) requiring needle chest decompression
- Anterior approach:
 - Second intercostal space at the midclavicular line immediately above the third rib (2 ICS @ MCL)
 - Third intercostal space at the midclavicular line immediately above the fourth rib (3 ICS @ MCL)
- Anterolateral approach:
 - Fourth intercostal space at the anterior axillary line immediately above the fifth rib (4 ICS @ AAL)
 - Fifth intercostal space at the anterior axillary line immediately above the sixth rib (5 ICS @ AAL)
- Lateral approach:
 - Fourth intercostal space at the midaxillary line immediately above the fifth rib (4 ICS @ MAL)
 - Fifth intercostal space at the midaxillary line immediately above the sixth rib (5 ICS @ MAL)

Note: Inability to positively identify the insertion site is a contraindication to needle chest decompression.

Prepare the insertion site:

- Use aseptic technique
- Swab the site with alcohol, povidone iodine, and/or Chloraprep
- Confirm use of the clinically indicated personal protective equipment (PPE)
- Remove the Luer lock or slip tip fitting from the end of the IV needle-catheter set
 - Alternatively attach a syringe partially filled with Normal Saline

Needle Chest Decompression

Perform needle chest decompression:

- Insert the IV needle-catheter set at a 45° angle, bevel up, just superior to the inferior rib
- Advance the IV needle-catheter set into the intercostal space while rapidly transitioning to a 90° angle
- Advance the needle-catheter set through the parietal pleura while listening for a rush of air
 - Alternatively while watching for a rush of bubbles in the partially filled syringe
- If air is released:
 - Withdraw the needle while leaving the catheter in place
 - Secure the catheter using bandages and tape
 - Reassess signs and symptoms of tension pneumothorax
 - Monitor patency of catheter
- If air is not released:
 - Advance the needle-catheter set up to approximately 5 mm and stop
 - Withdraw the needle-catheter set and dress the insertion site with a petrolatum gauze dressing
 - Reassess signs and symptoms of tension pneumothorax
 - Monitor for iatrogenic pneumothorax

Note: If air is released and signs and symptoms improve this indicates temporary relief of the tension pneumothorax. Repetition of the procedure may be indicated.

Note: If air is not released repetition of the procedure may be indicated.

Critical Success Targets

- Improved cardiac output; including return of pulses, improved skin color, improved BP, improved level of consciousness
- Chest rise and fall with each breathe or ventilation
- SpO₂ of 95%
- Improved PETCO₂

System Benchmark

The percentage of patients with improved tissue perfusion, ventilation and oxygenation following needle chest decompression.

Applicable Protocols

Treatment protocols [4302 - Traumatic Injuries](#), [4406 - Cardiac Arrest](#), and any other policy authorizing needle chest decompression.

Competency & Proficiency Standards

- Team leadership, patient safety, and use of diagnostic tools
- Respiratory anatomy, physiology, and pathophysiology
- Assessment of airway, breathing, and circulation
- Differentiation between adequate and inadequate breathing/ventilation
- Auscultation and diagnostic differentiation of lung sounds
- Differentiation between a simple pneumothorax and a tension pneumothorax
- Needle chest decompression indications and contraindications
- The procedure for needle chest decompression

Equipment Requirement

The following required equipment is included in the REMSA Drug and Equipment List:

- Hand Sanitizer
- Multiple-Use Eye Protection
- Respiratory Protection
- Barrier Garment
- Medical Exam Glove
- Stethoscope
- Monitoring and Resuscitation Equipment
- Alcohol, Povidone Iodine, and/or Chloraprep Swab
- Syringe and Hypodermic Needle
- Normal Saline 0.9% — 10 mL Prefilled Syringe or Vial
- 3.25 inch 14 g IV Catheter(s) for Needle Chest Decompression
 - 3.25 inch 16 g IV Catheter(s) for Needle Chest Decompression (optional)
- 1.75-2 inch 18 g IV Catheter(s) for Needle Chest Decompression
- Portable Sharps Container
- Gauze Sponge, Pad, Bandage, and/or Dressing
- Tape
- Petrolatum Gauze Dressing
- Biohazard Bag
- Waste Bag

Instructor Resource Materials

1. Advanced Trauma Life Support, 9th Edition
2. Prehospital Trauma Life Support 7th Edition
3. NHTSA EMS Educational Instructor Guidelines for EMT and Paramedic

Validation of Needle Chest Decompression

PERFORMANCE CRITERIA: 100% accuracy required on all items marked with an *

Before performing needle chest decompression, the paramedic must:

