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Case Report

Pericardiocentesis From Back Under Ultrasound Guidance An Approach for Posterior Pericardial Effusions

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ABSTRACT

Pericardial effusion (PE) remains an important cause of morbidity after cardiac surgery, and it can be life threatening when tamponade leads to hemodynamic compromise. Transthoracic echocardiography is the most important tool for diagnosis, grading, performing the pericardiocentesis procedure and follow up of post surgical pericardial effusions. The present case highlights the unique technique of posterior approach for pericardiocentesis for a post surgical effusion in the presence of a large left pleural effusion which otherwise would have required surgical drainage.

Key words: Pericardial effusion, Pericardiocentesis, Posterior approach, Echocardiography.

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INTRODUCTION

Pericardial effusion (PE) remains an important cause of morbidity after cardiac surgery, and it can be life threatening when tamponade leads to hemodynamic compromise. Postoperative PE may have its origins in a retained mediastinal clot, in pharmacological interactions (overdosage of anticoagulants), or in systemic or local inflammatory reactions to operative trauma. Postoperative PEs are more likely to develop in elderly patients affected by renal failure undergoing cardiopulmonary bypass and are more frequent after valve surgery than after coronary artery bypass grafting or concomitant valve/coronary artery bypass grafting.[1]

CASE REPORT

A 42-year-old man with rheumatic aortic stenosis, aortic regurgitation, severe mitral stenosis, moderate mitral regurgitation, severe pulmonary artery hypertension with atrial fibrillation, h/o seizures, normal coronaries, ejection fraction 64% was opearted at our institute. Double valve replacement was done with 20 mm medtronic ATS mechanical bileaflet aortic and 27 mm bileaflet mechanical prosthetic mitral valve under cardio pulmonary bypass. He presented six months later to the intensive care unit with h/o breathlessness and easy fatiguability. The patient had discontinued his antiepileptic medications and had a seizure. Labs revealed altered liver function tests with deranged INR of 6.8 for which he received FFP transfusions. The patient was found to have bilateral pleural effusions. A transthoracic echocardiogram demonstrated normal left ventricular ejection fraction, concentric hypertrophy of the left ventricle, no e/o prosthetic valve dysfunction, and preserved right ventricular function. A posterior-lateral ultrasound view showed a large left pleural effusion, a substantial loculated posterior pericardial effusion, and a prominent pericardial layer demarcating the 2 fluid-filled sacs (Figure 1).

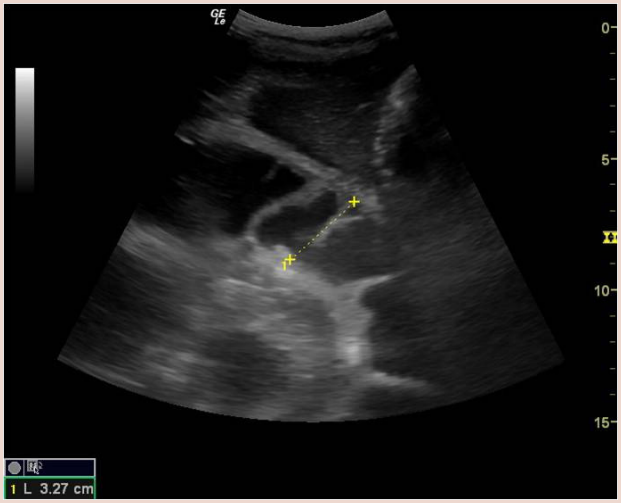

Figure 1: showing posterior lv wall with septated pericardial and left pleural effusion.

Urgent bedside pericardiocentesis was performed. Needle insertion corresponded to the area where the largest amount of fluid could be detected. The patient was placed in the sitting position with forward bending over a table for stabilization. After painting and draping the local site, local anesthesia to the skin was administered with 2% lidocaine. The procedure was performed by 2 physicians, 1 who performed the ultrasound and 1 who performed the puncture and drainage. Once placement and direction of the needle were chosen, the needle was connected to a syringe for constant gentle aspiration, and it was slowly introduced through the fourth intercostal space 4 cm medially to the left posterior axillary line until there was echographic visualization of the tip. When the pleural space was reached, agitated saline bubbles confirmed that the needle tip was in the pleural space. The needle was then advanced into the pericardial cavity under echocardiographic guidance and an emulsion of 5 mL of saline solution shaken with 1 mL of air was injected through the needle to verify the intrapericardial location . The syringe was then removed from the needle, and a curved guide wire was advanced into

the pleurapericardial sac. A multiple-hole, 30-cm-long catheter was subsequently introduced along the guide wire according to the Seldinger technique into the posterior pericardium. Serous-hemorrhagic fluid (350 ml) was drained from the pericardial cavity and, after retraction, serous fluid was aspirated from the left pleural cavity (a total of ≈700 mL), with consequent hemodynamic and respiratory improvement. After the procedure, chest radiography excluded the presence of pneumothorax, and the patient underwent noninvasive mechanical ventilation to restore aeration in atelectatic-consolidated lung. Apical 4-chamber echocardiographic view showed normal biventricular function. A light residual effusion was still present without extrinsic compression of the heart chambers. Pericardial fluid analysis showed no evidence of infection or malignancy. The postoperative evolution was progressively favorable and the patient could leave the intensive care unit 2 days later.

DISCUSSION

Pericardiocentesis is a technique widely used for therapeutic evacuation of PE, especially when cardiac tamponade occurs. Posterior PE is normally treated by surgery because of the difficulty in percutaneous drainage. This case reports the technique of " pericardiocentesis from posterior approach" performed under ultrasound guidance as an acceptable alternative to surgery in the unique situation characterized by the simultaneous presence of a large left pleural effusion. In the presence of a large left pleural effusion, pulmonary atelectasis and displacement of air-filled pulmonary tissue allows ultrasound transmission from the patient's back to the heart through a liquid interface and needle insertion "from back" to reach the pericardial space. Posterior pericardiocentesis must be performed by qualified physicians under ultrasound guidance. Ultrasound offers significant advantages: it can be rapidly performed at the bedside; it shows the location and entity of the effusions, helping to select the optimal pericardiocentesis entry site; and it allows the step-by-step guidance of the needle positioning in the pericardial and pleural cavities with immediate verification of procedural success. Without echo monitoring, complications associated with blind needle punctures may be cardiac wall perforation, hemopericardium, puncture of the coronary arteries, and liver and lung bleeding. Finally, echographic guidance for the posterior approach can help assess the left ventricular posterior wall and left atrium, localize the descending aorta, and differentiate PE from pleural effusion by clearly delineating the pleuropericardial border and by defining respiratory lung excursions.[2,3] If localization of the needle tip results are uncertain, opacification of the punctured cavity by an echographic contrast method allows the nature of this cavity to be instantly determined.

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