



PERICARDIOCENTESIS – A UNIQUE BLIND METHOD ADOPTED IN THE DEPARTMENT OF CARDIOLOGY, SILCHAR MEDICAL COLLEGE AND HOSPITAL

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ABSTRACT

Background – Pericardiocentesis is not without complication even with conventional (gold standard) echocardiography/ultrasound guidance. In order to overcome these complications, many methods with advanced pericardiocentesis kits are adopted in many centres. Sometimes, in dire emergency of cardiac tamponade, the help of 2 D echocardiography or Fluoroscopic guidance in cathlab can not be awaited. Also, longer duration of aspiration is preferred to avoid re-accumulation. Many commercially available pericardiocentesis kits are used which may be either too costly or difficult to avail, particularly in those hospitals catering BPL (below poverty line) category patients. **Aims And Objectives** – Keeping this in mind, we started this method in our college hospital, as a safe, cheap and affordable alternative to many guided costly techniques. This study is in progress since 2009. More than 300 patients have been enrolled till date. **Material and methods** – After thorough evaluation of the patient in the echocardiography laboratory, the patient is prepared in the ICCU with a crash cart trolley ready with defibrillator and temporary pacing set. Overhead monitor and IV line are started. With good aseptic and antiseptic precaution and under 2% xylocaine anesthesia, a niche is made in the subxiphoid space, just below the inferior angle of xiphisternum. The permanent lead introducer (PLI) needle is then guided into the pericardial sac with saline filled 10ml/20ml syringe. Once free flow of fluid is confirmed, the radial artery guide wire is inserted into the pericardial sac. The PLI needle then removed and over the guide wire the radial sheath is now negotiated into the sac. The guide wire is now removed and a 5-6F feeding tube (Ryle's Tube) is pushed into the sac. The sheath is now withdrawn over the tube and fluid aspiration is continued via the feeding tube. Patient monitoring is continued. The tube is anchored in the subxiphoid space with a stay suture. **Result And Observation** – This method has been conducted on cases of cardiac tamponade, symptomatic massive pericardial effusion (>20mm). Except two major (pericardial decompression syndrome) and few minor complications (vasovagal hypotension), no additional major complications has been encountered till date. **Conclusion** – the procedure is safe, easy, cheap and comfortable. It can be performed in any ICCU setting with a standby defibrillator and temporary pacing set.

KEYWORDS

Pericardiocentesis, pericardial effusion, cardiac tamponade, permanent pacemaker lead Introducer needle, radial arterial sheath, radial arterial guide wire and defibrillator.

INTRODUCTION:-

Cardiac tamponade is a life threatening condition requiring urgent therapeutic pericardiocentesis. Other moderate to massive (>20mm) symptomatic pericardial effusion require pericardiocentesis for therapeutic and diagnostic indications. Starting in 1653, when Riolanus suggested sternal trephination for relieving pericardial pressure, centuries have elapsed in the evolutionary trajectory of a safe method for pericardiocentesis. Schuh in 1840 did the first blind percutaneous drainage without an incision on chest wall. In 1911, Marfan opened up the historical gate way – the subxiphoid approach for blind pericardiocentesis. This approach has a morbidity and mortality risk 60% and 6% respectively. Though surgical pericardiocentesis which requires general anaesthesia (having little higher mortality and longer stay at hospital) was practiced simultaneously, the search for safer percutaneous method continued. Bishop in 1956, started ECG guided pericardiocentesis which was a potentially dangerous technique. Pericardiocentesis using M-mode echocardiography was reported in 1977 by Chandraratna et al. In 1979, Mayo Clinic paved the revolutionary approach of the modern gold standard method of USG guided pericardiocentesis. The USG guides the needle trajectory to the safest port of the pericardial sac.

Fluoroscopy guided pericardiocentesis technique first reported in 1992 is still in use in different centres. But, radiation and availability of Cathlab or a C-ARM with IITV monitor are big hindrances. CT guided pericardiocentesis is in use from 2005. This safe technique needs availability of a CT machine. Radiation exposure is another hazard. Though Fagan in 1999 cautioned in the editorial of the journal CHEST 'blind no more', we in 3rd world countries are loaded with BPL category patients in hospitals not equipped with different imaging

modalities. The nightmare of unavailability of a bed side echocardiography machine in acute crisis of cardiac tamponade, keep ways open for a safer blind percutaneous technique (like the blind temporary pacing in dire situation of uncontrolled Stokes Adams Attack).

MATERIAL AND METHOD

Study Design and Population – this ongoing study started in August 2009 with venous sheath – Seldinger Needle with sheath (available those days in St. Jude temporary pacing set) is still continued with this modified technique under discussion. More than 300 cases (47% females, 53% males), mean age of the study population was 48(+/-)24 years, have been included with prior written consent. This is a single centre, hospital based, prospective observational study, conducted after receiving approval from the institutional ethical committee in accordance with Helsinki Declaration.

All cases with cardiac tamponade (85%) and large symptomatic effusion (15%) were included. Patients who declined to sign the informed consent (2 cases till now) were excluded. Mild to moderate effusions (<20mm) were excluded from the study. No case of uncorrected coagulopathy or cases on anticoagulant therapy were found during the study period.

