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Anesthetic Challenges in a Patient with Nodular Sclerosing Classical Hodgkin's Lymphoma complicated by Cervical Metastasis and SVC Syndrome: A Case Report

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Abstract

This case presents the anesthetic complexities involved in managing a patient with nodular sclerosing classical Hodgkin's Lymphoma, who presented with severe airway compromise, limited neck mobility due to C7 vertebra involvement, and superior vena cava syndrome. The patient, with an extensive anterior neck mass extending into the mediastinum, post-auricular, and axillary areas, exhibited symptoms such as dyspnea, orthopnea, facial swelling, and upper extremity edema, complicating traditional airway management techniques. Faced with these challenges, the team anticipated significant difficulty with ventilation, direct laryngoscopy, and invasive airway access. To address the airway obstruction effectively before initiating radiotherapy, the anesthesiologists employed awake nasotracheal intubation using a fiberoptic scope with minimal sedation using Remifentanil. This approach successfully secured the airway and facilitated an extended tracheostomy. The patient tolerated the procedure well and was eventually discharged. This case underscores the critical role of fiberoptic intubation in managing complex airway scenarios, particularly in patients with complex malignancies and associated complications.

Keywords: Classical Hodgkin Lymphoma, Difficult airway, Limited neck mobility, SVC syndrome

Introduction

Hodgkin's Lymphoma (HL) is a hematopoietic neoplasm, usually manifesting with supra-diaphragmatic lymphadenopathy and systemic B symptoms.[1] Nodular sclerosing HL often features a mediastinal mass, but severe airway compromise is rare, occurring in just 2.4% of patients. Tracheal compression over 33% leads to respiratory issues.[2] Superior vena cava (SVC) syndrome is also uncommon in HL, with only 25 cases reported by 2021.[3] Enlargement of mediastinal lymph nodes can cause compromised venous return, cardiovascular collapse and complete airway obstruction. Difficult airway, including challenges with direct laryngoscopy, facemask and supraglottic airway ventilation, or invasive airway access,[4] was a concern in our case.

Case Report

This is a case of a 35-year-old Filipino female with Classical Hodgkin's Lymphoma, nodular sclerosing type, presenting with a twelve-year history of a progressively enlarging anterior neck mass measuring

20x28x22 cm. The mass extended from the anterior and posterior neck to the mediastinum, post-auricular region, and axillary areas. The patient experienced intermittent fever, cough, shortness of breath, resting dyspnea, orthopnea, facial swelling, neck swelling, and upper extremity edema, indicative of SVC syndrome. She was assisted in all activities of daily living and can only tolerate lying on a high back rest. Her past medical, psychosocial, and family histories were otherwise unremarkable.

Airway examination revealed a mouth opening limited to 2 fingerbreadths due to trismus, which made it impossible to accurately assess the Mallampati score. The mass caused decreased submandibular, sternomental, and thyromental distances, along with total restriction of neck flexion and extension. The mass extended from the neck into the upper chest, with overlying areas of erythema and crusting [Figure 1]. Midline neck structures were not discernible and the sternal notch was not palpable. The patient had equal chest expansion and decreased but clear breath sounds in the bibasal lung fields. The abdomen was globular and nontender. Facial, neck and upper extremity edema was also evident.

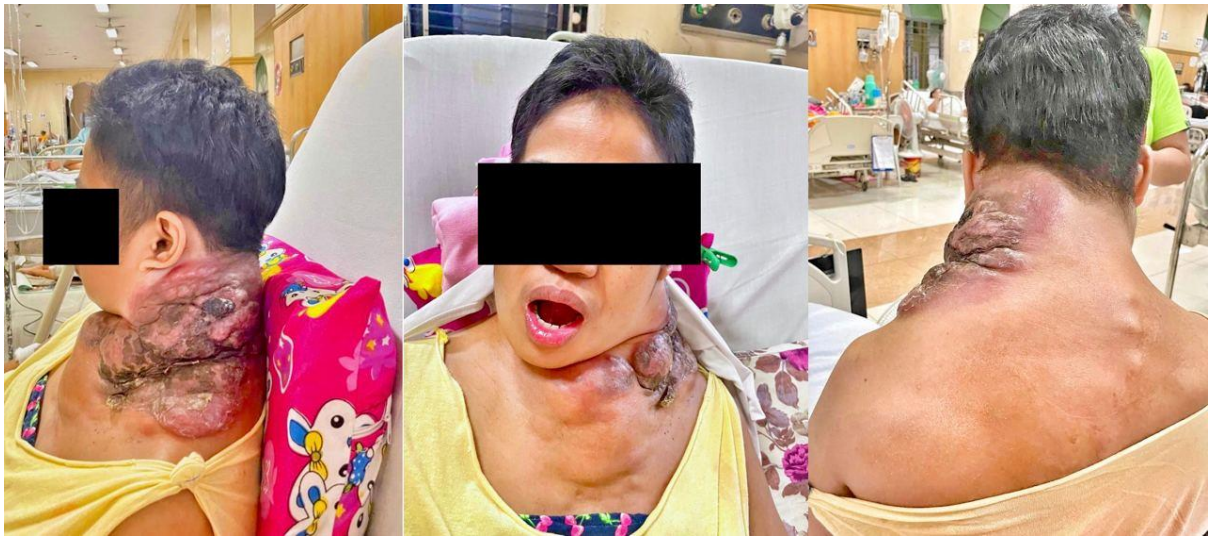

Figure 1. An assessment of the patient's mass showing a firm, fixed confluence of masses extending from the cervical area to the mediastinal area.