Points	Score	Performance Steps	Additional Information
1		Use standard, contact, and droplet precautions	Personal protective equipment includes: multiple-use eye protection, respiratory protection, barrier garment, and medical exam gloves
1		Assess the patient	<ul style="list-style-type: none"> • Be suspicious of tension pneumothorax in the context of known or suspected torso trauma • Be suspicious of spontaneous tension pneumothorax
1		Recognize and differentiate the signs and symptoms of tension pneumothorax *	<ul style="list-style-type: none"> • Chest pain • Air hunger • Respiratory distress • Tachycardia • Hypotension • Tracheal deviation away from the side of the injury (late manifestation) • Unilateral absence of breath sounds • Elevated hemithorax without respiratory movement • Neck vein distension • Cyanosis (late manifestation)
1		Treat hypoxemia and inadequate ventilation *	<ul style="list-style-type: none"> • Position the patient as clinically indicated to meet physiologic requirements • Assist breathing as clinically indicated: <ul style="list-style-type: none"> ○ Give only sufficient volume to cause chest rise ○ Monitor the manometer during bag-valve-mask (BVM) ventilation • Use minimum titratable oxygen to reach 95% SpO₂
1		Recognize and correct confounding factors *	<ul style="list-style-type: none"> • Tension pneumothorax due to occlusive dressing of open pneumothorax • Misplaced endotracheal tube
1		Confirm the indication for needle chest decompression *	<p>Unilateral:</p> <ul style="list-style-type: none"> • Signs and symptoms of tension pneumothorax with rapidly progressing respiratory distress unrelieved by less invasive means with s/s compromised cardiac output <p>Bilateral:</p> <ul style="list-style-type: none"> • Cardiac arrest with known/suspected torso trauma • Cardiac arrest with a presentation suggesting spontaneous pneumothorax
1		Assemble equipment required for needle chest decompression	<ul style="list-style-type: none"> • Hand Sanitizer • Multiple-Use Eye Protection • Respiratory Protection • Barrier Garment • Medical Exam Glove • Stethoscope

(cont.)	(cont.)	(continued)	<ul style="list-style-type: none"> • Monitoring and Resuscitation Equipment • Alcohol, Povidone Iodine, and/or Chloraprep Swab • Syringe and Hypodermic Needle • Normal Saline 0.9% — 10 mL Prefilled Syringe or Vial • 3.25 inch 14 g IV Catheter(s) for Needle Chest Decompression <ul style="list-style-type: none"> ○ 3.25 inch 16 g IV Catheter(s) for Needle Chest Decompression (optional) • 1.75-2 inch 18 g IV Catheter(s) for Needle Chest Decompression (optional) • Portable Sharps Container • Gauze Sponge, Pad, Bandage, and/or Dressing • Tape • Petrolatum Gauze Dressing • Biohazard Bag • Waste Bag
1		Identify and aseptically mark the appropriate side(s), approach(es), and insertion site(s) *	<p>Left, right, or bilateral</p> <ul style="list-style-type: none"> • The side(s) requiring needle chest decompression <p>Anterior approach:</p> <ul style="list-style-type: none"> • Second intercostal space at the midclavicular line immediately above the third rib (2 ICS @ MCL) • Third intercostal space at the midclavicular line immediately above the fourth rib (3 ICS @ MCL) <p>Anterolateral approach:</p> <ul style="list-style-type: none"> • Fourth intercostal space at the anterior axillary line immediately above the fifth rib (4 ICS @ AAL) • Fifth intercostal space at the anterior axillary line immediately above the sixth rib (5 ICS @ AAL) <p>Lateral approach:</p> <ul style="list-style-type: none"> • Fourth intercostal space at the midaxillary line immediately above the fifth rib (4 ICS @ MAL) • Fifth intercostal space at the midaxillary line immediately above the sixth rib (5 ICS @ MAL) <p>Note that the inability to positively identify the insertion site is a contraindication to needle chest decompression.</p>
1		Prepare the insertion site	<ul style="list-style-type: none"> • Use aseptic technique • Swab the site with alcohol, povidone iodine, and/or Chloraprep • Confirm use of the clinically indicated personal protective equipment (PPE) • Remove the Luer lock or slip tip fitting from the end of the IV needle-catheter set <ul style="list-style-type: none"> ○ Alternatively attach a syringe partially filled with Normal Saline

While performing needle chest decompression, the paramedic must:

1		Perform needle chest decompression *	<ul style="list-style-type: none">• Insert the IV needle-catheter set at a 45° angle, bevel up, just superior to the inferior rib• Advance the IV needle-catheter set into the intercostal space while rapidly transitioning to a 90° angle• Advance the needle-catheter set through the parietal pleura while listening for a rush of air<ul style="list-style-type: none">○ Alternatively while watching for a rush of bubbles in the partially filled syringe• If air is released:<ul style="list-style-type: none">○ Withdraw the needle while leaving the catheter in place○ Secure the catheter using bandages and tape○ Reassess signs and symptoms of tension pneumothorax○ Monitor patency of catheter• If air is not released:<ul style="list-style-type: none">○ Advance the needle-catheter set up to approximately 5 mm and stop○ Withdraw the needle-catheter set and dress the insertion site with a petrolatum gauze dressing○ Reassess signs and symptoms of tension pneumothorax○ Monitor for iatrogenic pneumothorax
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Critical Failure Criteria

- ___ Failure to use standard, contact, and droplet precautions
- ___ Failure to recognize and differentiate the signs and symptoms of tension pneumothorax
- ___ Failure to treat hypoxemia and inadequate ventilation
- ___ Failure to recognize and correct confounding factors
- ___ Failure to confirm the indication for needle chest decompression (must have compromised cardiac output)
- ___ Failure to identify and aseptically mark the appropriate side(s), approach(es), and insertion site(s)
- ___ Failure to prepare the insertion site
- ___ Failure to perform clinically indicated needle chest decompression
- ___ Failure to reassess and monitor
- ___ Any procedure that would have harmed the patient