

C-54 Anesthetic Management for Robotic Pericardial Window in a Known Difficult Airway Patient With New Onset of Atrial Fibrillation

Moderator(s)/Facilitator(s): Cheng Feng, D.O., Faraz Mahmood, M.D.

Objective

After completion of this session, the participant will be able to:

- Address the pitfalls of multiple severe comorbidities in the anesthetic management during robotic pericardial window surgery.

Case Stem Question

An 84-year old female presents for robotic pericardial window and left atrial appendage clipping via left video-assisted thoracic surgery (VATS). Patient presented two weeks ago to the cardiologist with palpitations found to be a new onset Atrial Fibrillation (AFib). She has had a small pericardial effusion for approximately 20 years without intervention due to small size. Incidentally the echo exam demonstrated growth of pericardial effusion to 2.1 cm with reduced ejection fraction (EF) to 45-55%, with mildly reduced right ventricular function and moderate mitral and tricuspid regurgitation, and normal estimated pulmonary artery systolic pressure. Currently she denies any chest pain, shortness of breath, dyspnea on exertion, leg swelling, increased elevation to sleep, or other symptoms. She is on anticoagulant medication and betablocker.

Other significant history is that patient has had surgery in 2014 for the removal of basal cell carcinoma in the left mandible. She reported no problems with mouth movement at the time. However, with the recurrence of cancer, patient underwent radiation and is now unable to open her mouth more than 2cm.

On physical examination, patient is alert and oriented to time, location, and person. Heart rhythm is irregularly irregular at rate between 70-80's. Patient is able to open her mouth less than 1.5 cm, at the corner of right side only, and has complete occlusion at the center of the mouth. Patient weight was 53kg, and patient height was 5 feet 1 inch tall.

After extensive conversation with the patient regarding awake/minimal sedation/topical anesthetic for nasal intubation, patient agreed with the plan and wanted to proceed. She was brought to the operating room and standard ASA monitors were applied. Patient sat at 45 degrees and nebulizer with 2% 4cc lidocaine orally was initiated. Glycopyrrolate 0.2 mg was administered intravenously with minimum affect on heart rate.

Dexmedetomidate 0.8 mcg/kg/hr infusion started simultaneously. Right nostril was atomized once with 2cc of 4% lidocaine and different sizes of nasal trumpets with viscous lidocaine jelly introduced to the right nostril about 30 seconds each (24, 28, and 32). Regular 7.0 ETT was gently advanced through the right nostril and guided with fiberoptic bronchoscope to the opening of vocal cords where 2cc of 4% lidocaine was injected. Bronchoscope was advanced further into the trachea, ETT was able to follow

and was placed into the trachea with ease. End tidal CO₂ was confirmed, and propofol and fentanyl were given to induce general anesthesia.

Right radial arterial line and second intravenous line 18 gauge were placed in right forearm post induction. The bronchial blocker was inserted through ETT under bronchoscopy guidance. The right lung was deflated and left lung was ventilated with TV of 200cc, rate of 25, PEEP of 5, and FiO₂ of 100%. Pediatric TEE probe was successfully advanced into the esophagus without difficulty. Patient was positioned into left lateral decubitus and thoracoscopic robotic pericardial window began. Echo exam demonstrated 2cm of circumferential pericardial effusion surrounding the heart. Minimal to trace MR and TR were noted. No pericardial tamponade physiology was present. Approximately 500-600cc of pericardial effusion was drained and a piece of pericardium was sent for biopsy.

The pericardial effusion was successfully drained, yet LAA clipping was not performed. The TEE was not able to absolutely exclude presence of clots in the LAA. Electric cardioversion was not performed. Patient returned to two lungs ventilation, was spontaneously breathing, and able to extubate without any complication. Patient was discharged home on post-operative day two.

