

Title: Emergency tracheostomy and venovenous extracorporeal membrane oxygenation for a difficult airway patient with carinal melanoma: a case report and literature review

Comment(s) from reviewer #1:

Point 1: Thank you for your presentation of this useful case report. You handle the situation properly and can give some meaningful tips. One point I noticed in the report. Blood gas analysis is the most important indication for ECMO, but you didn't give any blood gas result in the article. Only few blood gas results are mentioned in Table 1. I suggest you give blood gas results of different time points, including before going into the operation room, before anesthesia, before VV-ECMO, and after ECMO.

Response

We thank the reviewer for kind comment. The blood gas results were listed in Table 1, and we have added the time points of blood gas analysis including before induction, during tracheostomy, and after ECMO removal in Table 1; and we have added relative descriptions in the revised manuscript which read: "During performing tracheostomy for rigid bronchoscopy access, progressive desaturation occurred despite the assistance of intermittent volume ventilation and continuous insufflation (blood gas analysis showed hypoxemia and hypercapnia, Table 1)."(*please see Treatment section, page 8, line 6-8*), "With adequate oxygenation (evidenced by blood gas analysis, Table 1) and stable hemodynamic postoperatively, 50 mg of protamine was administered intravenously, and VV-ECMO was weaned smoothly."(*please see Treatment section, page 8, line 15-17*), "Serial blood gas analysis revealed that this patient with 90% tracheal obstruction had progressive CO₂ retention and hypoxemia ins supine position even under an O₂ mask 10 L/min support."(*please see Treatment section, page 11, line 18-19*), "Consequently, we instituted VV-ECMO immediately (within 5 min) via femoro-jugular cannulation to ensure adequate oxygenation and reduce hypercapnia (Table 1)."(*please see Treatment section, page 13, line 1-2*). The revised Table 1 is listed below:

Table 1. Comparison between serial anesthesia management for this patient with different degree of tracheal obstruction

Time point	Surgery	previous symptoms	Tracheal Obstruction	Induction agents	Airway management	Muscle relaxation	Oxygen support	PaO ₂ (mmHg) ^a	PaCO ₂ (mmHg) ^a	Subsequent management	Outcome
October 8, 2019 (age 40 yrs)	Right temporal craniotomy	No respiratory distress	20% at carina level	Fentanyl, propofol	Awake nasal fiberoptic intubation	Yes	1 L/min, FiO ₂ 100%	461	28.8	Extubation at OR	Uneventful
February 19, 2020 (age 41 yrs)	Oral commissure reposition	No respiratory distress	50% at carina level	Fentanyl, propofol	Awake nasal fiberoptic intubation	Yes	1 L/min, FiO ₂ 70%	368	32	Extubation at OR	Uneventful
May 23, 2020 (age 41 yrs)	At OR, before induction	Smooth respiration in supine position	90% at carina level		Spontaneous respiration under simple O ₂ facemask	No	O ₂ mask 10 L/min	63.7	42.3	Oxygen support	prepare for tracheal tumor excision.
	After intubation	Tracheostomy, tracheal tumor excision and stent insertion	Sudden desaturation after transferring to OR bed	Fentanyl, propofol	Awake nasal fiberoptic intubation, spontaneous respiration via ETT	No	2 L/min, FiO ₂ 100%	58.2	46.6	Intermittent positive pressure ventilation, attempt tracheostomy	Progressive desaturation
	During tracheostomy, before VV ECMO	desaturation due to cough, tumor bleeding, or airway compression		propofol	Spontaneous respiration via ETT	No	2 L/min, FiO ₂ 100%	48.9	45.4	Intermittent positive pressure ventilation, ECMO deployment	decompensation
	After VV ECMO deployment	Desaturation during tracheostomy		cisatracurium	Tracheostomy, machinal ventilation	Yes	2 L/min, FiO ₂ 100%	84.2	27.1	Tracheostomy, tracheal tumor excision and tracheal stent insertion	Improved oxygenation
	After tracheal tumor excision	Improved oxygenation under ECMO support	Tracheal stent		Tracheostomy, mechanical ventilation	Yes	1 L/min, FiO ₂ 100%	220.3	41.3	ECMO weaned	Care at intensive care unit
	After ECMO removal	Improved oxygenation after tumor removal	Tracheal stent		Tracheostomy, mechanical ventilation	Yes	1 L/min, FiO ₂ 80%	260.3	39.4	ICU care	Uneventful

Abbreviation: ECMO = extracorporeal membrane oxygenation; OR = operating room; ETT = endotracheal tube. ^a PaO₂ and PaCO₂ values were obtained from intraoperative arterial blood gas analysis.

Comment(s) from reviewer #2:

General comment: Authors showed a case of carinal melanoma recurrence accompanying airway obstruction. He was successfully treated by VV-ECMO. Present difficult case was successfully treated, and the case report was well-written. But a few points should be clarified.

Point 1: In present case, nasotracheal intubation was performed before intervention. Authors should show the location of the tube head.

