

Posterior Membranous Tracheal Laceration After Uncomplicated Endotracheal Intubation: Primary Repair with Intercostal Muscle Flap

Herbert, K., MD, Kamal, R., MD, Pak, A., MD, Carter, R. MD
Summa Health System – Akron, OH

Introduction

Post-intubation tracheal laceration is rare but potentially life-threatening and may present subtly with postoperative neck swelling and subcutaneous emphysema. Risk factors include female sex, advanced age, and iatrogenic mechanisms related to tube--membrane friction or cuff overinflation. Prompt CT and bronchoscopic evaluation guide operative versus conservative management. Larger, distal membranous tears generally warrant surgical repair, often via right thoracotomy for intrathoracic injuries.

Clinical Presentation

A woman in her 70s with ESRD (CKD4), HTN, T2DM (insulin-dependent), RA, and asthma underwent elective creation of an upper-extremity arteriovenous fistula under general anesthesia with apparently uncomplicated direct laryngoscopy (Macintosh #3) and single-attempt intubation. In PACU she developed dyspnea and left-sided neck swelling with palpable crepitus. Chest radiograph showed cervical/upper thoracic subcutaneous emphysema without clear pneumothorax; CT revealed a large posterior tracheal defect above the carina. Awake bronchoscopy confirmed a longitudinal membranous tear >3 cm. Given the size and location, the patient proceeded emergently to surgery.

Operative/Postop Course

After bronchoscopic guidance for double-lumen tube placement and one-lung ventilation, a right posterolateral thoracotomy was performed. An ~ 5 cm clean laceration of the distal membranous trachea not extending beyond the carina was identified and primarily repaired with interrupted sutures. The area was reinforced with an intercostal muscle flap. Leak testing under saline demonstrated an airtight repair; chest tubes were placed. The patient was extubated in the operating room and transferred to the intensive care unit. She required no supplemental oxygen, had stable serial chest radiographs, and chest tubes were removed after several days. She received empiric mediastinitis-prophylaxis antibiotics and one-unit PRBC for baseline anemia; postoperative acute (on CKD) kidney injury was comanaged by nephrology. Residual subcutaneous air resolved without pneumothorax or dehiscence. She was discharged home on postoperative day 11 and was recovering well at clinic follow-up.

