


# Malposition of the central venous catheter secondary to accessory hemiazygos vein variant

The Journal of Vascular Access  
1–3  
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DOI: 10.1177/11297298231154291  
journals.sagepub.com/home/jva  


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## Abstract

A 36-year-old female with sickle cell disease presented with sickle cell pain crisis. After failure to establish peripheral venous access, an internal jugular central venous catheter (CVC) was placed. Confirmation of internal jugular cannulation was performed with bedside ultrasound. A confirmatory chest X-ray revealed an unusual position of the catheter, taking a course inferiorly, making a loop and remaining on the left side of the mediastinum. A lateral view was done and revealed that the catheter passed inferiorly through the internal jugular vein then posteriorly and inferiorly giving the looped appearance. This is better delineated on a sagittal view CT scan showing the tip of the catheter terminating in the accessory hemiazygos vein. This unusual course is due to a variant of the accessory hemiazygos vein which is connected to the left superior intercostal vein. This creates a lower resistance pathway for the CVC which passes from the internal jugular vein, down the left superior intercostal vein (instead of the left brachiocephalic vein) and into the accessory hemiazygos vein. Discussion: The correct tip placement of an internal jugular CVC terminates in the superior vena cava just above the cardiac silhouette. In 1%–2% of individuals, a connection between the accessory hemiazygos and the left superior intercostal vein is present. Rare cases are discovered incidentally during CVC placement. The diameter of the accessory hemiazygos vein is less than half of that of the superior vena cava. The catheter should not be used as central venous access and removal is recommended. Malpositioning of central catheters is unpredictable but can be easily avoided by using intraprocedural methods to confirm tip position. Such modalities include intracavitary ECG or ultrasound with agitated saline injection as described in the SIC (Safe Insertion of Centrally Inserted Central Catheters) protocol.

## Keywords

Intensive care, interventional radiology, nursing, nutrition, oncology access, techniques & procedures

Date received: 7 August 2022; accepted: 7 January 2023

## Case

A 36-year-old female with multiple congenital deformities, paraplegia and sickle cell disease presented with symptoms consistent with sickle cell pain crisis. After failure to establish peripheral venous access, an internal jugular central venous catheter (CVC) was placed. Confirmation of internal jugular cannulation was performed with bedside ultrasound imaging. A confirmatory portable chest X-ray revealed an unusual position of the catheter in the anteroposterior (AP) view, taking a course inferiorly, making a loop and remaining on the left side of the mediastinum (Figure 1). A lateral view chest X-ray (Figure 2) was done to delineate the course and revealed that the catheter passed

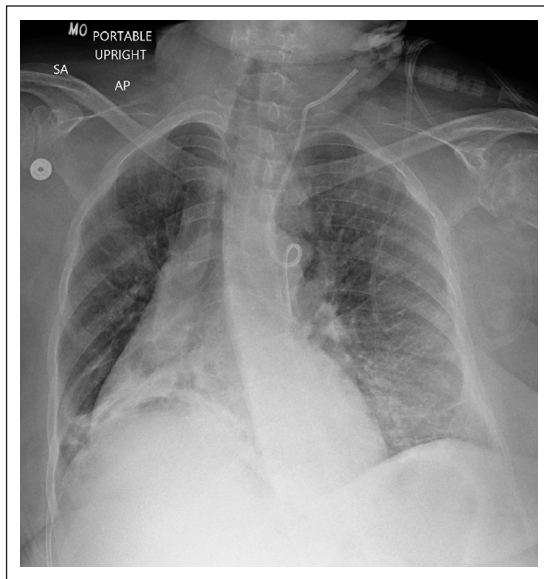
inferiorly through the internal jugular vein then posteriorly and inferiorly giving the looped appearance on the AP view. This is better delineated on a sagittal view CT scan with intravenous contrast (Figure 3) showing the tip of the catheter terminating in the accessory hemiazygos vein. This

