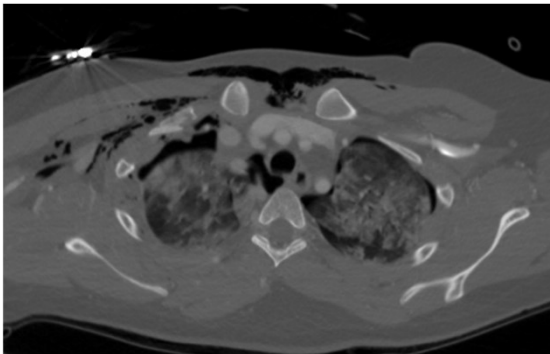


# Operative Technique for Intrathoracic Fixation of the First Rib

Alexandra Morgan, MD; Kallye Baggett MD; Mouayyad Zaza, MD  
University of Mississippi Medical Center, Department of Surgery  
Division of Acute Care Surgery, Trauma and Surgical Critical Care

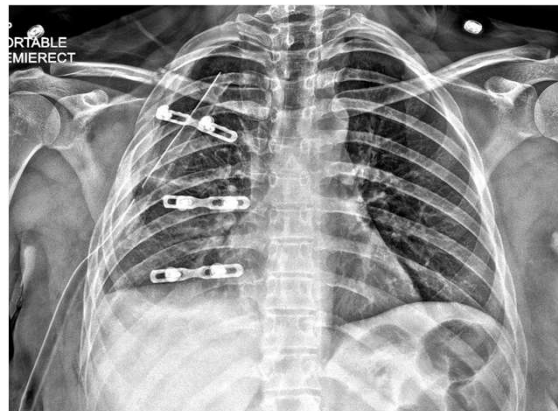
## Case Description

- 22yo F pinned between two cars
- Initial vitals with tachypnea and hypoxia (SpO2 84% on 100% nonrebreather).
- Paradoxical motion of right chest wall with significant ecchymosis, tenderness, and decreased breath sounds.
- After chest tube placement, scans identified a right 1<sup>st</sup> rib posterior and anterior fracture as well as right 2-4<sup>th</sup> rib fractures with costochondral disruption and lateral fractures. This created a flail segment. She also had bilateral pulmonary contusions, R clavicle fracture, and 1<sup>st</sup> rib fracture on left side.
- Admitted to the surgical intensive care unit and started on HFNC, multimodal pain control as well as a ketamine infusion.
- Continued to have significant pain and poor respiratory effort so on hospital day 4, she was taken to the operating room for video-assisted thoracoscopy and intrathoracic plating of right ribs 1-3.



## Outcome

- After fixation, all three ribs were palpably secure and well-aligned. The overall chest wall stability was restored
- Patient was quickly weaned from HFNC. Chest tube was placed to water seal the following day and removed the day after. Patient was discharged on hospital day 6 (POD#2) on multimodal pain control.
- She continues to do well on follow-up



## Operative Technique

- Through a median sternotomy incision, the sub-pectoral plane was developed laterally and superiorly to expose the 1<sup>st</sup> rib. The subclavian vessels were identified and dissected away from the working space
- To access to the distal end of the fracture, a percutaneous 5mm trocar was inserted to allow passing the drill and plate reduction wires in a perpendicular fashion
- A 12mm working port was then placed inferiorly. We performed intrathoracic fixation of anterior ribs 1-3 using Zimmer Biomet Advantage System in a standard fashion.

## Conclusion

- Although limited literature exists surrounding first rib fixation, this case describes an effective approach for treatment of flail segment involving the first rib.
- This rare case supports aggressive intervention for flail segments, and using intrathoracic plates to repair first rib fractures in a safe manner.