

Unusual malposition of PICC into the Anomalous left Brachiocephalic vein: A case report

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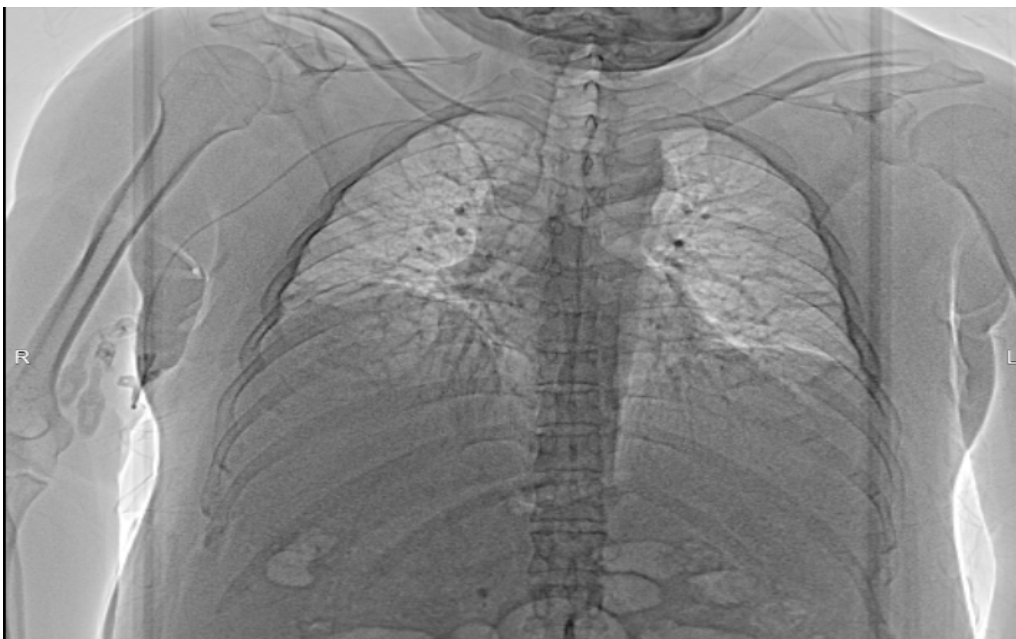
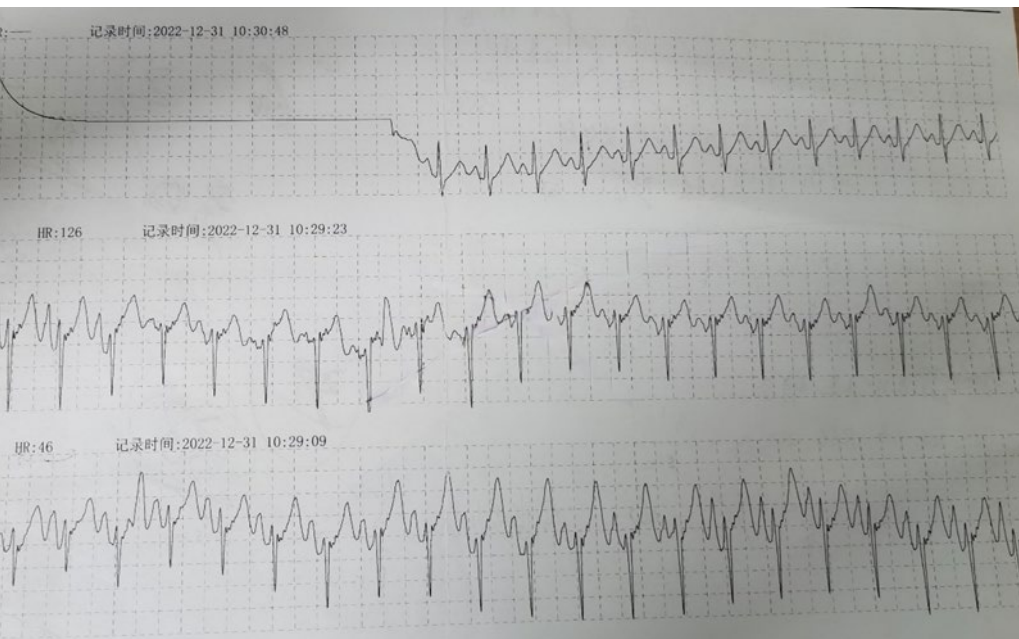


Background

PICC is widely used in clinics. With the application of real-time positioning tip technology of intracavitary electrocardiography (IC-ECG), the incidence of malposition is reduced, but malposition may still occur, sometimes IC-ECG can't distinguish. It is reported that when the catheter enters the azygos vein, the p waveform of the IC-ECG changes. In addition, many malposition can't be identified through CXR, resulting in unnecessary extubation.

