

Evacuation of hemothorax during SSRF: Does the technique influence the outcome?

David Sutori^{a,b,c}, Thomas W. White^d, Imre Uri^e, Peter Zsoldos^a, Zachary M. Bauman^f, Laszlo Erdelyi^{b,g}, Andrew Ross Doben^h, SarahAnn S. Whitbeckⁱ, Mathieu M.E. Wijffels^j

^a Aladar Petz University Teaching Hospital, Győr, Hungary ^b Hungarian Air Ambulance Nonprofit Ltd., Budaörs Legimento, Hungary ^c Doctoral School, University of Pécs, Pécs, Hungary

^d Intermountain Medical Center, Salt Lake City, UT ^e Semmelweis University, Szeged, Hungary ^f University of Nebraska Medical Center, Omaha, NE ^g Gottsegen National Cardiovascular Center, Budapest, Hungary ^h Saint Francis Hospital and Medical Center, Hartford, CT ⁱ Chest Wall Injury Society, Salt Lake City, UT ^j Erasmus MC, University Medical Center, Rotterdam, The Netherlands

Background

A third of all trauma patients have thoracic injuries which often include fractures of the ribs, sternum or clavicle.

A hemothorax (HTX), which is the presence of blood in the pleural space, occurs in one in three patients after thoracic trauma and results in an overall mortality of 9.4%.

The indications for acute resuscitative thoracotomy include acute or ongoing blood loss and major air leakage. Goals of this thoracotomy are bleeding control and removal of the HTX, after which a chest drain is inserted.

Left untreated about 25% of all HTX cases can become complicated by empyema, which is a collection of pus in the pleural cavity. This supports the rationale for early HTX removal.

Rationale and Specific Aims

Surgical guidelines recommend chest cavity exploration and removal of post-traumatic HTX. Video-assisted thoracoscopic surgery (VATS) is a minimally-invasive technique that has gained increasing popularity in the treatment of acute intrathoracic injuries. Another commonly used minimally-invasive technique to wash out the intrapleural hematoma is intra-operative pleural irrigation (IOPI). IOPI has been shown to decrease the likelihood of retained hemothorax and empyema, compared to non-surgical management. However, there is no evidence if the better outcome was attributable to IOPI or to the Surgical Stabilization of Rib Fractures (SSRF).

Comparative studies on the most effective and safe technique for HTX drainage are lacking. This study compares the outcome of cases in which a posttraumatic HTX was evacuated either with VATS (visualization technique with camera) or IOPI (blind technique without camera), during a Surgical Stabilization of Rib Fractures (SSRF) procedure.

Methods

This is a retrospective analysis from the Chest Injury International Database (CIID), which belongs to the Chest Wall Injury Society (CWIS). Two groups of patients with HTX without pneumothorax, were created. Group VATS (SSRF with Video Assisted Thoracic Surgery (VATS)), and group IOPI (SSRF with blind intra-operative pleural irrigation (IOPI)). The primary endpoint was hospital length of stay (HLOS). Secondary endpoints were pneumonia, mortality, chest tube days, Intensive Care Unit length of stay (ICLOS), 30-day readmission, and mechanical ventilation).

Video-assisted thoracic surgery (VATS)