Media

Figure 1: PACU Stat upright PA CXR

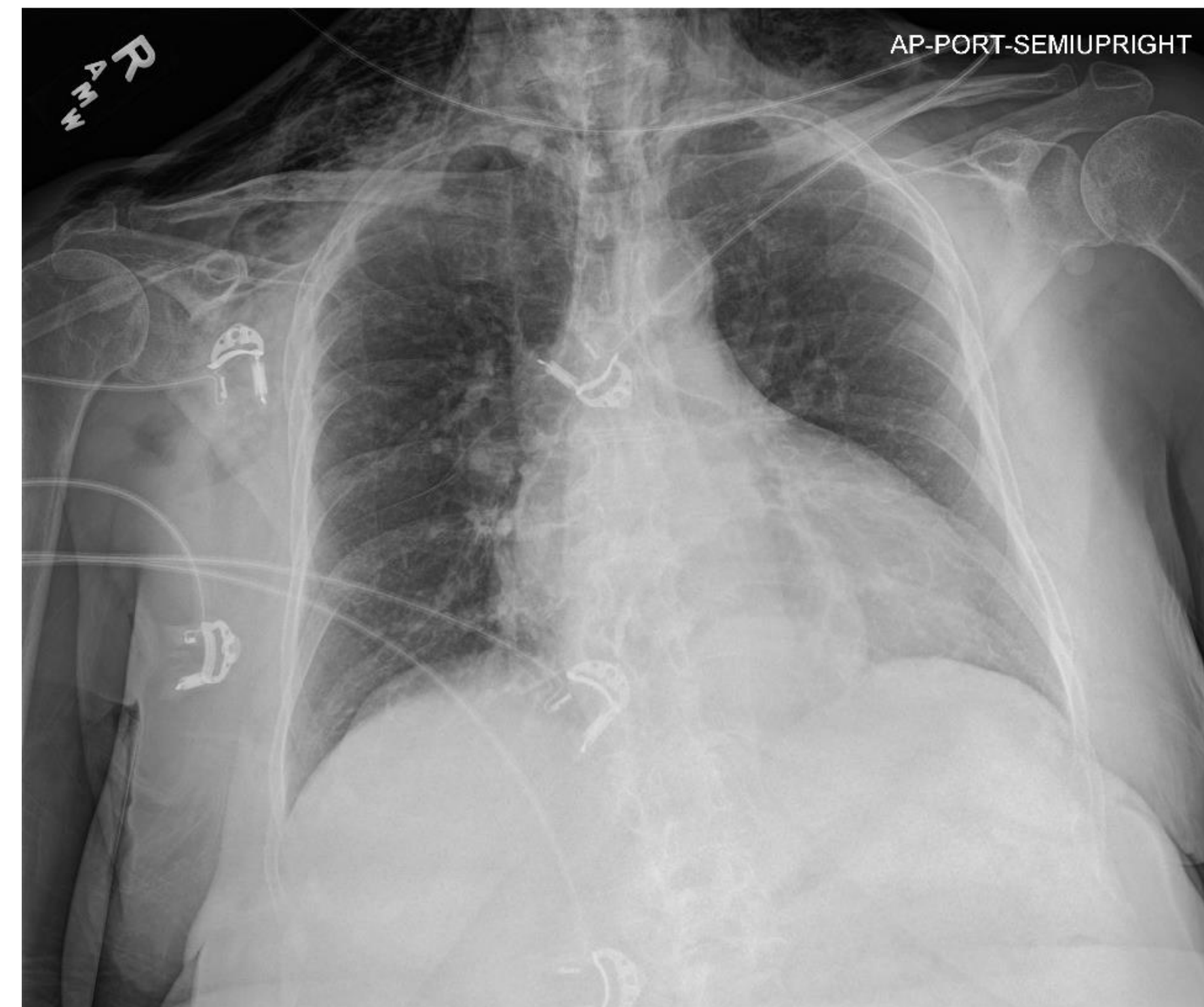


Figure 2: STAT Chest