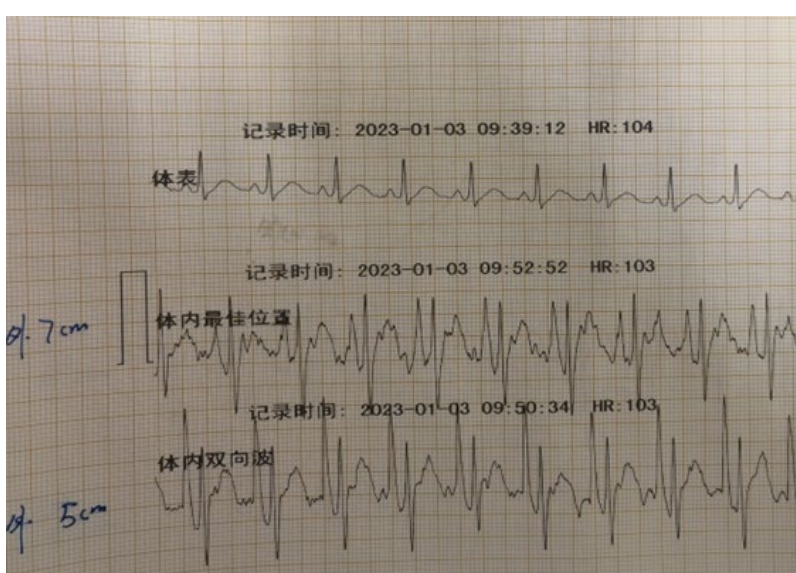
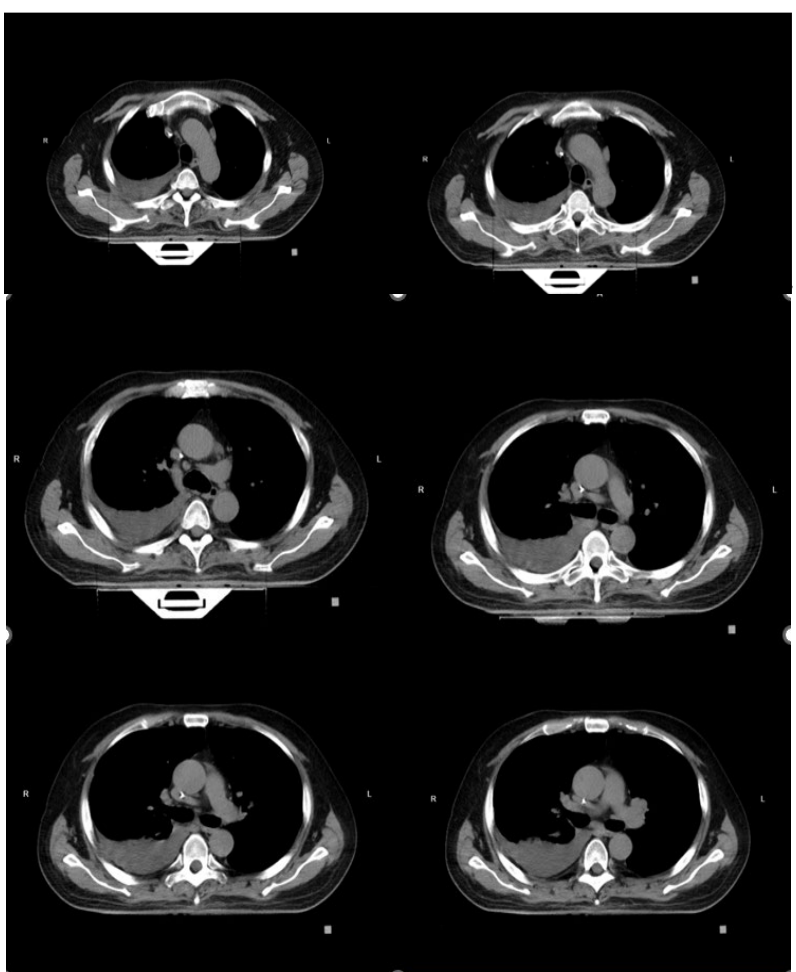
Case Description

A 45-year-old male was admitted and diagnosed with acute liver failure, hepatitis B cirrhosis, hepatic encephalopathy, ascites, and hypertension, awaiting a liver transplant. During his hospital stay, he contracted COVID-19, developed pneumonia, and required ICU support and oral tracheal intubation. Due to his condition and a high INR of 3.16, central venous infusion therapy via a PICC was initiated. A 5F double-lumen PICC was inserted through the right basilic vein by a specialist nurse. Intra-cavitary electrocardiography (IC-ECG) was utilized during the procedure, revealing an increased P-wave amplitude, but the biphasic P-wave or negative P-wave was not observed. Subsequent chest X-ray confirmed incorrect positioning of the PICC tip.



