

MANAGEMENT OF CARDIAC TAMPONADE

Definition: cardiac tamponade is compression of the heart produced by accumulation of fluid under pressure in the confined space of the pericardial sac.

Aetiology: in neonatal practice tamponade may occur following thoracic or cardiac surgery or secondary to infectious pericarditis. However, more commonly it is the result of perforation of the cardiac wall as a complication of central venous line (CVL) replacement.

Pathophysiology: pressure in the pericardial space increases exceeding the intracardiac pressure resulting in decreased filling and a reduced cardiac output. The rise in ventricular end diastolic pressure produces systemic and pulmonary venous congestion.

History and Examination:

Have a high index of suspicion in a rapidly deteriorating infant with a CVL.

- a) Initially a lowered systolic BP with a narrowed pulse pressure and tachycardia, followed by a falling mean arterial pressure and bradycardia.
- b) Muffled heart sounds, poor peripheral perfusion.
- c) Distended neck veins and rising central venous pressure.

Slow accumulation of TPN in the pericardial sac may be surprisingly well tolerated initially and the diagnosis may be made from a routine chest x ray showing an unexpected widening of the mediastinal shadow. However, in a symptomatic patient do not delay by gaining a chest x ray to confirm the diagnosis. It is easy to demonstrate a pericardial effusion on echocardiography and this rapid investigation may be extremely useful in an infant whose acute deterioration you are unable to understand.

Management: In a symptomatic infant standard resuscitative measures will be in progress: **A**irway, **B**reathing and **C**irculation. However, move rapidly on to subxiphoid pericardiocentesis once cardiac tamponade is confirmed or strongly suspected.

PERICARDIOCENTESIS

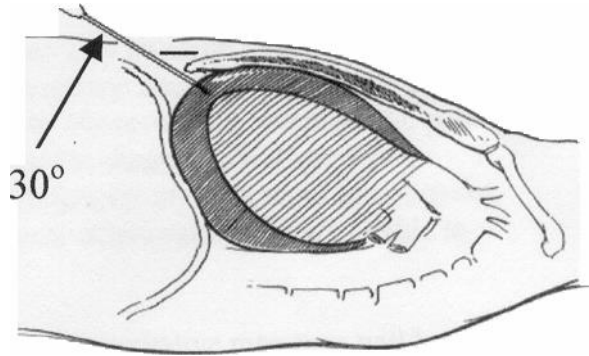
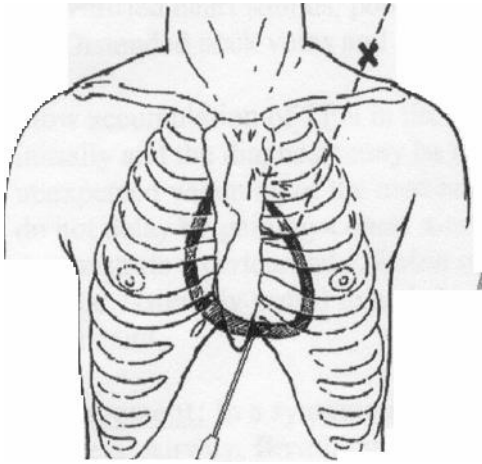
Minimum equipment:

- ECG monitoring
- Skin prep (chlorhexidine 0.5% in 70% alcohol) and surgical drapes
- Local anaesthetic (1% lignocaine, 0.2 ml/kg maximum dose), 1ml syringe and 25G (orange) needle for infiltration
- 10 ml syringe
- 20G (pink) cannula

Procedure:

- Swab xiphoid and subxiphoid areas with surgical prep
- If time permits sterile drapes and local anaesthesia
- Attach the 10 ml syringe to the cannula
- Puncture the skin just to the left of the xiphoid process
- Advance the cannula at a 30° angle to the skin in a line aiming just medial to the left shoulder tip (see figures). Aspirate all the time.
- If during the procedure the cannula needle is advanced too far (into the myocardium), blood will be aspirated and ECG changes observed e.g. ST elevation, wide QRS complexes. If the needle is withdrawn slowly the ECG will normalise and a further attempt at aspiration can be tried without ill effect.

- In the case of TPN tamponade once the pericardium is entered lipid is aspirated. The cannula can be advanced removing the needle and for further aspiration of fluid (often 10-20 ml) a three-way tap may be attached.
- Fluid should be sent for culture and biochemical analysis including lipids.



- Clinical recovery is dramatic and the cannula should be removed straight away.
- In a severely ill infant a CVL may be lifesaving and its removal is not strictly necessary following tamponade. However, the line needs to be withdrawn and the correct position of the tip confirmed on X-ray.
- The baby should be observed for further signs of tamponade.

NB. Pericardiocentesis may be life saving but correct central line placement should make this procedure almost redundant in neonatal practice (see policy for insertion of central catheters).

Cerebral Ultrasounds

Guidelines to perform a cerebral ultrasound

Date amended: 20th, February 2003 HR

Next review: 03/04

Indications for cerebral ultrasound

- ❖ All infants equal or < 32 weeks gestation
- ❖ All infants with intrauterine growth retardation admitted to UNIT or PRH SCBU
- ❖ All infants with history consistent with hypoxic ischemic insult
- ❖ Time scheduled
 - Day 1 (if baby is stable)
 - Day 3-5
 - Day 7, 14, 28, term or at discharge

Practical procedure:

1. Warm up a small amount of ultrasound gel in incubator, switch on machine and clean transducer with Cutan wipes. Make sure that the program paediatric/cerebral is selected. If not, press "scan head" to select.

2. Press “patient data” and type in patient’s surname, first name, your initials and patient K number.
3. Adjust the focal zone to maximum depths by using the switch focus. The green dot on the transducer probe corresponds to the left/right marker on the screen. The green marker should be directed to the right ear of the patient for the coronal sections, so that the printed image will be an anatomically correct view. For sagittal/parasagittals sections the green marker should direct to the patient’s nose. Please do not forget to mark all views with RT for right and LT for left.
4. Quality demands for ultrasound image:
 - ❖ The images should be symmetrical about the midline.
 - ❖ The depth control should be adjusted for each image to ensure that the whole of the brain is included with optimum magnification, so that the image fills the screen. The lower border must include the skull bones.
 - ❖ Appropriate depth, gain (power) and slope (time gain curve) settings should be used to produce a uniform echo pattern in the near and far fields.
 - ❖ The complete cerebral ultrasound examination should comprise of 12 sections (see figures below). In some circumstances, more images might be useful and in others (eg following progress of ventricular dilatation) fewer images might be sufficient.
 - ❖ The sections 1 to 11 can be obtained with 7.5 sector transducer. For section 12, which is used to determine the size of the extracerebral CSF space, the linear transducer is required. A small intrusion depth should be used.
 - ❖ Document your findings on the respective sheets in the patient’s notes and update the cranial ultrasound diagnosis on NIMS. Apart from obtaining the printout of the sections in future recording on video could be used. These can then be reviewed in the weekly teaching sessions.