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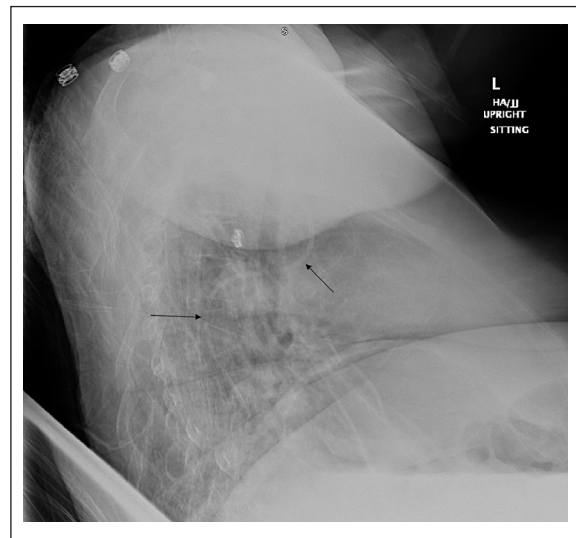
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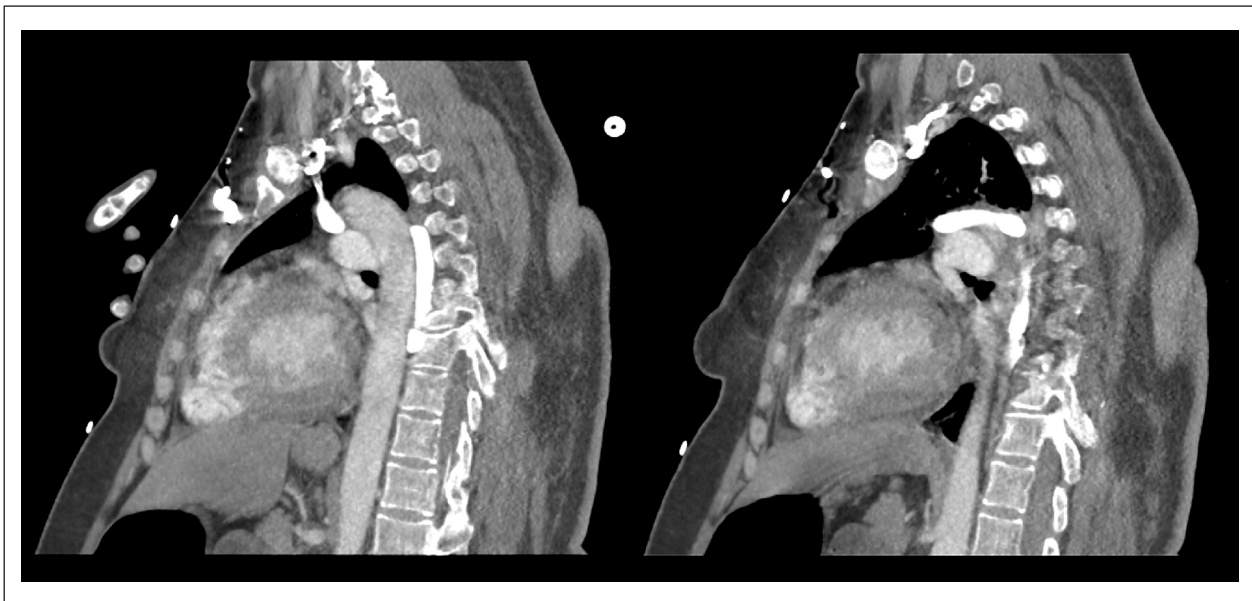
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**Figure 1.** Anteroposterior view chest X-ray showing the course of the central venous catheter.



**Figure 2.** Lateral view chest X-ray showing the course of the same central venous catheter.



**Figure 3.** Sagittal view CT scan with contrast showing the course of the central venous catheter.

unusual course is due to a variant of the accessory hemiazygos vein which is connected to the left superior intercostal vein. This creates a lower resistance pathway for the CVC which passes from the internal jugular vein, down the left superior intercostal vein (instead of through the left brachiocephalic vein) and into the accessory hemiazygos vein.

## Discussion

The correct tip placement of an internal jugular CVC terminates in the superior vena cava just above the cardiac

silhouette.<sup>1</sup> In 1%–2% of individuals, a connection between the accessory hemiazygos and the left superior intercostal vein is present.<sup>2,3</sup> Most of these cases remain unidentified while others are incidentally discovered usually during CVC placement.

The diameter of the accessory hemiazygos vein is less than half of that of the superior vena cava<sup>4</sup> and the catheter should not be used as central venous access. Removal of the malpositioned CVC is recommended.

Malpositioning of central catheters due to anatomical variance is unpredictable but can be easily avoided by

using intraprocedural methods to confirm the position of the catheter tip. Such modalities include intracavitary ECG or ultrasound with agitated saline injection among other modalities as described in the SIC (Safe Insertion of Centrally Inserted Central Catheters) protocol.<sup>5</sup>

### Author note

Authors report nothing to declare. Consents were obtained from all subjects involved in the study as outlined by the institution's IRB. Institution's ethics code was followed in the designing and execution of this study.

### Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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