Central line tip location: Extrapericardial SVC in relation to anatomical landmarks | 1


Abstract:

BACKGROUND: Positioning central venous catheters (CVCs) in the proper part of the superior vena cava (SVC) is difficult. The aim of this exploratory study was to analyse topographic relationships of the extrapericardial SVC using chest X-ray (CXR) and computed tomography (CT). This included an appraisal of rules for optimal CVC tip placement.

METHODS: We retrospectively evaluated 100 patients with CVCs who underwent bedside CXR and CT on the same day. Distances between the sternoclavicular joint (SCJ), tracheal carina, SVC origin, pericardial reflection, and CVC tip were analysed on CT and, if visible, on CXR. These measurements served to locate the extrapericardial SVC in relation to anatomical landmarks. Different strategies for CVC tip positioning were evaluated.

RESULTS: The mean (standard deviation) extrapericardial length of the SVC was 26 (12) mm. The average position of the pericardial reflection was 5 mm below the carina (range, 29 mm below to 25 mm above). In our patient population, the best results in terms of tip positions in the extrapericardial SVC would have been achieved by using 85% of the SCJ-to-carina distance (in 86%) or by positioning the CVC tip 9 mm above the carina (in 84% of patients).
CONCLUSIONS: The extrapericardial part of the SVC varies considerably in length and position, and rules of thumb based on anatomical landmarks should be used cautiously. In our series, using 85% of the SCJ-to-carina distance or placing the CVC tip 9 mm above the carina would have resulted in a high percentage of positions in the extrapericardial SVC.