CT, immediately Post-op

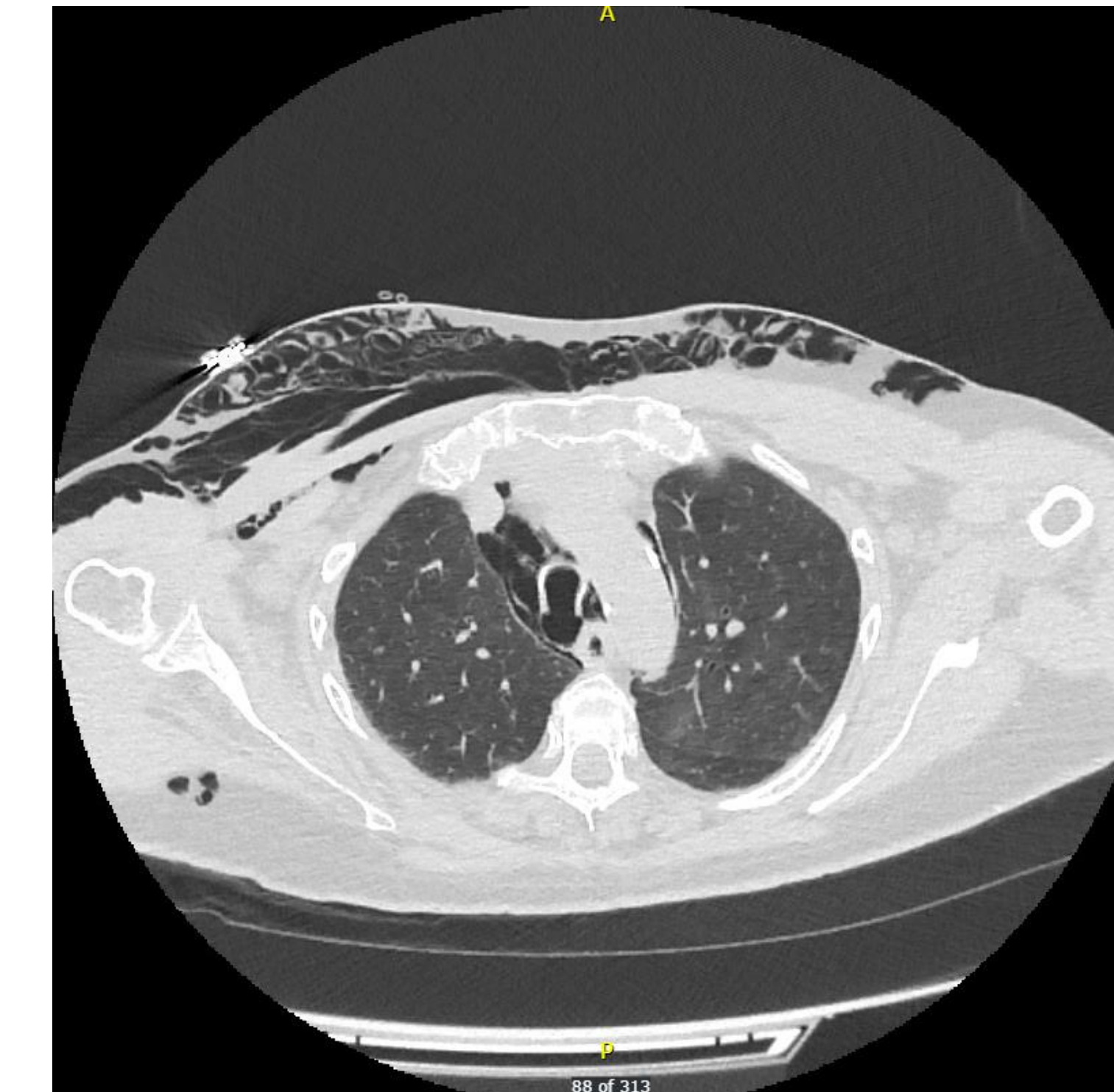


Figure 3: Intraoperative view of