Guiding Questions for Discussion

1. What other preoperative testing should be included?
2. How would you approach in securing the airway for this assumed difficult intubation patient?
3. How much of local anesthetic is safe in this patient in establishing the airway? How will local anesthesia toxicity (LAST) be presented and how to treated?
4. Would you place pre-induction arterial line? Pre-induction central venous line?
5. Would you place defibrillation pads before induction?
6. How would clinical management be different during induction if patient presented with pericardial tamponade physiology? Any change on medication or monitoring practice?
7. How to separate/isolate lung for one-lung ventilation (OLV)?
8. How to establish lung isolation if blocker wasn't able to position appropriately or confirm through nasal ETT?
9. What are predictors of hypoxemia during OLV? How can hypoxemia be treated during OLV?
10. Is TEE absolute required for pericardial window surgery? Would TTE be applicable on left lateral decubitus position?
11. How does positioning of the robot affect patient access and monitoring during the surgery?
12. What are common thoracic insufflation pressures during robotic thoracic surgery? How does thoracic insufflation affect cardiopulmonary physiology during OLV?
13. What are the etiologies of the rising PIP?
14. What are the etiologies of hypercapnia during OLV? How is hypercapnia treated?
15. How would you manage AFib if patient develop rapid AFib and hypotension?

16. Ethical concern: is it necessarily to perform a robotic pericardial window on a geriatric patient with potential difficult airway with new onset of AFib?

References

1. Irouschek A, Schmidt J, Ackermann A, et al. Management of the Expected Difficult Airway with Planned One-Lung Ventilation: A Retrospective Analysis of 44 Cases. *Thor Cardiovasc Surg*. DOI: 10.1055/s-0044-1791982
2. Collins SR, Titus BJ, Campos JH, Blank RS. Lung Isolation in the Patient With a Difficult Airway. *Anesthesia and Analgesia*. 2018 Jun;126(6):1968-1978. DOI:10.1213/ane.0000000000002637.PMID: 29189274
3. Cano PA, Mora Ic, Enriquez I, et al. One-lung ventilation with a bronchial blocker in thoracic patients. *BMC Anesthesiol* 23, 398 (2023). <https://doi.org/10.1186/s12871-023-02362-z>
4. Suwalski P, Witkowska A, Drobinski D, et al. Stand-alone totally thoracoscopic left atrial appendage exclusion using a novel clipping system in patients with high risk of stroke - initial experience and literature review. *Kardiochir Torakochirurgia Pol* 2015 Dec; 12(4):298-303. DOI: 10.5114/kitp.2015.56777. Epub 2015 Dec 30. PMID: 26855643; PMCID: PMC4735528
5. Ramlawi B, Bedeir K, Edgerton JR. Totally Thoracoscopic Closure of the Left Atrial Appendage. *Ann Thorac Surg* 2019;107:e71-3 <https://doi.org/10.1016/j.athoracsur.2018.07.046>
6. Branzoli S, Marini M, Guarracini F, et al. Standalone Totally Thoracoscopic Left Appendage Clipping: Safe, Simple, Standardized. *The Annals of Thoracic Surgery*, Volume 111, issue 1, January 2021, pages e61-e63. <https://doi.org/10.1016/j.athoracsur.2020.04.130>
7. Mizukami Y, Ueda N, Adachi H, et al. Long-Term Outcomes after Video-Assisted Thoracoscopic Pericardiectomy for Pericardial Effusion. *Ann Thorac Cardiovasc Surg*. 2017 Aug 9;23(6):304-308. Doi:10.5761/atcs.0a.17-00046. Epub 2017 Aug 9. PMID: 28794388; PMC5738452
8. Madhivathanan PR, Corredor C, Smith A. Perioperative implications of pericardial effusions and cardiac tamponade. *BJA Educ*. 2020 Jul;20(7):226-234. doi: 10.1016/j.bjae.2020.03.006. Epub 2020 Jun 12. PMID: 33456955; PMCID: PMC7808091
9. Correia M. Anaesthesia for patients with pericardial disease. *Southern African Journal of Anaesthesia and Analgesia* 2018; 24(3)(Supplement 1). ISSN 2220-1181. EISSN 2220-1173
10. Kunal K, Ashish KK, Somnath B, at al. Atrial Fibrillation: Current Evidence and Management Strategies During the Perioperative Period. *Anesthesia & Analgesia* 130(1):p 2-13, January 2020. DOI: 10.1213/ANE.0000000000004474