

Scoliosis After Chest Wall Resection

Michael Glotzbecker MD, Mark Puder MD, M.

Timothy Hresko MD

Children's Hospital Boston

Harvard Medical School



Background

- Study Design:
 - Retrospective review of pediatric patients who had a chest wall resection
- Objective:
 - To investigate the relationship between chest wall resection and spinal development



Background

- Increased focus on the role rib abnormalities have on the development of scoliosis, chest wall deformity, and lung function.
- Rib resection, as well as rib fusion may influence the development of scoliosis.



Methods

- Thirty seven patients with chest wall resection
- Follow up imaging in 25 patients
 - Mean age 12.6 years (2-17)
 - f/u mean 3.9 years
- Data collected
 - Patient demographic information
 - Location of resection
 - Degree of scoliosis pre-resection
 - Change in curvature after resection based on radiograph or scout CT films



Results

- 15 /25 patients had scoliosis at their latest follow up
 - Mean Cobb angle of the major curve was 25.1° ($9-70^{\circ}$)
 - 12/15 progressive spinal deformity after chest wall resection



Results

- In 12 patients who had a change in curvature:
 - 3/12 developed a convex *on the side opposite to* the chest wall resection
 - 9/12 developed a convex *on the same side as* the chest wall resection
 - Average change in the curvature was 27° (9-70 $^{\circ}$)



Results

- Average age ($p > 0.05$)
 - 12 patients with change in curvature:
 - 11.7 (6-15) years
 - 13 who did not have change in curvature:
 - 13.3 (2-17) years



Results

- 8/9 patients with rib resections that included a rib superior to the 6th rib developed scoliosis($p < 0.05$)
- Gortex: no increased association with development of scoliosis



Discussion

- Increased understanding of thoracic insufficiency syndrome and our ability to treat it (VEPTR)
- Animal models suggest rib resection can cause scoliosis
- Available case series heterogeneous, inconsistent, and include largely adult populations



Discussion

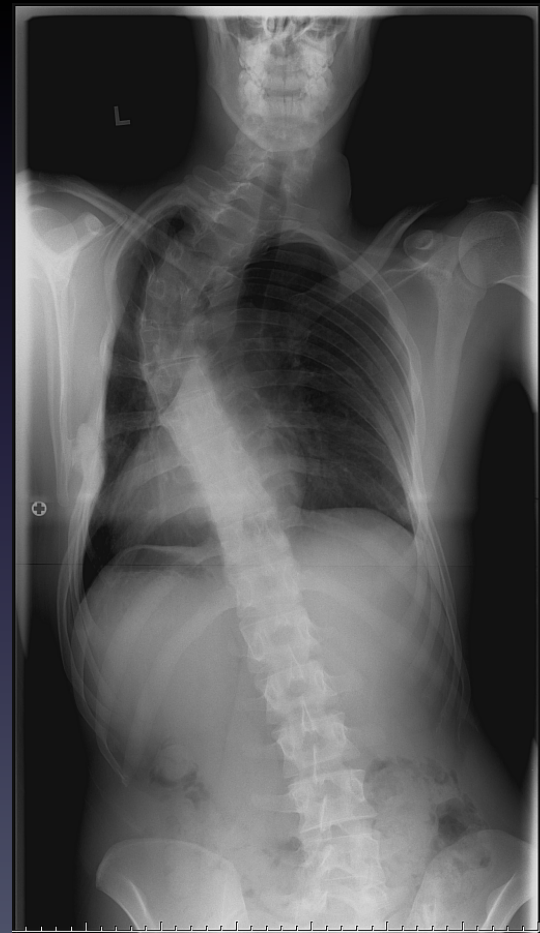
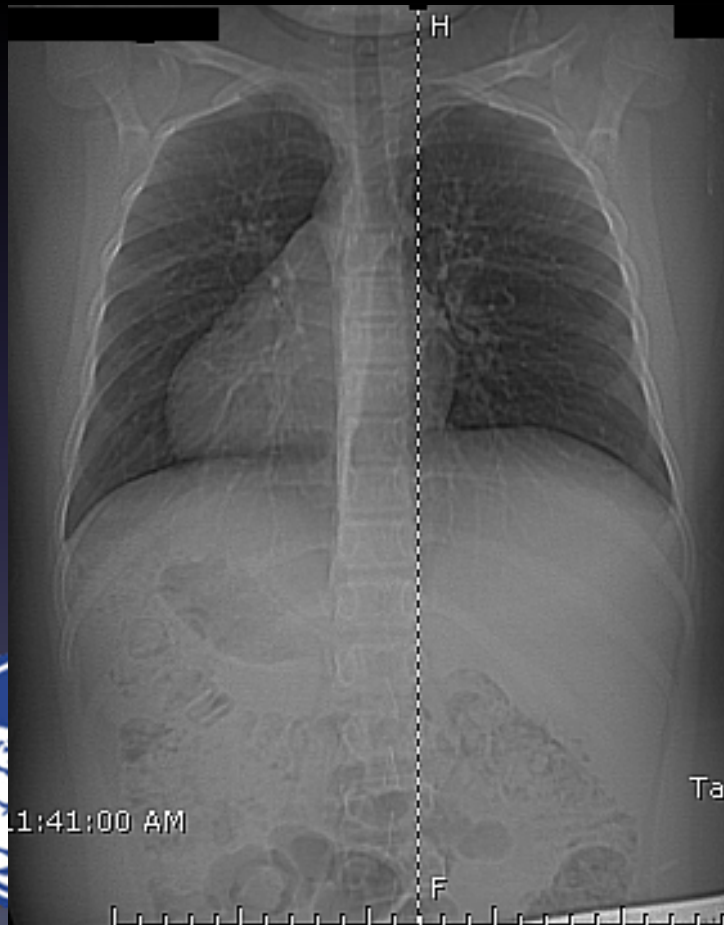
- Limitations:
 - Rare condition, small series despite collection over time
 - Diversity of procedures
 - Limited f/u in some cases (not until maturity)



Case Example

11yo M with Ewing's Sarcoma

Chest wall resection including ribs 3, 4, 5 and gortex reconstruction



Conclusion

- Patients who have had a chest wall resection are at risk for developing scoliosis, particularly if the resection is performed above the 6th rib