tracheal perforation

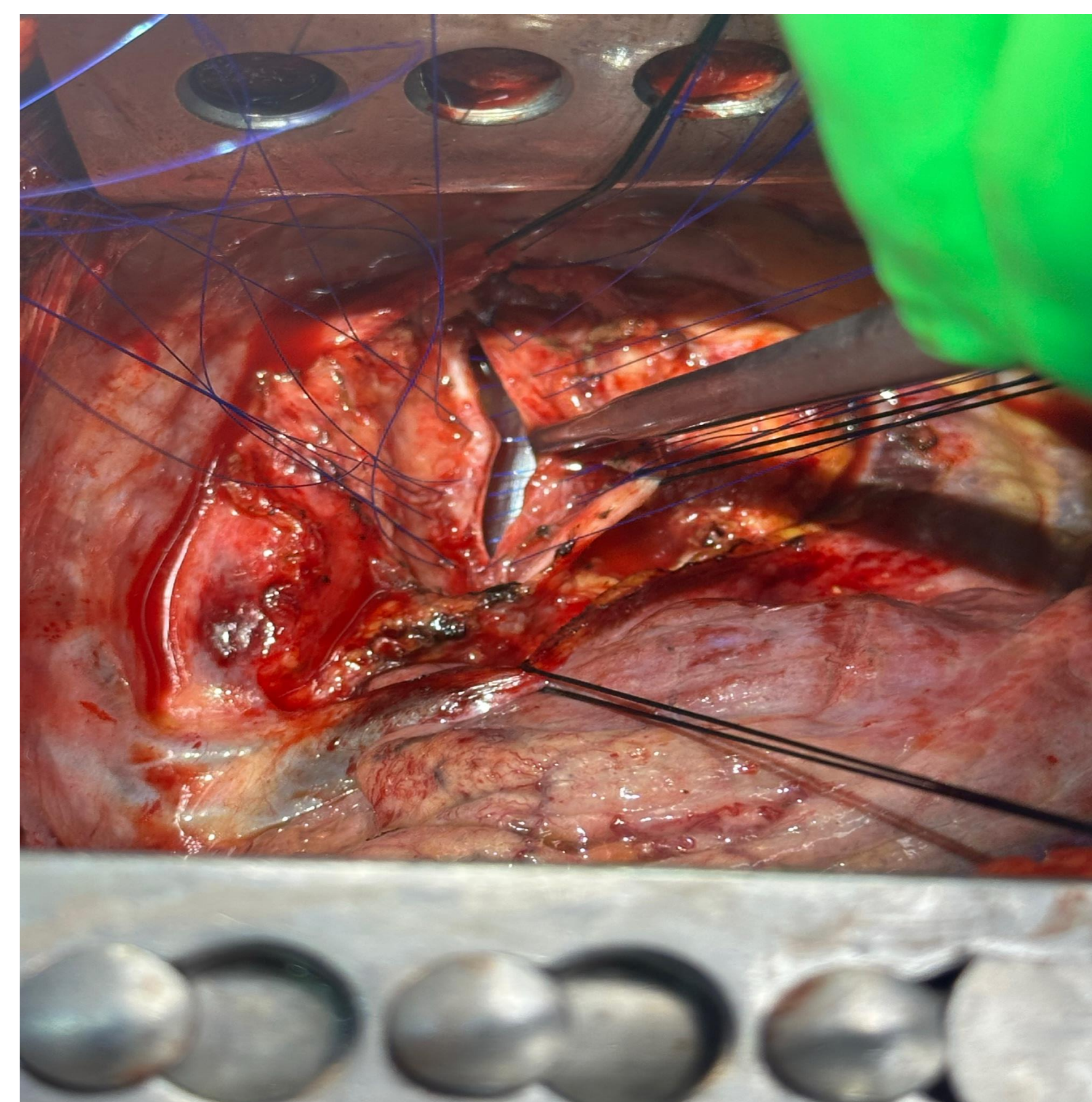
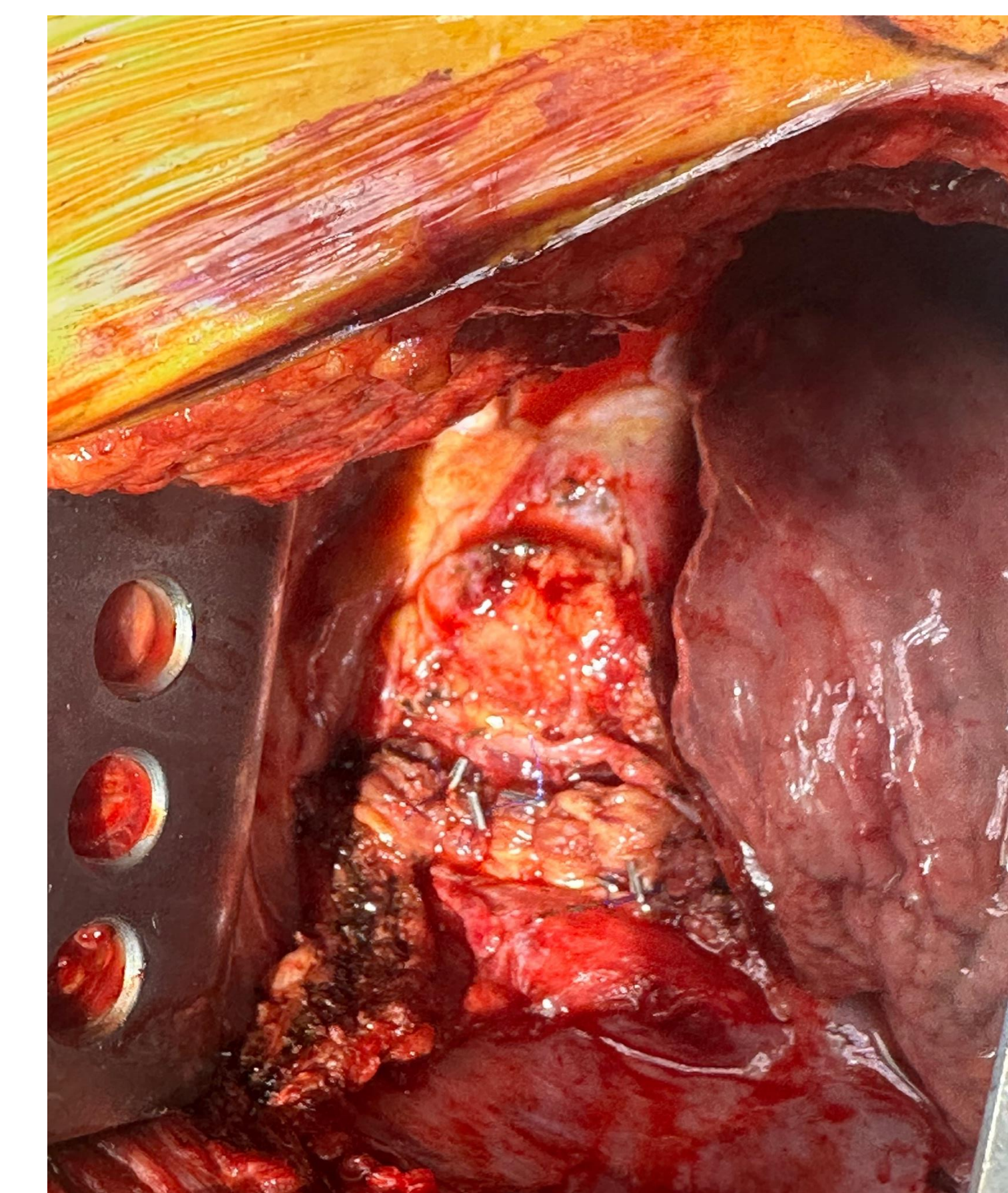


