INTRODUCTION
The Vertical Expandable Titanium Rib (VEPTR) is a growth friendly spinal and chest wall implant used to treat thoracic insufficiency syndrome, the inability of the thorax to support normal respiration or lung growth, and/or congenital chest wall and spinal deformities in growing children. The device is typically attached to the second or third rib proximally in the posterior axillary line and distally to the tenth or eleventh rib, the lumbar spine, or the pelvis. These anchors are then attached to "rib sleeves" which are overlapping rods which are then progressively expanded every three to six months allowing distraction between the proximal and distal anchors generating longitudinal growth of the spine and volumetric chest wall growth. While quite effective in producing spinal and chest wall growth, the VEPTR device, due to its positioning, decreases chest wall compliance. This is the first report of the need for cardiopulmonary resuscitation in a patient status post VEPTR.

BACKGROUND
A teenage patient presented with sacral osteomyelitis necessitating incision and drainage. The past medical history was significant for spina bifida, paraplegia, and recurrent sacral decubitus ulcers. He also had significant restrictive lung disease. PF is performed 3 years ago showed FVC 32% of his predicted volume. In early childhood, the patient underwent titanium rib placement, which subsequently had been removed. He then underwent posterior spinal reconstruction for neuromuscular scoliosis with subsequent removal of ribs secondary to infection. Despite his restrictive lung disease, he did not require home oxygen. In fact, other than frequent infections, he did well without the spinal fusion.

PERIOPERATIVE MANAGEMENT
The primary anesthetic concern was his significant restrictive lung disease, which is due to his severe neuromuscular scoliosis. Following premedication with midazolam, the patient was taken to the operating room and underwent uneventful induction and intubation. Anesthetic maintenance included sevoflurane and one microgram per kilogram of fentanyl. Neuromuscular blockade was reversed at the end of the procedure. At the end of the case, the patient experienced delayed emergence; however, before extubation, the patient was able to follow simple commands and had adequate respiratory mechanics. Approximately 90 minutes after arrival to PACU, the patient appeared quite sedated despite having not received any additional opioids. The midazolam and fentanyl were reversed and shortly thereafter, the patient experienced cardiopulmonary arrest. Chest compressions were started and were noted to be exceedingly difficult by multiple experienced providers. After one dose of epinephrine and being reintubated, the patient had return of spontaneous circulation. The patient was extubated less than 6 hours after arrival to the intensive care unit and has since undergone additional procedures without complications.

ANESTHETIC IMPLICATIONS OF VEPTR
The VEPTR procedure has existed for less than 15 years. Since titanium ribs promote chest wall fusion, even after removal, chest wall compliance is decreased. An extensive literature search produced nothing describing the challenge of effective CPR after VEPTR placement. The fused wall posed a significant challenge in the emergent care of this patient, and has inspired a further investigation into providing high quality CPR in patients with chest hardware.

References

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