Thoracentesis

1. **Purpose**
   a. **The purpose of thoracentesis is to remove air or fluid from the pleural space, thereby improving ventilatory function. Emergency closed chest needle aspiration in the child may be required for relief of symptoms due to tension pneumothorax**
   b. **Pneumothorax, when under tension, represents a life threatening emergency and thoracentesis must be corrected immediately.**
2. **Patient Criteria**
   a. **Symptoms of a tension pneumothorax include tachypnea, grunting, retractions and in severe cases, bradycardia, cyanosis and shock. Clinical signs may include: abrupt worsening of the respiratory or circulatory status, hypotension, bradycardia or tachycardia, bulging of the effected hemithroax, mediastinal displacement to the opposite side with shift in cardiac impulse and heart tone, absent or reduced breath sounds on the affected side.**
   b. **Tension pneumothorax may complicate trauma resuscitation or positive-pressure ventilation. It should be suspected in the victim of blunt trauma or in any intubated patient who deteriorates suddenly during positive-pressure ventilation. As pressure builds within the chest, the extraordinary mobility of the pediatric mediastinum results in extreme mediastinal shift, with resultant compromise in venous return, cardiac output, and air entry.**
   c. **Treatment of tension pneumothorax consists of immediate decompression. This should be done without confirmatory chest x-ray since delay can be fatal.**
3. **Equipment**
   a. **ECG / O2 saturation monitors in place with alarms on.**
   b. **Povidone – iodine**
   c. **30 cc syringe**
   d. **#14 to #18 gauge intracath**
   e. **3-way stopcock**
   f. **IV extension tubing**
   g. **Heimlich valve**
   h. **Tape**
4. **Preparation of Equipment and Patient**
   a. **Connect the 3-way stopcock and syringe to IV extension tubing. Turn the stopcock "off" to the remaining outlet (off to the atmosphere)**
   b. **Prepare sterile intracath and open Povidone swabs**
   c. **Position the child supine with affected side slightly elevated**
   d. **Restrain child's arms and legs**
   e. **Prep area with Povidone Iodine**

f. Locate nipple, sternum, and fourth and fifth intercostal space (ICS) midaxillary. Enter the 4th or 5th ICS with intracath pointed toward opposite shoulder. Enter just above the ribs. Or enter second ICS just above third rib midclavicular. Steady the needle in this position and remove needle guide
g. Attach IV extension tubing with 3-way stopcock and syringe to the hub of the intracath. Pull syringe to aspirate air. Turn the stopcock off to the patient and expel air from the syringe. Repeat process until resistance is encountered
h. As you are aspirating air, observe child's heart rate. Listen for improvement in breath sounds. When no more air is obtained with aspiration, turn 3-way stopcock off to the patient
i. Tape the intracath in place and attach Heimlich valve to IV extension tubing. If air reaccumulates, continue to aspirate air from chest until a chest tube is inserted
j. Obtain a chest radiograph as soon as possible
k. Observe child's respiratory status, (color, rate, effort) before, during, and after procedure

5. Documentation
   a. Upon stabilization of child, document procedure, signs manifested, site of puncture, amount withdrawn, vital signs before and after procedure, status after procedure, and any complications
   b. All documentation during transport will be completed on the Transport Record