Extracorporeal life support as a lifesaving procedure in palliative surgery of stenosing upper tracheal tumor

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ABSTRACT

In the patients with stenotic upper respiratory airways tumor, the tracheal intubation during the surgical resection is sometimes impossible. In these situations, Extracorporeal Membrane Oxygenation appears to be an interesting temporarily alternative to ventilation to allow tumor removal. In this report the authors describe a case of successful resection of tracheal tumor in an 80-year-old female patient in which tracheal intubation was impossible. A circulatory assistance was used to perform the operation. Afterwards, tracheal intubation was easily performed for the rest of the operation.

Keywords: Circulatory assistance, difficult intubation, dyspnea, tracheal stenosis

INTRODUCTION

Surgery involving the main airways requires optimal exposure and maintenance of adequate oxygenation and ventilation. An established alternative to ventilation in such situations is conventional cardiopulmonary bypass (CPB), which provides both gas exchange and haemodynamic stability at the same time. However, CPB also owns several disadvantages such as increased need for blood products due to full anticoagulation of the patients, or the potential danger of tumor cell spilling through the machine suction system. In this situation, extracorporeal life support (ECLS) offers an attractive alternative. While providing both oxygenation and circulation support, it avoids full anticoagulation, and the risk of tumor cell dissemination is reduced due to the closed loop extracorporeal circulation. In this work, the authors report a case of bronchosopic tracheal tumor resection under circulatory assistance.

THE CASE

It consisted of was an 80-year-old female and heavy smoker (80 packet-years) who was suffering from dyspnea for two months that was gradually complicated by wheezing and intercostal retractions. She was given corticoid but this treatment failed to decrease the symptoms. Nasal endoscopy revealed a bourgeoning tumor that severely narrowed the upper trachea just below the glottis. Biopsy was not done due to the high risk of bleeding. In the absence of histology, the surgical removal could not meet with requirements of cancer resection. Another issue was that the tumor is located at the right place to perform tracheostomy. Taking into account the advanced age of the patient, the staff decided to go for palliative tumor resection under veno-venous extracorporeal membrane oxygenation (ECMO). Due to dyspnea, the patient could...
not cope with supine position. As a consequence, the staff failed to catheterize the right internal jugular vein for cannulation. The final alternative solution was the performance peripheral femoro-femoral ECLS. But, as the ECLS was running, the patient developed Harlequin syndrome as she presented critical variation in the oxygen saturation between the upper and the lower part of the body deriving from a poor lung function. The treatment protocol associated three drugs that included nicardipine IV 1 mg which was repeated once, esmolol IV 100 mg repeated twice and noradrenaline 8 mg in 50 ml of physiological saline on electric syringe pump that was progressively increased. This allowed a secured removal of the bleeding tumor with the use of a bronchoscope and monopolar cautery [Figure 3]. The tumor was totally resected, the bleeding controlled and the tracheal lumen freed from stenosis. In this situation, putting a stent appeared to be unnecessary. Just after the tumor resection, the patient was easily intubated and then weaned from the assistance. She was extubated on postoperative day 1 in the intensive care unit. The postoperative course was uneventful; so Ms. BH discharged from hospital on day 15 postoperatively. Later, histology found small cell carcinoma and the assessment of tumor extension showed a pre-tracheal nodule but there was no distal metastasis. Then the patient was given chemotherapy (cisplatin + etoposide) four times followed by radiotherapy on the pre-tracheal nodule. The first follow up did not find any tracheal stenosis but it is to be continued.

**DISCUSSION**

The clinical relevance of this case is the morbid association: advanced age, clinical issues of the tumor location, clinically advanced stage and potential hemorrhage. Also, in the literature only some cases or some mini-series are reported.[4-6] Our main purpose was to highlight the issues that we faced at every step of the treatment. The alternative techniques for anesthesia were intubation through tracheostomy or circulatory assistance. But, as seen through this case, it was not that easy to cannulate the right internal jugular vein under some circumstances. Percutaneous ECLS was the easiest approach to perform and to remove but veno-venous ECMO was preferable as it could prevent the Harlequin syndrome. The tumor resection itself was not a tricky procedure once the bronchoscope was used as we have got a clear and tubeless operative field. This facilitated precise tumor dissection and removal but it certainly did not meet with the required limits of resection. In some settings, it may be appropriate to initiate ECLS prior to patient transfer[7] but the patient did not require maintaining assistance. The theoretical spread of tumor cells is neglectable, since ECLS is a closed system and suctioned blood can be discarded.[8] The postoperative course and follow up reinforced the fact that using ECLS in the management of complex airway tumors is less harmful.
and even useful. Other cases are to be performed to better establish protocols and guidelines.

CONCLUSION

Surgical resection is still undoubtedly the first line treatment of stenosing upper tracheal tumor on the condition that it is to be radical. When it is palliative, using circulatory assistance appears to be a good alternative to secure the performance.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Hoetzenecker K, Klepetko W, Keshavjee S, Cypel M. Extracorporeal support in airway surgery. J Thorac Dis 2017;9:2108‑17.
2. Hasegawa S, Otake Y, Bando T, Cho H, Inui K, Wada H. Pulmonary dissemination of tumor cells after extended resection of thyroid carcinoma with cardiopulmonary bypass. J Thorac Cardiovasc Surg 2002;124:635‑6.
3. Vaporciyan AA, Rice D, Correra AM, Walsh G, Putnam JB, Swisher S. Resection of advanced thoracic malignancies requiring cardiopulmonary bypass. Eur J Cardiothorac Surg 2002;22:47‑52.
4. Lang G, Ghanim B, Hötze necker K, Klikovits T, Matilla JR, Aigner C, et al. Extracorporeal membrane oxygenation support for complex tracheo-bronchial procedures. Eur J Cardiothorac Surg 2015;47:250‑6.
5. Kodama K, Higashiyama M, Yokouchi H, Takami K, Yasuda T, Kabuto T. Use of percutaneous cardiopulmonary support (PCPS) for extended surgery in patients with T4 tumor. Kyobu Geka 2000;53:721‑5.
6. Wiebe K, Poelting J, Arlt M, Philipp A, Camboni D, Hofmann S. Thoracic surgical procedures supported by a pumpless interventional lung assist. Ann Thorac Surg 2010;89:1782‑7.
7. Collar RM, Taylor JC, Hogikyan ND, Tutuo N, Ohye RG, Green GE. Awake extracorporeal membrane oxygenation for management of critical distal tracheal obstruction. Otolaryng Head Neck Surg 2010;142:618‑20.
8. Hasegawa S, Otake Y, Bando T. Pulmonary dissemination of tumor cells after extended resection of thyroid carcinoma with cardiopulmonary bypass. J Thorac Cardiovasc Surg 2002;124:635‑6.