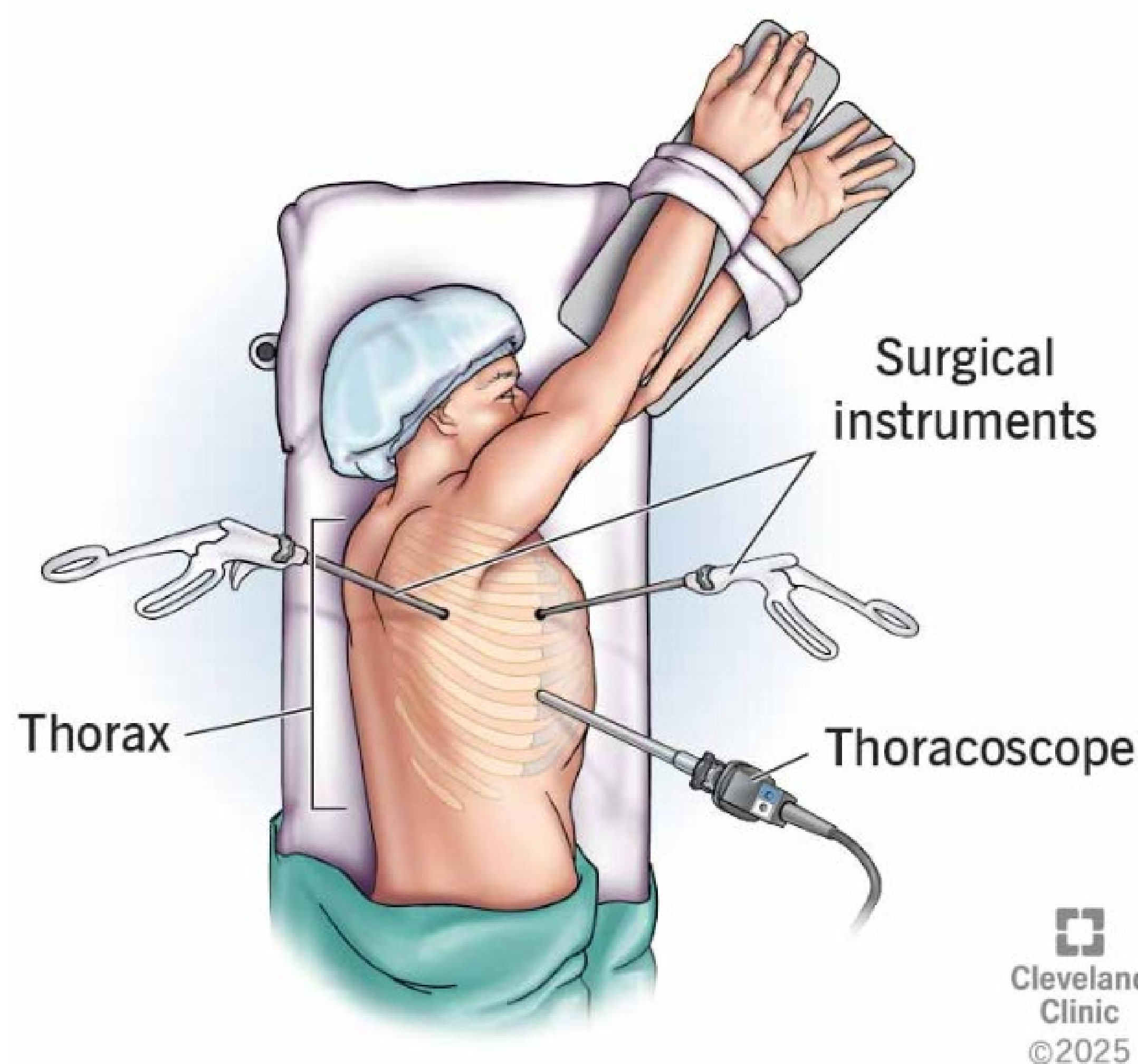