Complete blood count (CBC) results revealed anemia and thrombocytosis. Preoperatively, the patient received one unit of packed red blood cells, and post-transfusion CBC showed normalized values. Serum chemistry and coagulation parameters were within normal limits. Echocardiography indicated preserved systolic function and normal diastolic function, with an ejection fraction of 64%.

Preoperative stroboscopy showed that both true and false vocal cords were fully mobile and free of masses. Chest radiograph demonstrated a soft tissue density consistent with the known lymphoma, right lung pulmonary granulomata, and pleural effusion.

A positron emission tomography (PET) scan revealed a large, confluent soft tissue mass (22.1 x 15.7 x 12.1 cm) extending from the neck into the left mediastinum, compressing adjacent structures [Figure 2]. Intense hypermetabolic lymphadenopathy was observed in bilateral cervical, axillary, mediastinal, and left posterior scapular regions. Osseous metastasis in the C7 vertebra was highly suspected, with moderately increased fluorodeoxyglucose uptake in the bone marrow of other osseous structures. Enhancing nodules in both breasts raised concerns for lymphomatous involvement. Splenomegaly was also noted.

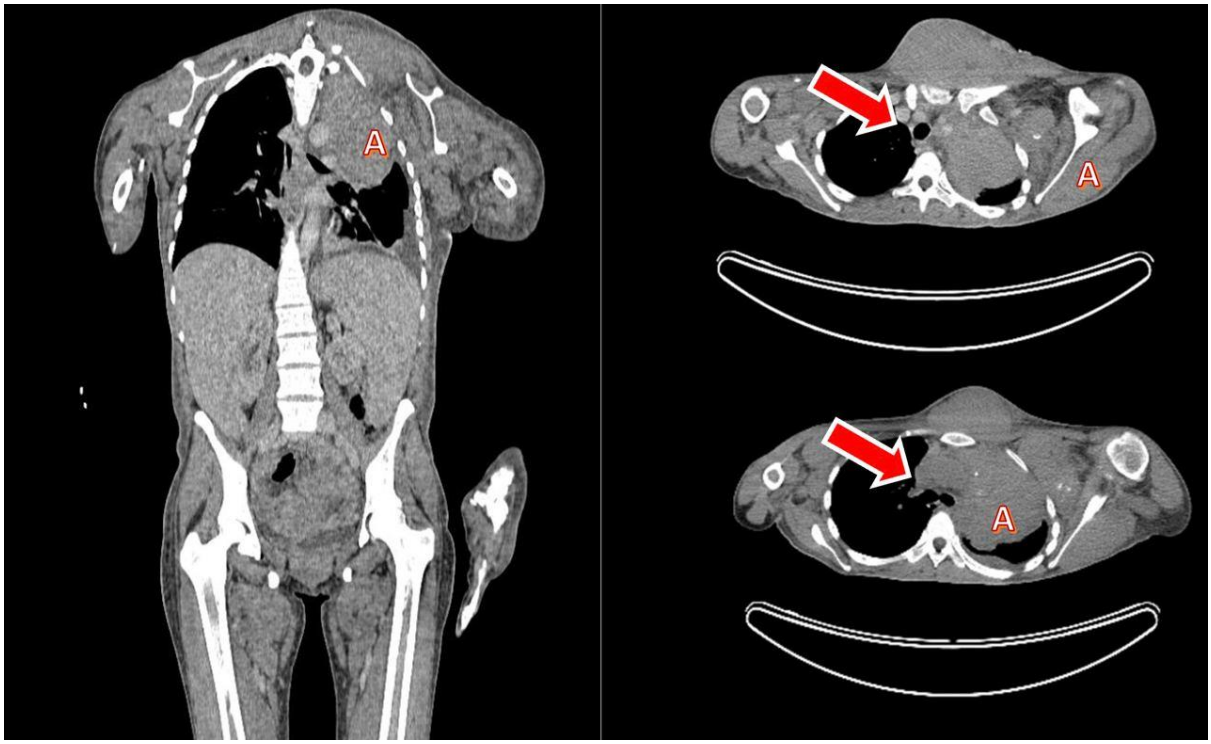

Figure 2. Mass (A) occupying the upper left hemithorax, with pleural effusion (left). Large, transspatial confluent soft tissue mass (A) measuring 22.1 x 15.7 x 12.1cm causing the trachea to deviate towards the right (upper right) Mass encasing and compressing adjacent structures (lower right)

SVC syndrome is diagnosed clinically, with contrast-enhanced computed tomography (CT) scan being the preferred imaging modality for confirmation. [5] Preoperatively, only a non-contrast PET scan was available. While this imaging confirmed that the large mass compressed the mediastinal structures—including the trachea and upper left hemithorax, it is recommended that contrast studies should have been performed. Contrast-enhanced imaging would have improved visualization of the structures and allowed for better assessment of the degree of compression.

