

## Case report:

# Anterior Mediastinal Placement of a Central Venous Catheter

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**A case of anterior mediastinal placement of a central venous catheter is being presented. Left internal jugular vein was cannulated for central venous access. Patient was scheduled for an elective mitral valve replacement surgery. Extra vascular placement of the catheter was picked upon sternotomy. No morbidity was caused as a result of this complication.**

**Key words. Central Venous, Catheter, Mediastinum**

The need for invasive monitoring of the cardiovascular system perioperatively is related to the patient's physical status and the nature of the surgical procedure planned. Placement of a central venous catheter via the internal jugular vein is a commonly performed procedure. Complications associated with the procedure are related to injury to adjacent structures. Anterior mediastinal placement of the catheter through puncture of the innominate vein is a rare event associated with the procedure. We report a patient in whom the central venous catheter was mediastinally placed through a puncture in the innominate vein when left internal jugular vein was used for central venous access. Patient was planned for an elective mitral valve replacement surgery. Luckily the complication was picked up early and no morbidity was caused as result of this complication.

### Case history

A 19 years old female patient was scheduled for an elective mitral valve replacement surgery. Patient had a solitary thyroid nodule on the right side of her neck so left internal jugular vein was cannulated after induction of general anaesthesia. Procedure was done without any difficulty and a triple lumen central venous catheter (Arrow—7F—CV—14703) using Seldinger's technique was threaded in. Placement of the catheter was confirmed by free back flow of blood. About 20 cm of the catheter was threaded in. Chest was opened through a median sternotomy approach. Upon dissection of thymus gland a moderate size haematoma was found in the anterior mediastinum. Once it was cleared the central venous catheter was found lying outside the innominate vein (Figure I- II). The catheter was pulled back and a successful attempt to right internal jugular vein was made to put a central venous catheter. Rent in the innominate was repaired. Rest of her surgical and post operative course was uneventful.

### Discussion

The central venous catheter serves as a source of information which helps in the management of patients perioperatively and in the intensive case setup. Moreover it

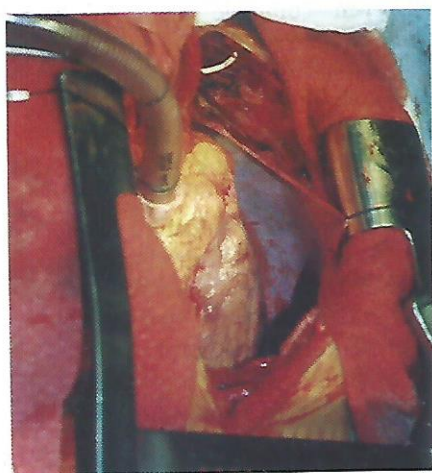
also acts as a crucial pathway for intravenous therapy. Complications associated with the procedure are related to malpositioning of the catheter and injury to surrounding structures. There have been incidents of severe and even fatal complications such as air embolism<sup>1</sup>, pneumothorax<sup>2</sup>, bilateral hydrothorax and hydro mediastinum<sup>3</sup>, thoracic duct injury<sup>4</sup>, horner's syndrome<sup>5</sup>, stroke<sup>6</sup>, extra dural insertion of the catheter<sup>7</sup>, vascular erosion<sup>8</sup>, arrhythmias and even complete heart block have been reported resulting from guide wire insertion during central venous cannulation<sup>9</sup>. If the right atrium or ventricle is perforated during the procedure than pericardial effusion or tamponade can result<sup>10</sup>. The use of "J" tipped guide wires and flexible catheters had made this a rarely reported complication.

Laceration or puncture of the mediastinal structures by locating or introducer needles have caused hydromediastinum<sup>11</sup>, tracheal laceration<sup>12</sup>, endo tracheal tube cuff puncture<sup>13</sup>, aortic dissection<sup>14</sup>, and pseudo aneurysm of brachiocephalic artery<sup>15</sup>. Brachial plexus, stellate ganglion and phrenic nerve all lie close to internal jugular vein. They can be injured during its cannulation<sup>16,5,17</sup>. Correct placement of a central venous catheter can be confirmed by the length of the catheter inserted, by free back flow of blood upon aspiration, by observing the respiratory fluctuations in the venous pressure and by observing the right atrial pressure wave forms when the catheter is connected to a pressure transducer. Finally post producer check x-ray of chest is the most definite and reliable method to confirm the position of the catheter.

We cannulated the left internal jugular vein. Correct placement of the catheter was confirmed by an appropriate length of the catheter inserted and by free back flow of blood through the catheter upon aspiration. But once the chest was opened the catheter was seen lying behind the thymus gland or in the anterior mediastinum. Probably the guide wire has caused a rent in the innominate vein which resulted in extra vascular placement of the catheter. Localized haematoma formation occurred at the site of vessel injury and the blood aspirated was probably coming from this haematoma. Luckily chest was opened quickly

and the extra vascular placement of catheter was picked up very early. We did not transduce the catheter to observe the pressure wave forms which might have alarmed as regarding extra vascular placement of the catheter. Another simple test which might be helpful in this regard is to keep the level of transfusing fluid through the catheter below the patient's heart level and observe the free back flow of blood through the catheter.

Although cannulation of internal jugular vein is a safe procedure but complications do happen even in experienced hands. Developing experience with the technique and a close attention paid towards the anatomical land marks of the neck with a back up knowledge of the possible complications associated with the technique will certainly go a long way in reducing the procedure related complications. Case report highlighted a rare complication of central venous cannulation. Repeated aspiration through the catheter and observing the free back flow of blood through the catheter by dropping the level of transfusing fluid should be done in every case which ensure intra vascular placement of the catheter.



**Fig. 1:**  
Central venous catheter is seen buried in the haematoma of the anterior mediastinum



**Fig. 2:**  
Central venous catheter is seen in the anterior mediastinum

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