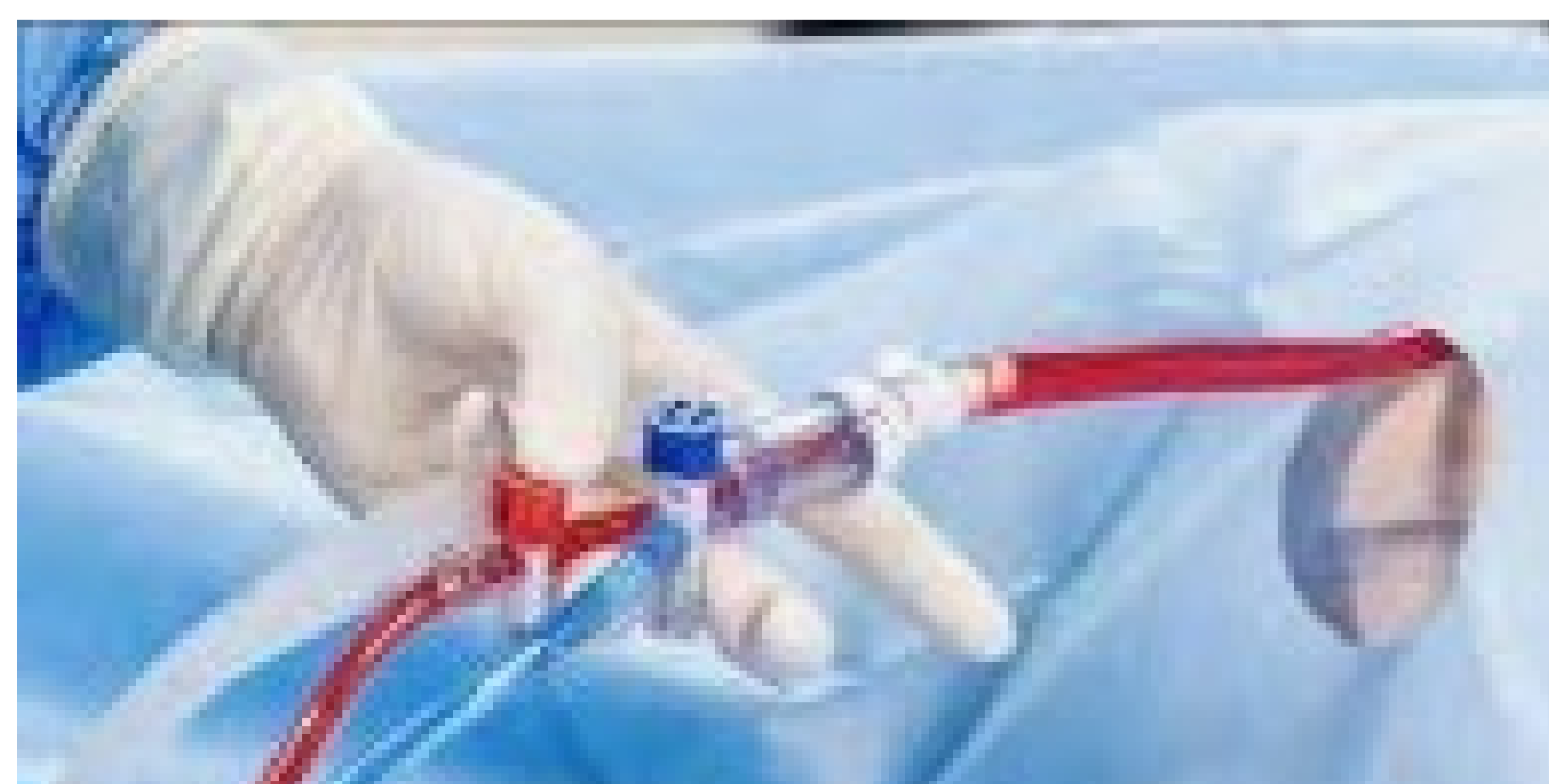


