



ORIGINAL ARTICLE

Computed tomography-guided pericardiocentesis – A single-center experience



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KEYWORDS

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Abstract

Introduction and Objectives: Pericardial effusion is a common complication in clinical situations such as cardiothoracic surgery and cancer, in which pericardiocentesis may be essential. Pericardiocentesis can be guided by different imaging techniques, most commonly echocardiography. Computed tomography (CT) has significant advantages but there is still little evidence supporting its use in this context. In this work we describe our experience with CT-guided pericardiocentesis (CTP) in a single center.

Methods: Patients referred for CTP between August 2008 and February 2014 were retrospectively analyzed. We assessed demographics, etiology of the effusion, international normalized ratio during the procedure, radiation doses, success rate and complications. Results were compared with those in the literature.

Results: During this period, 51 procedures were performed, in 46 patients. Five patients underwent a repeat procedure due to recurrence of effusion. The most common etiologies were post-surgical (48%, 22 patients) and neoplasm-related (17%, eight patients).

Drainage was considered completely successful in 46 cases (90%), partially successful in two (4%) and unsuccessful in three (6%).

The median duration of the procedure was 65 min (interquartile range 50–80) and median effective radiation exposure was 3.3 mSv (interquartile range 2.4–5.2 mSv). There were no significant adverse events related to the procedure.

Conclusions: By providing high-definition three-dimensional images, CTP enables accurate positioning of pericardiocentesis material. It was shown to be an accurate, effective and safe method, in agreement with previous findings. CTP should be considered a good option in centers with CT facilities.

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PALAVRAS-CHAVE

Pericardiocentese;
Tomografia
computorizada;
Derrame pericárdico

Pericardiocentese guiada por tomografia computadorizada – experiência num centro**Resumo**

Introdução e objetivos: O derrame pericárdico é uma complicação temível em várias situações clínicas, em que a pericardiocentese pode ter um papel fundamental. Esta pode ser guiada por vários métodos de imagem, sobretudo ecocardiografia. A tomografia computadorizada (TC) tem várias vantagens, mas o seu uso tem ainda fraca evidência clínica. Neste trabalho é reportada a experiência de um centro em pericardiocentese guiada por TC (P-TC).

Métodos: Foram analisados retrospectivamente pacientes (pts) referenciados para P-TC durante o período de agosto de 2008 a fevereiro de 2014. Foi avaliada a demografia, etiologia do derrame, INR, radiação, sucesso e complicações, sendo os resultados comparados aos publicados na literatura.

Resultados: Durante este período, foram realizados 51 procedimentos em 46 doentes. Cinco doentes repetiram o procedimento devido a recorrência do derrame. A idade média foi de $63 \pm 13,8$ anos. As etiologias mais frequentes foram pós-cirúrgica (48%, 22 pts) e neoplasia (17%, oito pts).

A drenagem foi considerada completa em 90% (46) dos casos, parcial em 4% (dois) e ineficaz em 6% (três).

O procedimento teve uma duração mediana de 65 minutos (Q1-Q3 50-80 minutos) e a exposição de radiação foi de 3,3 mSv (Q1-Q3 2,4-5,2 mSv). Não foram detetadas complicações imediatas relevantes.

Conclusões: Ao providenciar imagens de alta definição em três dimensões, a P-TC permite o posicionamento preciso do material de pericardiocentese, tendo demonstrado nesta série ser um método eficaz e seguro, indo ao encontro da informação previamente publicada. A P-TC deve, por isso, ser considerada uma boa opção em centros com disponibilidade de TC.

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Introduction

There are many clinical scenarios in which pericardial effusion may develop.¹ It can be caused by bleeding into the pericardial space or other fluid accumulation. Etiology may be inflammatory/infectious, traumatic, post-operative,² or related to cancer or other chronic conditions such as uremia.³ Its main adverse consequence is its potential impact on cardiac hemodynamics, which will depend mainly on the volume and rate of development of the effusion.⁴ Clinical presentation of a significant pericardial effusion usually includes lightheadedness, chest discomfort, dyspnea, anxiety, tachycardia and hypotension.⁵ Echocardiography is the imaging modality of choice for diagnosis and for estimating hemodynamic impairment, through assessment of right heart chamber dynamics. Other diagnostic tools may be required for etiologic investigation or anatomical definition, such as computed tomography (CT) and cardiovascular magnetic resonance.^{6,7} Pericardiocentesis is usually indicated when hemodynamic impact is significant or when needed for etiologic diagnosis.⁸⁻¹⁰

As it is an invasive procedure, there is always a significant risk of complications, which may be reduced with enhanced control in needle positioning, in order to avoid unintended puncture of structures. Electrocardiogram-guided¹¹ and fluoroscopy-guided¹² techniques have been described. Guidance in recent years has been mainly through echocardiography¹³⁻¹⁶ (offline or real-time) because of its improved safety over a blind approach. CT-guided

pericardiocentesis (CTP) is also an option in centers with access to and expertise in this technique,^{17,18} with the advantage of detailed three-dimensional imaging, which enables fine needle positioning.

This work reports on our experience with CTP.

Methods

All procedures were performed by experienced cardiologists or cardiac surgeons, using a Seldinger technique according to previously described protocols.¹⁷ CT guidance was obtained using a 64-slice scanner (Siemens SOMATOM Sensation, Erlangen, Germany) (Figure 1). Patients provided informed consent. During the procedure they were asked to breathe steadily and abstain from moving or breathing deeply. Local anesthesia with subcutaneous lidocaine was performed in every patient and light sedation (diazepam 5 mg orally) was administered when needed.

Images of the whole thorax were acquired before the procedure and were analyzed with dedicated software (Siemens Syngo Viewer®). Parameters used by protocol were: tube voltage 100 kV, tube current 110 mAs, reconstruction with 0.75 mm sections, overlap 0.5 mm. Typical window width/level used during the procedure was 700/80. The best entry point and needle orientation were determined (Figure 1). We used an 18 gauge needle from the PeriVac™ kit (Boston Scientific®). After superficial needle insertion, new images of the area of interest were acquired.

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