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CONTRALATERAL PLEURAL INJURY IN PATIENT WITH VERTEBRAL ARTERY INJURY– AN ANAESTHESIOLOGIST CHALLENGE

Anesthesiology

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ABSTRACT

Vertebral artery injuries are rare in stab wound with a reported incidence of 1- 7.4%, because of its protected anatomical location along the vertebral column. Associated vascular injuries can be external jugular veins, internal jugular veins and vertebral vein. Laryngeal, tracheal, oesophageal and cervical spinal injuries are other associated injuries, though incidence is rare. Haemothorax and pneumothorax also occur frequently in association with vertebral artery injury. We herein report a case of intra-operative contralateral pleural injury following an isolated left vertebral artery injury after 48 hours when patient reported for pack removal which was left in situ owing to active bleed of vertebral artery due to stab wound in the neck.

KEYWORDS

Stab wound neck; Vertebral artery injury; Associated injury in stab neck

Introduction

A stab wound to neck (SW) is a challenging presentation for both anaesthetist and surgeons. The evaluation and further stabilization of such patients can be difficult because of the high concentration of vital structures in the region. Vertebral artery (VA) injuries are rare in SW with a reported incidence of 1- 7.4%, because of its protected anatomical location along the vertebral column. [1] Operative isolation and control of an injured vertebral artery is difficult and a multidisciplinary approach should be applied in the management. [2] We herein report a case of intra-operative contralateral pleural injury following an isolated ipsilateral vertebral artery injury in a patient who sustained a suicidal stab wound to the neck.

Case Report

A 55 year-old man reported in accident & emergency department of our institute, with a stab wound on the anterior aspect of the neck just below the level of cricoids cartilage slightly on left side (fig1). Vital signs at admission included blood pressure of 90/70, heart rate of 110 bpm, and Glasgow Coma Scale of 15/15. Bleeding neck wound was packed and patient was intubated to prevent any respiratory compromise. Two units of blood were transfused. After that, vitals of patient stabilised. Patient was admitted in the ward for further evaluation. Investigations revealed haemoglobin to be 10 gm%, blood urea to be 46 mg%, blood sugar 89 mg%, serum sodium 146 mg%, and serum potassium 4.8 mg%. X-Ray chest was normal showing no evidence of injury. 4 vessel angiography was done which revealed injury to the first part of left vertebral artery. After 48 hours patient was posted for pack removal and exploration of the wound. Patient's vitals were stable and chest skiagram of evening prior to pack removal was normal.

On Operation table baseline arterial pressure, heart rate, respiratory rate and room air O_2 saturation were 130/60 mmHg, 86 beats/min, 16/min and 98%, respectively. Patient was induced with injection thiopentone slowly in incremental doses, injection fentanyl $2\mu kg^{-1}$ (140µg), injection suxamethoium ($1.5\ mgkg^{-1}$) to facilitate intubation, after intubation air entry was confirmed, which was found to be equal bilateraly. Anaesthesia was further maintained using 33% O_2 in 66% N_2O, sevoflurane and incremental dosages of atracurium.

After induction end-tidal CO_2 monitor was attached, the radial artery was cannulated and the arterial blood pressure was monitored continuously. Femoral vein was also cannulated to record central venous pressure.

After induction patient was handed over to surgeon for pack removal. As soon as the pack was taken out, active bleeding was observed and immediate repacking was done. Estimated visible blood loss was around 800 ml. Four units of blood were transfused, but still blood pressure was below 80/50 mm Hg. After 20-25 minutes patient started desaturating and SpO_2 could not reach above 82-84% inspite of all measures. On auscultation air entry significantly decreased on right side. Portable chest radiograph showed lung collapse and massive collection (FIG-2) on right side which was further confirmed by bed side USG. ICD was inserted in 2nd right intercostal space and massive hemothorax was noted and about 2 Litres of blood drained out. After sometime lung expanded and air entry became normal on right side and vitals stablised. The patient was shifted to cardiac operating room for vertebral artery ligation. Left vertebral artery was then identified, and partial laceration of its proximal segment was noted. Ligation of the vessel at its origin from the subclavian artery was performed. There was tract passing behind the trachea & SVC into the right pleura which was the cause of repeated hemothorax. There was about 3 litres of collected blood and few clots in the right pleural cavity. Patient was shifted to ICU and was extubated on 2nd postoperative day.



