

Jacobs Journal of Clinical Case Reports

Case Report

Superior Vena Cava Syndrome, Anesthetic Challenges

Bell, Calvin¹* D.O., Maurtua, Marco¹ M.D.

¹*Parkside Medical Group, USA*

**Corresponding author: Dr. Calvin-Bell, 21513 Halworth Rd Beachwood OH, USA, Tel: 307-253-0213; Email: bell.calvin.cb@gmail.com*

Received: 11-17-2015

Accepted: 05-30-2016

Published: 06-21-2016

Copyright: © 2016 Bell, Calvin

Introduction

Superior vena cava (SVC) syndrome can present many complications and anesthetic risks the most important being hemodynamic collapse and airway compression; which can be fatal upon induction of anesthesia [1-4]. The SVC provides venous drainage from the head and upper extremities. These vessels are easily compressed most commonly from an extrinsic tumor specifically a bronchogenic carcinoma or lymphoma [5]. As blood flow to the right atrium becomes obstructed alternative pathways must be established to allow venous return to the heart. Upper body venous pressure can become significantly elevated. This results in the clinical signs and symptoms of venous congestion including cough or headache even swelling of the arms and face as well and engorgement of the mucous membranes involving the upper airway [5]. In general these symptoms may worsen when the patient is placed supine. The venous obstruction tends to decrease blood return to the right ventricle lowering preload and produce swelling of the upper airway leading to orthopnea. We report the cancelation of an upper GI endoscopy under GA due to SVC syndrome.

Case Report

A 55 year old male admitted to the Cleveland Clinic with the chief complaint of shortness of breath. His hospital course was complicated by the development of coffee ground emesis. He was brought to the endoscopy suite requesting an anesthetic for an EGD to evaluate his esophagus for active bleeding. His past medical history was significant for COPD, bilateral subsegmental pulmonary embolisms (PE) and small cell lung cancer (SCLC) complicated by SVC syndrome. When interviewed at bedside the patient explained that he was able to lie flat but said that he felt like someone was choking him. Upon exam

when he was placed supine venous congestion could be seen in his head and upper extremities. Recent CTA showed occlusion of the right innominate vein and severe diffuse narrowing of the left brachiocephalic vein with multiple stents placed in the right subclavian vein and the SVC to overcome the tumor's extrinsic compression. We decided to cancel the procedure in the remote location where it was scheduled and recommended it to be performed in the main operating rooms since it was evident that an awake fiberoptic intubation was required as well as lower extremity IV access and invasive blood pressure monitoring. He was examined the next day by ENT with the chief complaint of stridor and found on flexible laryngoscopy to have and immobile left vocal cord in the paramedian position and a hypomobile right vocal cord with only minor adduction capabilities and a glottic narrowing of approximately seventy five percent. His symptoms continued to worsen requiring awake intubation in the ICU and left cordotomy in the OR the next day. He was extubated later in the ICU but his symptoms of venous congestion continued to worsen combined with increasing confusion the patient was transferred to hospice care and expired shortly thereafter.

Discussion

A complete history and physical exam must be completed including a detailed evaluation of the patient's airway. As in our patient involvement of the recurrent laryngeal nerve is possible and may lead to vocal cord paralysis. The anatomy or the extent of the tumor and its relationship to other vital structures can be defined by a recent CT or MRI and should be considered before the patient is anesthetized.

In the setting of orthopnea due to upper airway obstruction secondary to venous congestion, an awake intubation tech-

nique with the patient in the sitting position would be the safest to secure the patient's airway [6].

In terms of cardiovascular assessment, a preoperative echocardiogram can be a useful tool to provide a real time estimate of the extent of caval obstruction, the existence of direct heart compression, the presence of a pericardial effusion or an intracardiac thrombus, since venous stasis will lead to a hypercoagulable state. One of the major questions the anesthesiologist must always entertain is will this patient decompensate hemodynamically upon induction of anesthesia and initiation of positive pressure ventilation. Preoperative cardiac restriction or right ventricular outflow obstruction from direct tumor compression or pericardial effusion should alert the clinician of possible need to cannulate the femoral veins pre induction in preparation for femoral to femoral cardiac bypass in case of hemodynamic collapse [7,8].

Due to the obstruction of venous return from the upper body to the heart, it is critical to obtain venous access via the lower extremities. If a central venous line or pulmonary artery catheter is desired it is recommended that this access be obtained via the femoral vein [6].

As venous return from the upper body is limited venous pressure in the head can rise and lead to an increase in intracranial pressure (ICP). Symptoms that may indicate cerebral edema are headache, confusion and obtundation [9]. Efforts may be required to avoid raising ICP such as, raising the head of the OR bed to 45degrees, avoidance of hypercarbia with the goal being normocarbia, and hyperventilation should only be established if concerns for herniation are noted. It is important to remember that inhaled anesthetics produce a dose dependent cerebral vasodilation that could be avoided by using a total intravenous technique or by adding an infusion of a hypnotic agent to lower the inhalation anesthetic requirements. Hypotension should be avoided to maintain cerebral perfusion [5].

Conclusion

Patients with SVC syndrome require detailed pre anesthetic assessment and planning before initiating any anesthetic intervention. A careful clinical evaluation and review of cardiovascular and imaging studies should be performed. SVC syndrome may affect both , airway management and hemodynamic stability therefore special consideration to anesthetic technique, hemodynamic monitoring and availability of human and non-human resources are a must to deliver a safe anesthetic.

References

1. Azizkhan RG, Dudgeon DL, Buck JR, Colombani PM, Yaster M et al. Life-threatening airway obstruction as a complication to the management of mediastinal masses in children. *J Pediatr Surg.* 1985, 20(6): 816-822.
2. Béchard P, Létourneau L, Lacasse Y, Côté D, Bussi eres JS. Perioperative cardiorespiratory complications in adults with mediastinal mass: incidence and risk factors. *Anesthesiology.* 2004, 100(4): 826-834.
3. Keon TP. Death on induction of anesthesia for cervical node biopsy. *Anesthesiology.* 1981, 55(4): 471-472.
4. Levin H, Bursztein S, Heifetz M. Cardiac arrest in a child with an anterior mediastinal mass. *Anesth Analg.* 1985, 64(11): 1129-1130.
5. Orlando Hung, Michael F. Murphy Management of the Difficult and Failed Airway 2e. The McGraw-Hill Companies, Inc. 2012.
6. Kapil Chaudhary, Anshu Gupta, Sonia Wadhawn, Divya Jain, Poonam Bhadoria et al. Anesthetic management of superior vena cava syndrome due to anterior mediastinal mass. *J Anaesthesiol Clin Pharmacol.* 2012 , 28(2): 242-246.
7. Atilio Barbeito, Andrew D. Shaw, Katherine Grichnik. Thoracic anesthesia. The McGraw-Hill Companies, Inc. 2012.
8. Pepe PE, Marini JJ. Occult positive end-expiratory pressure in mechanically ventilated patients with airflow obstruction: the auto-PEEP effect. *Am Rev Respir Dis.* 1982, 126: 166-170.
9. Jesse B. Hall, Gregory A. Schmidt, John P. Kress Principles of Critical Care 4th edition. McGraw-Hill Companies, Inc. 2015.