Study methodology - For safer blind or USG guided/fluoroscopy guided pericardiocentesis many commercially available kits are used, e.g. – PERIVAC (Boston Scientific, Figure below), Pericardiocentesis kit (Merit Medical), Lock Pericardiocentesis Kit (Cook Medical) etc. In our study we are using very simple easily available instruments, - a radial arterial sheath with guide wire, a PLI needle, one 5-6F pediatric feeding tube (figure below). After thorough evaluation of the patient in

the echocardiography laboratory, the patient is prepared in the ICCU with a crash cart trolley ready with all resuscitative medications, a defibrillator, and a temporary pacing set. The patient is positioned in the bed 300 to the horizontal, IV line and bedside monitor are attached. Using 10% povidone iodine lotion, the lower part of the chest and upper part of the abdomen are cleaned. The area is draped with a cut sheet, with 2% xylocaine the area below the xiphisternum is anesthetised. A niche is made just below the inferior angle of the xiphisternum or between the xiphisternum and left costal margin. Now, the PLI needle with a saline filled syringe is held in a 15-300 angle to the abdominal wall, directed towards the left shoulder and slowly pushed into the pericardial sac. Once fluid is aspirated the needle is advanced slightly (~2mm). Syringe is removed and the radial guide wire is advanced into the sac. PLI needle is now withdrawn and the radial sheath is negotiated slowly into the sac over the guide wire. Fluid aspiration is reconfirmed. Now, the feeding tube is slowly pushed into the sac. Fluid aspiration continued. Fluid collected for cytological and biochemical analysis. Aspiration continued till JVP becomes flat or patient became symptom free. The tube is then anchored over the niche with a stay suture. In the beginning of the study, we used to do the procedure with femoral vein puncture needle (Seldinger needle with sheath), which used to come with St. Jude temporary pacing lead set. The needle is no longer available and the current needle is safer and more comfortable. Patient's hemodynamic is closely monitored. IV fluid continued.

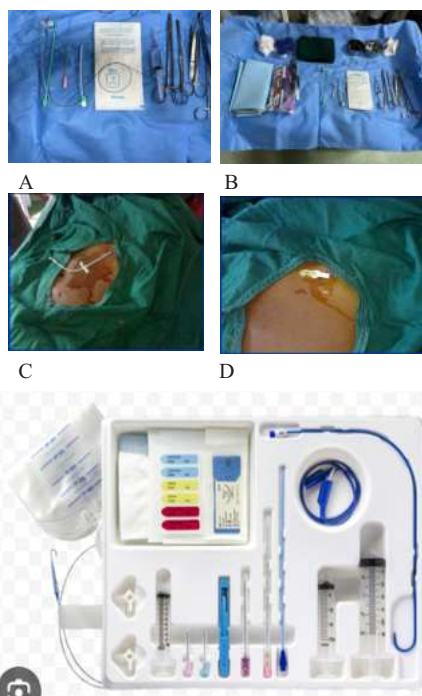


FIG - (A) OUR KIT, (B) OUR TRAY WITH INSTRUMENTS, (C) SHEATH WITHDRAWN (D) VENOUS SHEATH AND NEEDLE INSERTED IN ONE OLD PATIENT (E) PERIVAC KIT

Result and Observation :-

Major complications (0.3-3.9% reported in large series) including death, laceration of cardiac chambers/coronary arteries/intercostal vessels, puncture of abdominal viscera/peritoneal cavity, pneumothorax requiring intercostals drainage, severe bacteraemia were not encountered in the current series. 2 (0.66%) cases of transient VT was overcome by observation only. 2 (0.66%) cases of pericardial decompression syndrome were encountered in the early phase of the study between 6-12 hours of aspirations. One (0.33%) succumbed in spite of intubation and resuscitation, one recovered with immediate resuscitative treatment in the central ICU. Minor complications (0.4-20% reported in large series) like pneumothorax without hemodynamic instability and pleuro-pericardial fistulas were not seen. Transient vasovagal hypotension and bradycardia was encountered in 20 (6.67%) cases, treated with immediate measures by our team with fluid, atropine, lowering of head end of bed, CPR etc. 5 (1.67%) cases transient supraventricular arrhythmias (AF) were treated with observations only. Ryle's tube blockade was averted by repeated aspirations and occasionally instillation of small (2ml) heparinised saline.

STATISTICAL CONSIDERATION –

Statistical analysis was performed using SPSS for window version 22 (SPSS Inc., Chicago, IL). Continuous variables were expressed as mean value $\pm$ SD (standard deviation) and categorical variables were expressed as frequencies and percentages.

CONCLUSION –

Pericardiocentesis is a life threatening condition that carries a high risk of complications. In this regards imaging support and careful planning of entry site though are fundamental, in hospitals having dearth of search imaging modalities and in moribund patients (presenting with Becks Triad) where such modalities cannot be awaited, blind method has to be tried. Our kit is cheap, safe and affordable and can be judiciously used in any ICCU with a standby defibrillator and temporary pacing set.

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