Fig.1 Showing site of stab wound

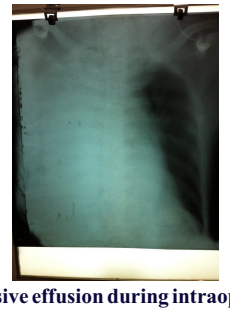


FIG 2 Showing massive effusion during intraoperative period

Discussion

Penetrating neck injuries remain challenging, as there are a number of important structures in a small area and injury to any of these structures may not be readily apparent so surgical exposure is often difficult. [3, 4]

Two thirds of patients with penetrating vertebral artery injuries have associated injuries.

The external (EJV) internal jugular (IJV) veins and vertebral vein are the most commonly injured vascular structures. [1, 3-5] Reported incidence of Laryngeal and tracheal injury is approximately around 3.4% to 9.7%. Oesophageal injuries and cervical spinal injuries are rare. Nerves that frequently gets involved are facial, vagus, accessory, phrenic, recurrent laryngeal) and brachial plexus. Haemothorax and pneumothorax can occur frequently (13.5% to17.5%) in association with vertebral artery injury. [1, 3-6] Any neurologic deficit is usually not associated with injury to this vessel. [4] In our patient ipsilateral vertebral artery injury was associated with injury to pleura of contralateral lung but sparing other vital structures. Pleural injury was not obvious for 48 hours, but it manifested when repacking of the wound was done.

As soon as patient with suspected vertebral artery injury reports in emergency department, besides vital monitoring, care should be taken to manage threatened upper airway obstruction because of expanding hematoma simultaneously cervical spine injury should be ruled out and should be accordingly managed. [1,6]

In penetrating trauma, injury to the vertebral artery bleeding should be controlled with direct pressure while being vigilant of expanding haematoma. Airway should be secured if any evidence of airway obstruction is observed. Besides direct pressure application, the use of Foley catheter for generating a balloon tamponade to control rapid bleeding in vascular injuries in neck had been tried. An occlusive dressing should be applied to the wound to prevent air embolism. [1, 4] Many authors believe that clinical assessment alone is unreliable for detecting significant injuries, one is likely to miss some injuries which can result in significant mortality. [5]If patient is stable chest skiagram should be done to demonstrate presence of haemo/pneumothorax, pneumomediastinum and subcutaneous emphysema if any. Cervical spine X-ray radiograph may be done if there is a high suspicion for such an injury. If patient is stable, CT angiography (CTA)and 4-vessel angiography should be done to trace extent of injury. [5, 6]

If massive hemorrhage is there the airway must be secured. Before intubating these patients cervical spine injury should be ruled out. Hemorrhage must be controlled and blood products should be transfused. Further management consists of proximal and distal ligation of the vessel [6] Proximal and distal embolization of the vertebral artery lesion is usually necessary to control active bleeding. [7] Embolization of the distal segment of the vertebral artery should be attempted if the anatomy and hemodynamic stability of the patient allow this maneuver. [2,7,8]

Any attempt at exploration of wound in ED should be avoided as it can dislodge clots and cause torrential bleeding. Also, blind clamping is not advised as it can worsen existing injury. [1,3,7]

Immediate exploration is necessary in extreme situation of shock, but if patient is hemodynamicaly stable, surgery should be properly planned. Technique of induced hypotension should be used by anesthetist to facilitate surgical exposure and reduce the blood loss. Monitoring of intra-arterial blood pressure, central venous pressure, temperature, urine output and blood gas should done in such patients. [2]

Conclusion:

In conclusion, we recommend meticulous preoperative evaluation of patients prior to any definitive management. Proper intraoperative planning, team work and an integrated, multidisciplinary approach is necessary for a positive outcome to manage such difficult cases. Extensive monitoring and hypotensive anesthesia may be required for better success in these patients.

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