

Abstract

Objective: To delineate the clinical characteristics associated with central venous catheter (CVC) malposition into the lateral thoracic vein (LTV).

Methods: A systematic literature search was conducted in PubMed, Embase, Scopus, Web of Science, CINAHL, and the China National Knowledge Infrastructure from their inception to June 1, 2025. Case reports and small case series describing CVC malposition into the LTV were included. Data regarding the catheter tip position, complications, and radiographic features of misplacement were extracted.

Results: From 1675 identified articles, 43 studies reporting a total of 49 patients with LTV catheter malposition were included. Malposition occurred in the left LTV in 30 patients (61.2%) and the right in 19 (38.8%). Posteroanterior chest X-radiography (PA-CXR) was the primary initial method for catheter tip verification (n=30, 85.7%). The typical radiographic finding was a catheter shadow descending bilaterally along the mediastinum; on the right side, the catheter shadow was totally overlapped with the superior vena cava. After CVC placement, 14 patients (28.6%) did not undergo catheter tip examination. Among the 35 patients (71.4%) who received an initial examination, malposition was not timely identified in 33 cases (94.3%). Catheter malposition-related complications occurred in 20 patients (40.8%). The most frequent clinical manifestations of the complications were chest/back pain (n=16), pleural effusion (n=4), and changes in respiratory status (n=3) or thrombosis (n=3). The primary reasons prompting clinicians to reassess catheter tip position were the occurrence of complications (n=15, 34.9%), catheter dysfunction (n=12, 27.9%), and abnormal findings on initial CXR (n=11, 25.6%).

Conclusions: Clinicians should be aware of LTV catheter malposition, particularly following left-sided venous access and when patients present with newly emerged symptoms such as chest/back pain, pleural effusion, or respiratory changes after catheter placement. Lateral CXR is an effective modality for confirming LTV catheter malposition and should be considered part of a routine post-procedural examination.

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