Figure 4: Intraoperative view of buttressed repair



Discussion

Even with an uncomplicated and single-attempt direct laryngoscopy intubation is not always without consequence. Iatrogenic tracheal injuries may be present and can pose a difficult case for operative repair. This case highlights classic postoperative clues (neck swelling, crepitus, dyspnea) prompting rapid imaging and bronchoscopy for diagnosis, as were present in our patient. Astute clinical awareness and appropriate intensive care unit transfer allowed for expeditious and appropriate workup. Multi-facetted diagnostic and operative planning including computed tomography and awake video-assisted bronchoscopy allowed for rapid evaluation and preoperative decision making.

Conclusions

Contemporary reviews support operative repair for large (>2–4 cm), full-thickness, or distal membranous injuries; smaller, partial-thickness tears in stable patients may be managed conservatively. Right thoracotomy provides optimal exposure for distal intrathoracic trachea; reinforcing the primary repair with vascularized tissue (e.g., intercostal muscle flap) helps buttress the suture line and mitigate air leak. Our patient's favorable course—immediate extubation, no leak, and early recovery—aligns with published series emphasizing early recognition, meticulous airway strategy, and definitive repair by an experienced team.

References

1. Pswarayi RMV, Kerola AK. A rare and unique experience of a blunt intrathoracic traumatic injury of the trachea and its management in South Africa: a case report. *J Trauma Inj*. 2023;36(4):416-420. doi:10.20408/jti.2023.0036
2. Paouris D, Kunzo S, Šebová I. Subcutaneous emphysema with pneumomediastinum after elective tonsillectomy—case study. *Otolaryngol Case Rep*. 2021;21:100356. doi:10.1016/j.xocr.2021.100356
3. Grewal HS, Dangayach NS, Ahmad U, Ghosh S, Gildea T, Mehta AC. Treatment of tracheobronchial injuries: a contemporary review. *Chest*. 2019;155(3):595-604. doi:10.1016/j.chest.2018.07.018
4. Sheikh S, Akbar Baig M. Iatrogenic post-intubation tracheal injury: an emergency room presentation in a 17-year-old girl. *Eurasian J Emerg Med*. 2019;18(2):112-114. doi:10.4274/eajem.galenos.2019.25238
5. Carbognani P, Bobbio A, Cattelani L, Internullo E, Caporale D, Rusca M. Management of postintubation membranous tracheal rupture. *Ann Thorac Surg*. 2004;77(2):406-409. doi:10.1016/S0003-4975(03)01344-4