



TRACHEAL SURGERY USING PERIPHERAL CARDIOPULMONARY BYPASS WITHOUT USING INITIAL ENDOTRACHEAL INTUBATION

General Surgery

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ABSTRACT

While ventilatory support can be life-saving, it can also have negative consequences such as postintubation tracheal stenosis, which is caused by injury to the larynx and trachea. Cardiopulmonary bypass is typically not employed for the surgical treatment of tracheal stenosis. Nevertheless, wait s discovered that utilising cardiopulmonary bypass can offer benefits during tracheal resection and reconstruction.

KEYWORDS

Tracheal surgery, Tracheal carcinoma, Cardiopulmonary bypass, Intubation

INTRODUCTION

Respiratory assistance is frequently employed in the care of severely unwell patients. Although this therapy can save lives, it can also have negative consequences, such as postintubation tracheal stenosis resulting from damage to the larynx and trachea due to the extended use of endotracheal and tracheostomy tubes. Tracheal stenosis may develop within just 48 hours following intubation.¹ After extended periods of intubation, 19% of individuals experience the development of the disease.² The onset of symptoms in patients typically occurs within a range of 10 to 42 days, although symptoms can manifest as early as 2 days.³ The onset of symptoms might be sudden or gradual, depending on the nature of the lesion. Stridor typically occurs when the stenosis narrows to a diameter of 5 mm or smaller.⁴

Tracheal primary carcinoma is an exceptionally uncommon condition. Delayed diagnosis often results in patients presenting in an acute state, primarily due to substantial airway blockage at the time of diagnosis. Cardiopulmonary bypass may be necessary in situations where airway control is challenging.⁵ Cardiopulmonary bypass (CPB) is typically not employed during tracheal resection and reconstruction for the surgical treatment of tracheal stenosis. Nevertheless, it has been discovered that the utilization of CPB can offer benefits in such circumstances.

Case Details

The patient was a 55-year-old male, a smoker for more than 30 years, who quit 5 years ago. he presented with symptoms of cough, dyspnoea, and stridor. The patient was treated for carcinoma of the oesophagus with chemotherapy. No case details were available.

The patient had a full investigation. A polypoidal mass measuring 4 cm was observed during bronchoscopy, located distally to the vocal cords. The mass exhibited bleeding upon contact. A CT scan revealed a tracheal mass located inside the trachea, below the vocal cords. The mass is occupying the posterior wall, as well as the right and left lateral walls of the trachea, resulting in almost complete blockage of the airway. Bronchial washings indicated the presence of a squamous cell tumor.

The surgical resection presented challenging issues, including the difficulty of ventilation due to the shared airway between the anaesthetist and surgeon, as well as the difficulty of accessing the tumor. The decision was made to conduct the surgery using peripheral cardiopulmonary bypass without initially inserting an endotracheal tube. The patient had spinal anesthesia with Bupivacaine, and a Dexmedetomidine infusion was initiated.

The left femoral artery and vein were surgically exposed, cannulation was performed after administration of Heparin, and the patient was placed on cardiopulmonary bypass. Thiopentone, Fentanyl, and Rocuronium were introduced into the circuit.

A T-shaped cervical incision was performed along with a sternotomy. The right atrium was cannulated. The tumor site was detected using Fiber optic Bronchoscopic guidance. Two tracheal rings were

surgically removed in addition to the tumor. The superior and inferior margins were sent for frozen section analysis, which confirmed the absence of malignancy. The trachea was mobilized and then a primary end-to-end anastomosis was performed using interrupted sutures. A thymic flap was used to reinforce the anastomosis.

The endotracheal intubation was done with the guidance of the surgeon. The patient was weaned off CPB and the chest was closed. The guardian sutures were placed from the chin to the chest wall to prevent tension on the anastomosis. The patient was extubated on the table. The Ryles tube feeds were started on 2nd postoperative day. ICD and guardian sutures were removed on the 7th postoperative day.

The patient was followed up for 2 years and remained symptom-free with no recurrence.



Figure 1: Femoral Cannulation



Figure 2: Resected specimen



Figure 3: Tumor causing near total occlusion of Trachea

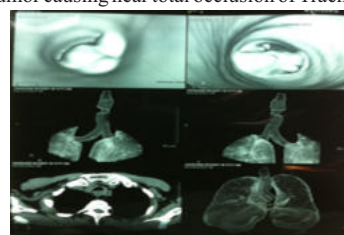


Figure 4: Virtual Bronchoscopy

DISCUSSION

Patients experiencing approximately 75% occlusion of tracheal obstruction exhibit symptoms of respiratory distress.⁶ Cardiopulmonary bypass was employed for tracheal and carinal resection during the period of the 1960s-1970s. Nevertheless, because of the possible complications associated with cardiopulmonary bypass (CPB), it was discontinued.⁷ In recent years, the use of cardiopulmonary bypass has become a reliable and widely accepted procedure. Performing peripheral cardiopulmonary bypass is straightforward and uncomplicated.^{8,9}

This technique is beneficial in situations where there is a notable blockage in the airway, which is used by both the surgeon and anesthesiologist. It is also useful in cases where there is difficulty in reaching the tumor.¹⁰

The majority of tracheal tumors are malignant and consist of squamous cell carcinoma. Carcinoma is observed in nearly 30% of tracheal malignancies. They are predominantly observed in males and individuals who smoke. Typically, they are observed in the back wall of the trachea and the lower section of the trachea. Currently, approximately 60% of tracheal tumors can be surgically removed when they are first diagnosed.^{11,12}

The surgeon faces challenges such as the size of the tumor, invasion into the mediastinum, and the spread of cancer to distant parts of the body. Grillo et al,¹³ demonstrated that up to 50% of the length could be surgically removed and reconstruction could be performed.

The primary options for end-to-end anastomosis involve several release techniques.¹⁴ The best prognostic factor is the extent to which the resection is complete.¹⁵ Postoperative radiotherapy is advised as a preventive measure against recurrence.¹⁶ The median survival period is 34 months, and the 5-year survival rate is approximately 47%.¹⁷

CONCLUSION

Peripheral cardiopulmonary bypass is a viable and secure choice for managing tracheal tumors with challenging airway management, notwithstanding the potential complications associated with cardiopulmonary bypass.

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