



Paediatric Intensive Care unit Nursing Procedure: Care of Chest Drains

Clinical reasons for insertion

- Pleural effusions
- Pneumothorax
- Tension Pneumothorax

The diagnosis of an intrapleural collection of fluid, pleural effusion or a pneumothorax can be made during a physical examination or a radiological approach.

Pleural Effusion,

"Pleural fluid accumulates because of a change in the balance between hydrostatic and colloid osmotic pressures between the parietal pleura space, or the pleural space and the visceral pleura or both"

Pneumothorax

"A pneumothorax is a collection of air or gas in the pleural space that may occur spontaneously, but more frequently results from trauma to the parenchyma"

Tension Pneumothorax

"A tension pneumothorax exists when air enters the pleural space at such a rate that the pressure in the pleural space increases enough to produce circulatory and ventilatory impairment"

Tension pneumothorax is a life threatening condition detected by visible physical signs

- 1 Engorgement of head and neck veins
- 2 Hyper-resonance of the affected side
- 3 Changes in physiological signs such as shallow breathing, cyanosis, haemorrhage and chest pain.

Insertion of Chest Drains

Prior to procedure:-

Ensure that the child and family are adequately prepared for the procedure (age appropriate), why it is being performed and what it entails and then that their understanding is sufficient.

Ensure that the child has adequate sedation and analgesia. if the child is ventilated, ensure that the endotracheal tube is secure.

The doctor performing the procedure will decide on the insertion site but it is usually the fifth intercostal space in the mid – axillary line on the side with the pneumothorax.

Equipment needed prior to insertion of Drain

This is a sterile procedure:

Clean trolley

- 1 Chest Drain Clamps(at least two)
- 2 Chest drain of appropriate size (8 French – 14 French guide sizes only)
 - use smaller size for draining air
 - larger size for draining blood/fluid

- * Newborn 8-12FG
- * Infant 12-16 FG
- * Child 16-24 FG
- * Adolescent 20-32 FG

- 3 Chest drain bottle
- 4 Curved and straight forceps
- 5 Dressing pack(cut down pack may be most appropriate)

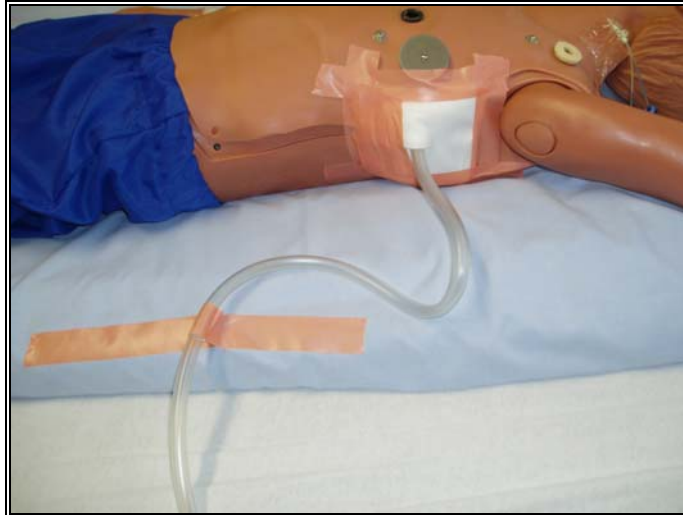
- 6 Iodine solution
- 7 Local anaesthetic – 1% lidocaine, syringe + small needle
- 8 Low level suction pressure
- 9 Scalpel
- 10 Silk sutures size 2.0 and upwards (straight sutures)
- 11 Sterile water for chest drain bottle (equate to zero)
- 12 Sample containers, if required.
- 13 Appropriate dressing, gauze squares, sleek



Once the procedure is done and the chest drain is secured a chest x-ray must always be taken.

Care of Chest Drain

- 1 Secure loosely to bed with clamps or tape to allow safe movement of patient, always ensure spare clamps are in the bedspace in case of emergencies
- 2 Ensure that the losses are recorded efficiently and correctly.
- 3 Ensure that the drain remains patent, and that suction is at the correct level.
- 4 Keep below waist level.
- 5 Following the initial blood loss, a drainage of 1-3mls/hr can be expected.