The patient was referred to otorhinolaryngology service for prophylactic tracheostomy prior to initiation of radiotherapy. Anesthetic plans of securing the airway using a fiberoptic scope while the patient is awake was well explained prior to the procedure.

The patient was received in the operating room on a moderate high backrest. Standard monitors were attached, and vital signs were stable prior to induction. Preoxygenation was provided using a nasopharyngeal airway connected to the breathing circuit. Remifentanil was started at 0.1 mcg/kg/min, oxymetazoline was applied to both nares, and 10% lidocaine was sprayed on the oropharynx and tonsillar pillars. While the patient was awake and in a semi-sitting position, an adult bronchoscope was guided through the nasal passages to visualize the airway structures [Figure 3]. A north endotracheal tube (size 6.5) was passed over the fiberoptic scope and successfully inserted into the trachea on the first attempt. Intubation was confirmed with capnography and the presence of breath sounds.

Figure 3. Induction of anesthesia (left) and airway setup (right).

Anesthesia was maintained with Sevoflurane at 2-3 vol% and Remifentanil IV at 0.05-0.1 mcg/kg/min. Tidal volume was kept at 6-8 ml/kg, and peak pressures were maintained below 30 cm H_2O. During the procedure, there was difficulty with neck dissection and multiple attempts were made to identify the trachea. The surgery concluded after two and a half hours, with an estimated blood loss of 200 mL. The patient tolerated the procedure and anesthesia well, with stable vital signs throughout. Postoperatively, the patient was immediately weaned from the mechanical ventilator and transferred to the recovery room with oxygen via a tracheal mask at 5 liters per minute. Postoperative medications included Paracetamol, Ketorolac, Tramadol, and Ondansetron. The postoperative course was uneventful, with the patient requiring no supplemental oxygen while in the ward. She was discharged after six days. The patient was scheduled for follow-up and radiotherapy but unfortunately passed away at home.

Discussion

Superior vena cava syndrome results from impaired blood flow through the SVC to the right atrium, disrupting the return of deoxygenated blood from the upper body to the heart. This obstruction is commonly caused by malignancies. [5] In our patient's case, it presented atypically as a result of classical Hodgkin's lymphoma, specifically due to the enlargement of mediastinal lymph nodes.

The extensive anterior neck mass created significant challenges for airway management. The patient, who could only tolerate a moderate high back rest or sitting position, presented with trismus, tracheal deviation, and restricted neck mobility, all of which complicated intubation efforts. Additionally, even if the mouth opening appears adequate, the presence of a large anterior neck mass does not exclude the potential for difficult intubation with conventional laryngoscopy.[6] Airway maneuvers such as chin lift and jaw thrust were not feasible due to restricted cervical range of motion, and the patient could not tolerate the supine position, precluding the optimal sniffing position. The option of performing a tracheostomy under local anesthesia was evaluated but ultimately deemed impractical due to the large neck mass and indistinct anatomical landmarks such as the trachea and sternal notch. [7]

Given these constraints, fiberoptic intubation was selected as the safest approach. This technique allows for direct visualization of the airway, enabling navigation around the obstructing mass. Preoxygenation

was a key component of the anesthetic management, using a nasopharyngeal airway to optimize oxygen reserves and prevent hypoxia, particularly given the increased risk of tracheal wall necrosis from prolonged pressure from the mass. [8]

Performing the procedure in a semi-sitting position was preferred to facilitate better drainage of secretions by gravity and reduced the risk of airway collapse. While sedation during induction is not strictly necessary, it can improve patient comfort, reduce anxiety, and minimize recall. [9] Remifentanil was used for its antitussive effects, [10] helping to minimize coughing during intubation.

Hemodynamic stability is crucial in patients with SVC syndrome due to the elevated venous pressure and potential cardiovascular instability. Monitoring and maintaining hemodynamic stability during anesthesia is vital. Sevoflurane was chosen for its minimal impact on hemodynamics, [5] making it suitable for maintaining anesthesia in this context. Vascular access was secured in the upper extremity, but this should generally be avoided in cases of compromised venous return. [5] Alternative access sites may be considered to prevent exacerbating venous congestion.

Conclusion

This case demonstrates an unusual presentation of nodular sclerosing Hodgkin's lymphoma, where a prophylactic tracheostomy, typically a straightforward procedure, was complicated by severe airway constraints and SVC syndrome. Establishing a secure airway and maintaining hemodynamic stability were paramount in this case. The successful use of awake nasotracheal intubation with a fiberoptic scope not only ensured the patient's safety but also facilitated the timely execution of necessary interventions.

Informed Consent

Physical signed copy is available upon request.

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