# What abnormality is evident on the chest X-ray after placement of the central venous catheter?

**Quiz**

A 74-year-old woman presented with a 3-month history of a non-healing, painful, right lateral tongue ulcer. Biopsy of the lesion confirmed carcinoma of the tongue. She had no prior history of cardiac diseases or congenital anomalies. She underwent right hemiglossectomy, excision of the right floor of the mouth, en-bloc supraomohyoid neck dissection, free anterolateral thigh flap for tongue reconstruction, and tracheostomy, under general anaesthesia. Complications included pneumonia and acute myocardial infarction with fast atrial fibrillation on the fifth day after the operation. A left subclavian line was inserted for guidance of fluid resuscitation, with the first reading 5 cm of water. The patient was managed conservatively and she made an otherwise uneventful postoperative recovery (Fig).

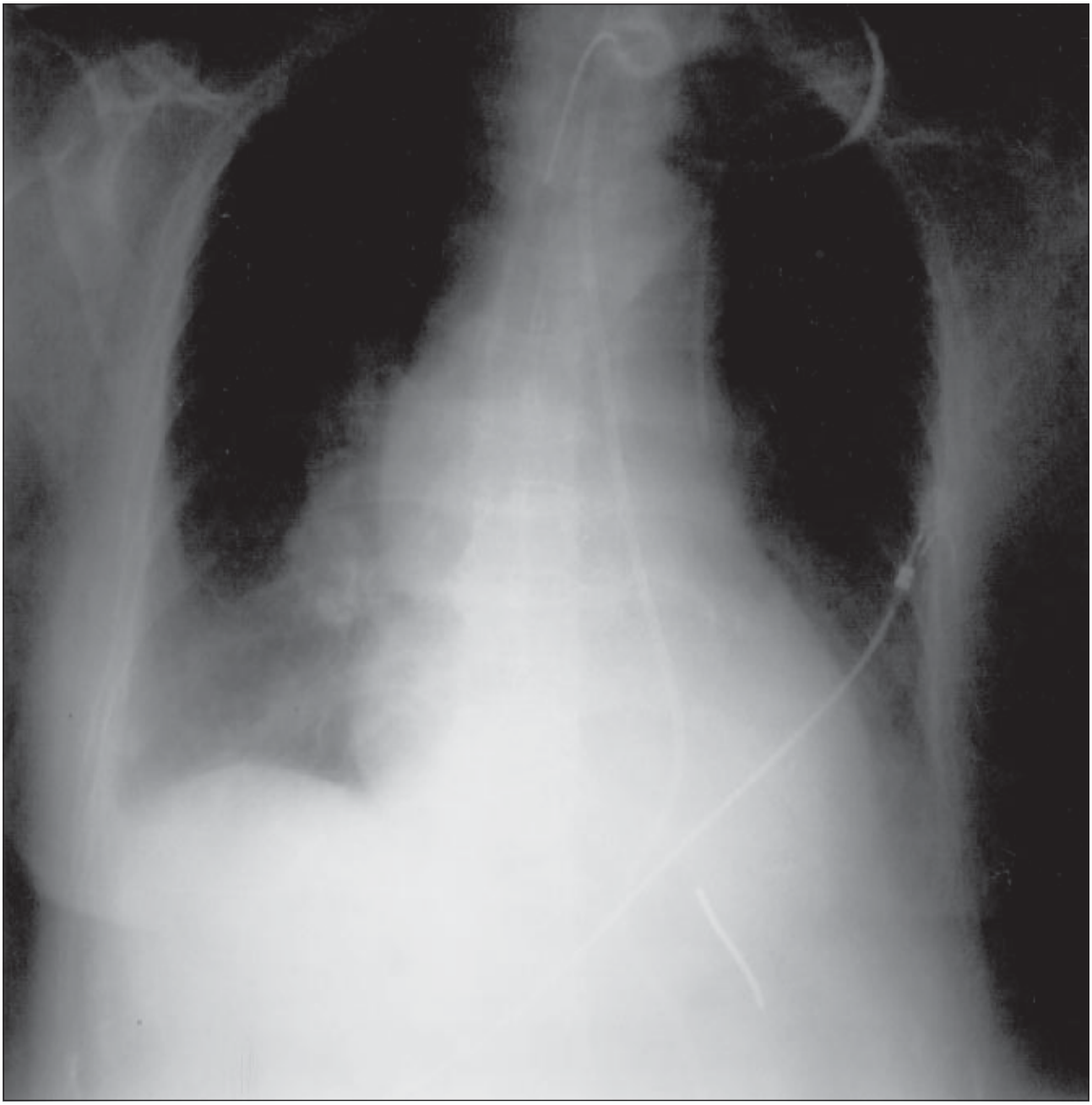

**Fig. Chest X-ray showing position of the central venous catheter**

## Answer

The central venous catheter is lying in the left superior vena cava.

Persistent left superior vena cava (PLSVC) is the most common thoracic venous anomaly, occurring in approximately 0.5% of the general population.[1] It can be an isolated condition but is also seen in association with various congenital heart diseases.

The superior vena cava is derived from the cranial portion of the right anterior cardinal vein. During the eighth week of gestation, the anterior cardinal veins are connected by an oblique anastomosis, which later becomes the left brachiocephalic vein. The caudal part of the left anterior cardinal vein then degenerates. Persistence of the left anterior cardinal vein results in the presence of PLSVC.[2] Coexistence of right superior vena cava (SVC) is found in 80% to 90% of cases. The left brachiocephalic vein is small or absent in 65% of patients with double SVCs. The size of the left SVC is also variable.

The left SVC courses lateral to the left common carotid artery and anterior to the left subclavian artery. It then passes lateral to the aortic arch and the main pulmonary artery to arrive in front of the left hilum, where it opens into the coronary sinus. It may anastomose with the hemiazygous vein. In the superior mediastinum, the left-sided SVC is almost a mirror image to that of the right. However, in the posterior mediastinum, it is more posterior in position than the right SVC.

Chest X-ray films may show a vertical or smooth convex shadow along the upper left border of the mediastinum. Computed tomography and magnetic resonance imaging of the chest are superior in demonstrating the anatomical details of PLSVC, especially when it is associated with other congenital cardiac anomalies.

Persistent left superior vena cava has been well described as an incidental finding during cardiac catheterization, when the catheter is introduced through the left arm. It may cause technical difficulty during placement of transvenous pacemakers or right heart catheterization, and a higher incidence of arrhythmias (including ventricular fibrillation, reported in patients with Swan-Ganz catheterization via left SVC, resulted from dilation of the coronary sinus opening, causing stretching of the atrioventricular node and His's bundle) has been observed.[3] One study postulated that the presence of a PLSVC may affect the coronary sinus and result in unexplained arrhythmias.[4] The presence of a PLSVC also has important clinical implications in heart transplantation.[5]

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