

Case Report

## Airway Obstruction due to Hematoma Following Internal Jugular vein Cannulation

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### SUMMARY

A patient developed neck swelling and acute airway obstruction following an internal jugular vein cannulation. During laryngoscopy, glottic exposure was impossible because of a hematoma-induced anatomical distortion of standard laryngeal landmarks. Finally, a nasotracheal tube was intubated into the trachea fibre-optically. This life-threatening complication is rare, possible origin and mechanism for the sudden hematoma are discussed, as well as the airway management.

**Key Words :** Jugular vein cannulation, Cervical hematoma, Difficult airway

### INTRODUCTION

Percutaneous cannulation of the internal jugular vein is widely accepted technique to measure central venous or pulmonary artery pressure.

We report a case of successful airway management for airway obstruction secondary to cervical hematoma following cannulation of the internal jugular vein.

### CASE REPORT

A 85-year-old man was transferred from a local hospital with the diagnosis of acute myocardial infarction and required emergency coronary artery bypass graft surgery. At the local hospital, an intravenous infusion of heparin was started. He had a history of hypertension. Before induction of anesthesia, cannulation of the internal jugular vein, using Seldinger technique, was planned in the intensive care unit. The first attempt on the right jugular vein cannulation was unsuccessful

because the right carotid artery was punctured. Applying pressure to the site for 15 min stopped bleeding.

The second attempt of right internal jugular catheterization was successful. A 8.0-French catheter introducer was inserted and a 7.0-French thermodilution flow-directed PA catheter was placed through the introducer while monitoring the pressure wave without complications.

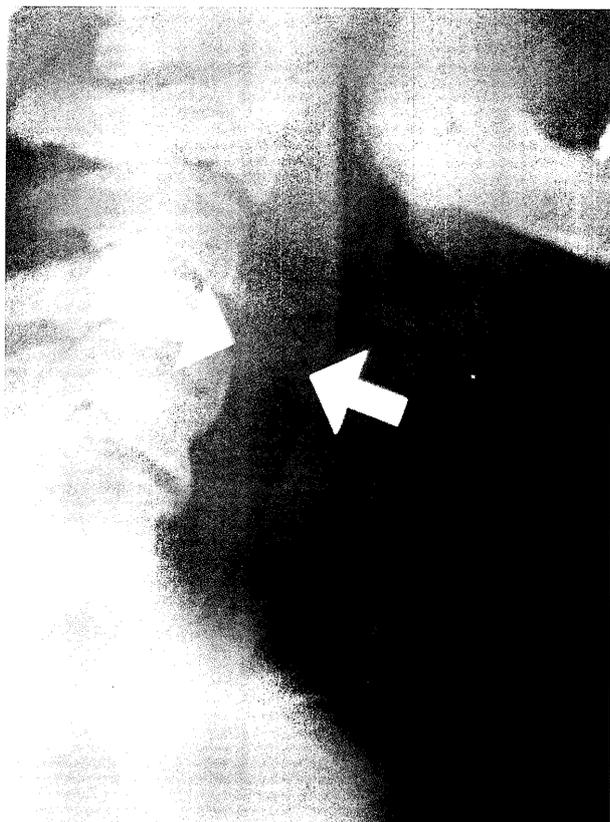
Approximately 30 min later, the patient arrived at the operation room. The patient was monitored with an electrocardiogram, pulse oximetry and invasive arterial pressure. The right side of the neck was slightly swollen and bleeding in the deep neck was suspected. However, the swelling did not appear to progress. The patient did not feel dyspnea and was able to speak normally. SpO<sub>2</sub> was 100 % on 3 ml/min of oxygen inhalation. It was considered safe to anesthetize the patient before securing an airway. After intravenous fentanyl, diazepam and vecuronium, we attempted mask ventilation. Mask ventilation was possible during spontaneous respiration but became difficult when spontaneous breathing stopped. Almost immediately, massive swelling of the neck occurred and SpO<sub>2</sub> decreased progressively to 90 %. An attempt at tracheal intubation was

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**Fig. 1** Lateral radiograph of the neck showing windening of the retropharyngeal space

made immediately. During laryngoscopy, no landmarks (including the epiglottis) could be seen, because the pharyngolaryngeal tissues were extremely edematous. Nasal intubation was tried with a flexible fiberoptic endoscope at the second attempt by an experienced anesthesiologist. A 6.5-mm cuffed tube was intubated into the patient's right nostril and the flexible fiberoptic endoscope was passed through the tube. Fortunately, we found that the tube was lying just above the vocal cords which was seen as pin hole and the tube was entered into the trachea. SpO<sub>2</sub> recovered to 100%. The patient was hemodynamically stable throughout the procedure. Then the operation started with heparinization. The surgical procedure, which lasted 4 h, was completed uneventfully, and the patient was transferred in stable condition to the intensive care unit.

Neck X-ray showed that marked widening of the prevertebral space made the clinical diagnosis of retropharyngeal hematoma (Fig. 1). The patient was kept intubated for the next 24 h. Next day, the retropharyngeal hematoma decreased and the patient was extubated with no trouble.

## DISCUSSION

Airway obstruction due to hematoma is a rare complication of jugular vein cannulation, even in patients with abnormal coagulation<sup>1)</sup>. However, some patients can quickly develop into a life-threatening condition<sup>2-8)</sup>. When it happens, one must suspect inadvertent arterial puncture, which is usually benign.

Airway obstruction occurred as a result of pharyngolaryngeal edema, caused by venous and lymphatic obstruction, and of direct laryngotracheal compression<sup>7)</sup>. However, some authors disagree, stating that the trachea is rigid and difficult to compress<sup>2)</sup>.

The choice of suitable airway management for this patient was limited. When tracheal intubation is quite difficult such as in this situation, mask ventilation and laryngeal mask airway may not be useful. The use of the fiberoptic endoscope and the gum-elastic bougie has also been reported as helpful in the management of similar difficult airways<sup>5,8)</sup>. Transtracheal ventilation or tracheostomy should be performed if the tube is difficult to pass, but can be difficult in the presence of distorted anatomy<sup>4)</sup>. Although nasal fiberoptic intubation was performed successfully in this case, this method may not be the best choice in all situations because blood and secretions may obscure the view. Further, there are a few reports of its failure<sup>5,6)</sup>.

Sudden airway obstruction at the induction of anesthesia is unexplained. Arterial pressure did not increase and bucking or coughing did not occur during the procedure. The massive increase in neck swelling may be related to the use of heparin.

The advantages of heparin for the treatment of patients with acute coronary syndromes are well established<sup>11)</sup>. However, hemorrhage is the most common and best-recognized complication of its treatment. This strategy should minimize the chance of hemorrhage in such a patient without creating additional problems.

Cannulation of the internal jugular vein is accepted as a relatively safe method of obtaining central venous access. This case report illustrates a serious complication which occurred following the jugular vein cannulation and demonstrates the importance of close observation not only at the time of catheter placement but also during induction of anesthesia, especially when in-

advertent arterial puncture happens.

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