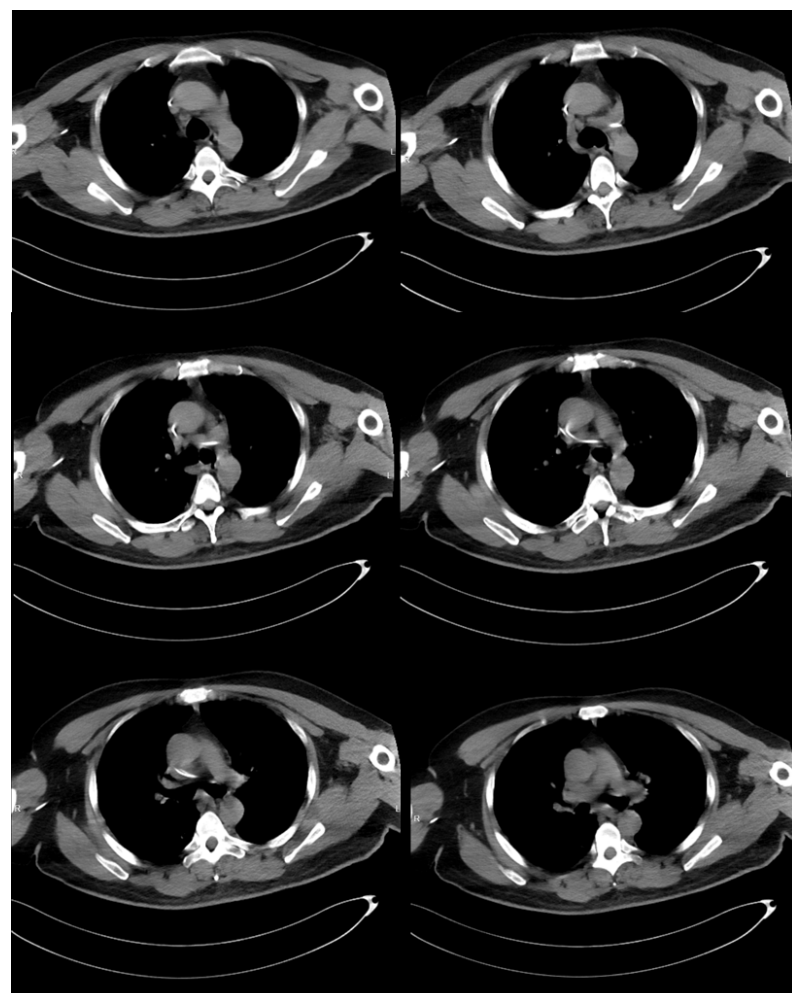
Methods

Despite initial electrocardiogram and CXR findings suggesting an atypical tip position, the catheter remained functional. Computed Tomography (CT) revealed that the tip of the catheter was located in a very unusual position, specifically within the Anomalous Left Brachiocephalic vein, with the catheter indwelling against the blood flow. Due to the potential possibility of dislodgement from the scouring power of blood flow, the catheter was neither removed nor adjusted. Instead, we utilized intracavitary electrocardiography localization technology to assess the tip position every 8 hours.



Results

After 56 hours, IC-ECG showed the appearance of a negative P wave, which was followed by CXR confirming that the catheter tip had entered the atrium. The negative P wave disappeared after the catheter was retracted by 2cm. Ninety-six hours after the catheter placement, a CT scan (conducted for other purposes) and CXR revealed that the catheter tip was located at the T5 level of the superior vena cava. The catheter continued to be used normally for 92 days.



Main findings

- The Anomalous left Brachiocephalic vein is a very rare abnormal vein, and when the tip of the PICC catheter is ectopic in this vein, it cannot be distinguished in CXR. In CT, it is similar to the persistent left superior vena cava and needs to be carefully distinguished. When the tip of the catheter is located in the persistent left superior vena cava and Anomalous left Brachiocephalic vein, the treatment is completely different.
- It is suggested that when using IC-ECG, an increase in P-wave amplitude cannot be solely relied upon as an indicator. If a biphasic P wave or negative P wave is not observed, CXR should be utilized for confirmation. When neither IC-ECG nor CXR can identify the tip, it is recommended to employ CT for tip position identification. Additionally, for catheters that require trimming before insertion, it is recommended to add 2-3cm to the measured preset length to induce biphasic P waves or negative P waves during IC-ECG.