Losses

Monitor closely the levels of losses, this may need to be replaced with IV fluids/blood products if the losses are greater than 3mls/kg/hr and if requested by medical personnel. More than 3mls/kg/hr for three consecutive hours is excessive and may indicate post operative haemorrhage

Suction Pressures (if required)

If there is a persistent leak or a large collection of fluid, continuous suction may be applied to enhance drainage and to extract air from the pleural space to restore a negative pressure. The suction can be applied through some of the drainage units, through an independent suction pump or via **low** pressure piped suction. High levels of suction should be avoided as this can lead to damage of the lung tissue and perpetuate existing air leaks. The most common amounts of pressure used are 3kpa-5kpa (Avery 2000) or 20cm H₂O.



Clamping and Milking of Drains

Drains should only be clamped when changing bottles or after accidental disconnection. Drains should not be clamped for transfer of patients to other wards. They should be hung on the bed securely for transfer and the nurse carry a clamp in case of disconnection. Milking and stripping are no longer advised.

Changing drainage tubing and bottles

Equipment

- 1 Sterile drainage bottle (90cc's or 2000cc's)
- 2 Sterile water
- 3 Two pairs of blunt chest drain clamps
- 4 Chlorahexidine Gluconate 0.5%
- 5 Sterile tubing

Procedure

- 1 Explain to patients and family the procedure that is going to take place, ensure that emergency equipment is in place.
- 2 Wash hands, place on gloves.
- 3 Prepare drainage bottle by adding sterile water to equate it to zero. If tubing is to be changed, attach clean tubing in preparation.
- 4 Take equipment to bedside
- 5 Clamp the pleural drain using both clamps, one at the top of the drain and one close to the bottle
- 6 Remove the chest drain tubing from underwater seal bottle and replace with clean bottle
- 7 Remove the clamps
- 8 Ensure that there is movement of the fluid from the drainage bottle
- 9 Ensure that the patient is comfortable and pain free.
- 10 Clear bedspace and dispose of equipment in appropriate way
- 11 Observe and record vital signs and report any changes in patient.

Removal of Chest Drain

Equipment

- 1 Sterile dressing pack
- 2 0.9% Sodium Chloride
- 3 Surgical Gloves
- 4 Stitch Cutter
- 5 Occlusive dressing such as Tegaderm DO NOT USE SLEEK

Procedure

- 1 Explain and discuss with patient and family, ensure they understand
- 2 Wash hands using aseptic technique, gloves and Alco gel

- 3 Prepare area and equipment, ensure that emergency equipment is to hand
- 4 Remove old dressing, clean area
- 5 Cut stitches, holding drain in place
- 6 Ventilated patient – bag and hold on the inspiration phase
- 7 Non ventilated patient – ask patient to hold breath in (if able), while carrying out procedure
- 8 Pull drain out steadily and quickly
- 9 Place occlusive dressing over wound. Ensure that the wound site is fully covered and secured safely.
- 10 Tell patient to breath normally again, ventilated patient – reconnect to ventilator.
- 11 Clear bed space and wash hands
- 12 Measure collected fluid and document
- 13 Monitor site for oozing and patient for changes in condition.

Complications from Chest Drains

- 1 Recurrent Pneumothorax caused by movement of atmospheric air into the pleural cavity.
- 2 Tissue necrosis around site of stitches.

Problems with Chest Drains

Problem	Reason	Solution
1) Lack of drainage	Kink or loop in tubing, system may be clamped	Clear tubing system and straighten. Remove any clamps that do not need to be there.
2) No movement of fluid in underwater seal	Re-expansion of lung Tubing is kinked Suction apparatus not working	Report finding to medical staff, follow procedure to remove drain if needed Straighten tubing Disconnect suction, ensure that drain is patent
3) Constant bobbing of fluid in the drain bottle	An air leak in the system	Clamp drain momentarily and establish if leak in system. DO NOT leave clamped for long as could cause a pneumothorax.
4) Patient shows rapid deterioration	? tension pneumothorax	Report to medical staff immediately, observe and record observations. administer oxygen

5) Accidental disconnection of tubing from drain		Apply clamps immediately to avoid air entering patient. Reconnect as soon as possible. Report to medical staff. An X-ray may be requested.
6) Drain falls out		Cover wound site IMMEDIATELY with occlusive dressing, this should be in the bed space incase of emergency. Drain may have to be reinserted.
7) Pain	Provide regular analgesia Monitor Pain score and report if analgesia is not adequate.	Re-evaluate whether appropriate analgesia

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References,
Trigg,E & Mohammed,T(2006) Practices in Childrens Nursing
Guidelines for hospital and community, Churchill Livingstone

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