Response: We thank the reviewer for kind comment. The location of nasotracheal tube was checked by direct visualization of tubal tip above carina around 3-4 cm using flexible fiberscope during awake nasotracheal intubation and bilateral equal breathing sound on auscultation during positive ventilation. We have added relative description in our revised manuscript and that read “Awake fiberoptic nasotracheal intubation was performed using a 6.5 Fr endotracheal tube fixed at 27 cm (tip above the carina 3-4 cm confirmed by direct visualization using a flexible fiberscope), and SpO2 was stabilized at > 95% after intermittent positive pressure ventilation.” *please see Treatment section, page 7, line 18 to page 8, line 1”*

Point 2: Present case was carinal melanoma. Tumor stiffness or behavior might be quite different according to tumor histology. Authors should clarify the intervention for airway obstruction according to the tumor origin.

Response: We thank the reviewer for kind comment. The carinal mass in our patient had the largest chance to be metastatic melanoma originated from previous lung metastasis based on pre-operative chest computed tomography and flexible bronchoscopy, and the characteristics of this masses were soft, multi-lobular, and easy-bleeding. Since our patient had stage IV metastatic melanoma with a five-year survival rate less than 30%, palliative therapy to relieve obstructive symptoms was chosen as a better option instead of curative therapy with carina resection and trachea reconstruction. Based on the tumor characteristics and location, rigid bronchoscopy-assisted resection of tracheal tumor and tracheal stent insertion instead of laser resection was chosen for our patient because it would further facilitate hemostasis and ensure airway patency. We have added relative descriptions in our revised manuscript and that read “Combined with the patient’s medical history and image findings, the main diagnosis for this patient was a protruding tracheal mass at the carinal level (most likely a metastatic melanoma), causing nearly total occlusion of the left main bronchus and partial obstruction of the right main bronchus.”(please see Diagnosis section, page 7, line 3-5), “After a multidisciplinary discussion between surgeons, oncologists, interventional pulmonologists, and anesthesiologists, rigid bronchoscopy-facilitated carinal tumor resection and tracheal stent placement were suggested for palliative treatment of this soft, easy-bleeding metastatic melanoma.”(please see Treatment section, page 7, line 7-9).

Point 3: In case presentation, authors should unify age not but year.

Response: We thank the reviewer for kind comment. We have added patient's age in each corresponding time points to facilitate the readability of this manuscript.

LANGUAGE POLISHING REQUIREMENTS: As the revision process results in changes to the content of the manuscript, language problems may exist in the revised manuscript. Thus, it is necessary to perform further language polishing that will ensure all grammatical, syntactical, formatting and other related errors be resolved, so that the revised manuscript will meet the publication requirement (Grade A). Authors are requested to send their revised manuscript to a professional English language editing company or a native English-speaking expert to polish the manuscript further. When the authors submit the subsequent polished manuscript to us, they must provide a new language certificate along with the manuscript.

Response: We have sent the revised manuscript to a professional English language editing company “Editage” for second English editing and the new language certificate is listed below.



Comment(s) from *Company editor-in-chief*:

General comment: I have reviewed the Peer-Review Report, the full text of the manuscript, and the relevant ethics documents, all of which have met the basic publishing requirements of the *World Journal of Clinical Cases*, and the manuscript is conditionally accepted. I have sent the manuscript to the author(s) for its revision according to the Peer-Review Report, Editorial Office's comments and the Criteria for Manuscript Revision by Authors. Before final acceptance, uniform presentation should be used for figures showing the same or similar contents; for example, "Figure 1 Pathological changes of atrophic gastritis after treatment. A: ...; B: ...; C: ...; D: ...; E: ...; F: ...; G: ...". Please provide the original figure documents. Please prepare and arrange the figures using PowerPoint to ensure that all graphs or arrows or text portions can be reprocessed by the editor. In order to respect and protect the author's intellectual property rights and prevent others from misappropriating figures without the author's authorization or abusing figures without indicating the source, we will indicate the author's copyright for figures originally generated by the author, and if the author has used a figure published elsewhere or that is copyrighted, the author needs to be authorized by the previous publisher or the copyright holder and/or indicate the reference source and copyrights. Please check and confirm whether the figures are original (i.e. generated *de novo* by the author(s) for this paper). If the picture is 'original', the author needs to add the following copyright information to the bottom right-hand side of the picture in PowerPoint (PPT): Copyright ©The Author(s) 2022. Before final acceptance, when revising the manuscript, the author must supplement and improve the highlights of the latest cutting-edge research results, thereby further improving the content of the manuscript. To this end, authors are advised to apply a new tool, the RCA. RCA is an artificial intelligence technology-based open multidisciplinary citation analysis database. In it, upon obtaining search results from the keywords entered by the author, "Impact Index Per Article" under "Ranked by" should be selected to find the latest highlight articles, which can then be used to further improve an article under preparation/peer-review/revision. Please visit our RCA database for more information at: <https://www.referencecitationanalysis.com/>

Response: We thank the editor for kind comment. The figures in the manuscript are all originally generated, and the figures have been uploaded in PowerPoint version. Besides, copyright information "Copyright ©Liu, et al. 2022." has been added to each picture in PowerPoint.