

Clinical Image

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All roads lead to rome

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Abstract

A 57 year-old man with a history of alcoholic-dilated cardiomyopathy was admitted in the Intensive Care Unit (ICU) with a cardiogenic shock due to electrical instability. During the ICU stay the patient condition's got worse and the team decided to use a Swan-Ganz catheter in order to monitor blood flow and pressures around the heart. The chest X-ray performed after the procedure revealed an abnormal route of the catheter. Above the level of the renal veins it was possible to define a loop, assuming an upwards route, entering the right atrium, the right ventricle and the pulmonary artery. No clinical effects were detected but the device was removed and replaced by a senior intensivist. However, the result was similar and it was able to be used despite the path. The pulmonary artery catheter represented an important contribution in the manage of the patient and images show an unusual path of the device, which can be related to anatomical variations.

Keywords: Swan-ganz catheter; Image; Hemodynamic monitoring; Intensive care.

Introduction

Pulmonary artery catheterization is a procedure where a catheter is placed into a pulmonary artery through a large-bore introducer sheath. The right internal vein is preferred because of its straight course to the right atrium and right ventricle. This device aims to help diagnosis and hemodynamic management of critical patients in the ICU.

Case presentation

A 57 year-old man with a history of alcoholic-dilated cardiomyopathy (left ventricular ejection fraction of 30%) and a colon tumor was admitted in the ICU with signs and symptoms of shock, initially considered a cardiogenic shock due to electrical instability. During the ICU stay signs of bloodstream infection were recognised and a *Fusobacterium nucleatum* bacteremia detected. The patient condition's got worse and the ICU team decided to use a Swan-Ganz catheter in order to monitor the heart's function, blood flow and pressures around the heart. The catheter was placed through a percutaneous right internal

jugular catheter introducer, guided by ultrasonography (single puncture), with no immediate complications. The chest X-ray performed after the procedure (Figure 1) revealed an abnormal route of the catheter, which motivated a request of a CT scan. The CT scan revealed the catheter passing through the superior vena cava, the right atrium and entering through the inferior vena cava. Above the level of the renal veins it was possible to define a loop of the catheter, assuming now an upwards route, entering the right atrium, the right ventricle and the pulmonary artery (Figures 2 & 3). No clinical effects due to the catheter position were detected but the device was removed and repositioned by a senior intensivist. However, the result was similar and the device was able to be used although the abnormal path. The Swan-Ganz catheter represented an important contribution in the manage of the patient, however his further multiple organ deterioration compromised the surgical approach of the local invasive colon tumor and the patient died three weeks later.



Figure 1: Chest X-ray performed after the procedure revealing an abnormal route of the catheter.



Figure 2: The CT scan (3D reconstruction) revealing the route of the catheter.



Figure 3: The CT scan (coronal view)-frame revealing catheter passing through the superior vena cava, the right atrium and entering through the inferior vena cava with a catheter loop above the renal veins. Abbreviations: Intensive Care Unit (ICU), Computerized Tomography (CT).

Conclusion

This uncommon route can be related with anatomical variations of the patient, although a proper placement method was used. Misplacement of the Swan-Ganz catheter is not the most common complication, since site hematoma, arterial puncture and arrhythmias are more common. However, we should be aware of this potential complication.

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