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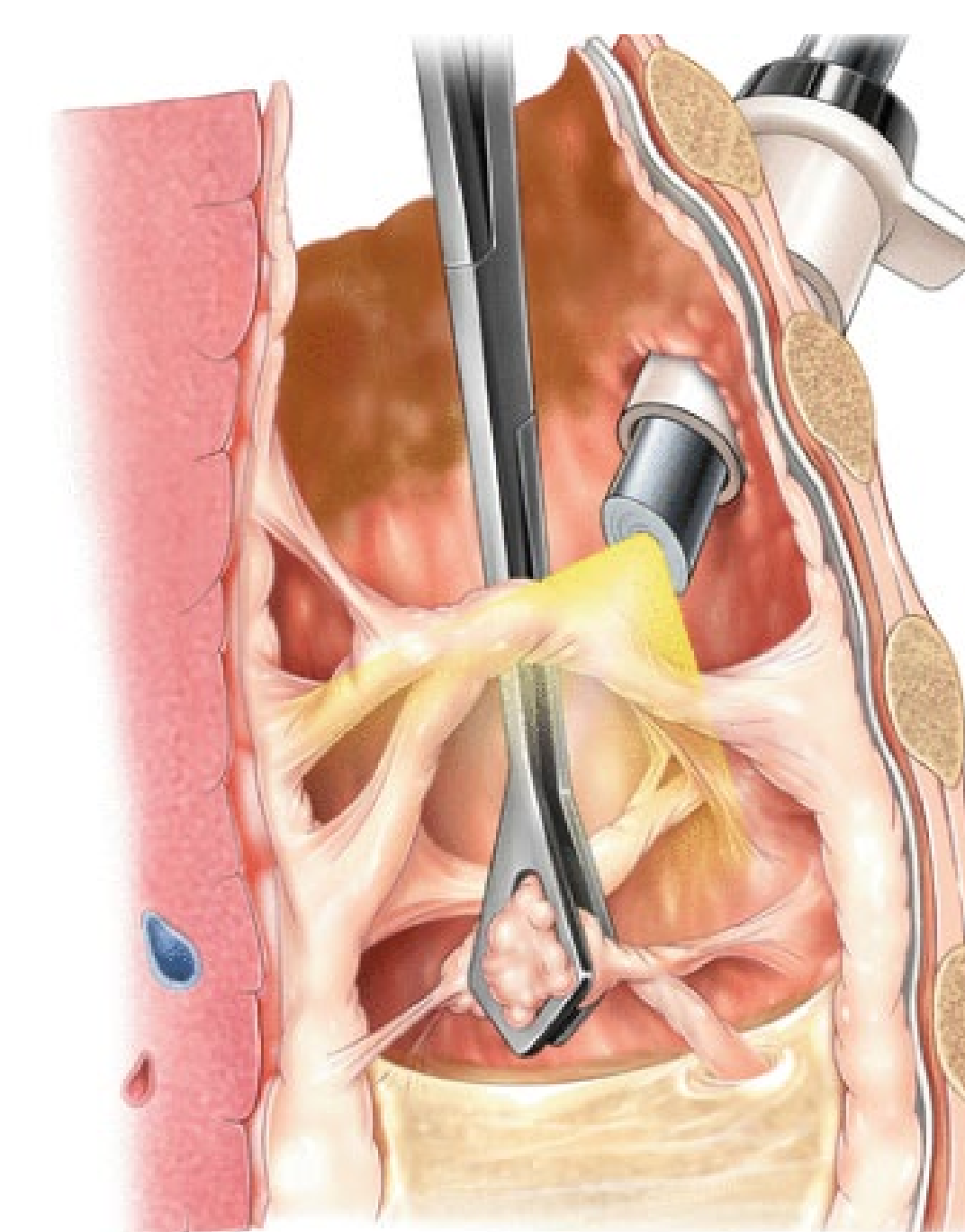
Google IOPI pleural irrigation

Results

A total 276 cases were included: group VATS (N=129) and group IOPI (N=147). The Injury Severity Score (ISS) was higher in group VATS ($p<0.05$). The Blunt Pulmonary Contusion Score 18 (BPC18) in group IOPI ($p<0.05$). The RIB score did not significantly differ between groups ($p=0.09$).

The primary outcome, HLOS, was significantly shorter in group IOPI ($p<0.05$). Chest tube days were shorter and rate of mechanical ventilation higher in group VATS ($p<0.05$). The length of ventilator therapy was longer in group IOPI ($p<0.05$).

No differences were found in mortality ($p=0.27$), pneumonia ($p=0.42$), readmission ($p=0.06$), or ICLOS ($p=0.21$).



Google: Empyema

Conclusion

In the absence of a pneumothorax. The use of the IOPI technique to evacuate a hemothorax during SSRF results in a shorter HLOS compared to the VATS technique, however the chest tube and ventilator days were significantly shorter using VATS.

Clinical outcome is comparable between these two techniques. Although HLOS was longer, short-term complications (chest tube days, ventilation days) were shorter with the VATS technique

This study was presented at the 2025 CWIS Summit.