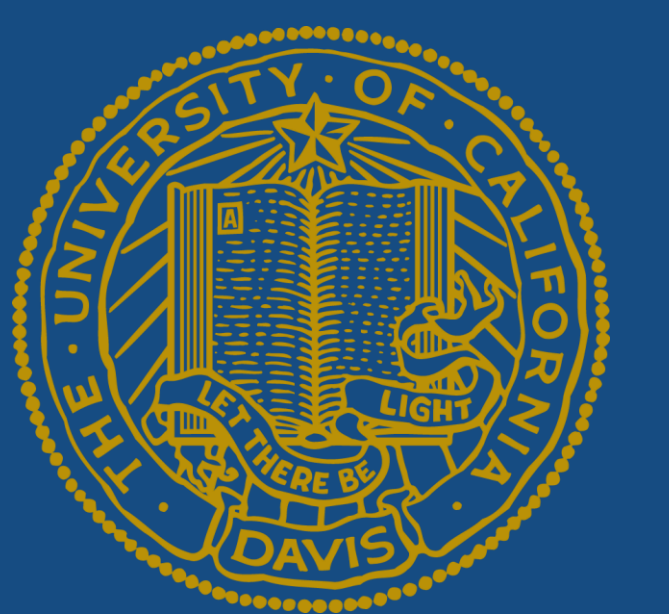




# Unusual Complication Following Esophageal Balloon Dilation In a Pediatric Patient



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## INTRODUCTION

- Esophageal dilation is a common procedure often performed in the outpatient setting
- Indications in the pediatric population: **esophageal atresia, strictures after caustic injury, iatrogenic atresia after tracheoesophageal fistula repair** [1]
- Any complication per procedure is less than 5%, and **perforation 0.02 to 0.2%** [2]
- Major complications include: **esophageal perforation, hemorrhage, aspiration and bacteremia** [2,3,4]

## PAST MEDICAL HISTORY

- This case involved a 14 month old, 9.5 kg male
- Born at term with no peripartum complications, taking no medications and no allergies
- Was previously healthy until 12 months of age when he had an accidental ingestion of an alkaline dishwasher detergent (pH 11)
- He underwent emergency esophagoscopy, and was managed in the pediatric ICU (PICU) at UC Davis Medical Center for 18 days before discharge home
- Was subsequently found to have persistent secretions and dysphagia when seen in follow up by pediatric surgery
- Consented for serial esophageal dilations to improve oral intake and weight gain
- This was his fourth dilation, the previous three were done under a general anesthetic with no issues

## PERIOPERATIVE EVENTS

- **Pre-operatively:** Given oral midazolam in the Children's Surgery Center at UC Davis
- **Induction:** Taken to OR. Easy masking, IV access obtained, 3.5mm endotracheal tube atraumatically placed with bilateral breath sounds
- **Ventilator settings:** PC 12cmH<sub>2</sub>O, RR 18, FiO<sub>2</sub> 40%, Vt 7-8cc/kg, SpO<sub>2</sub> at 99-100%.
- **Procedure:** Serial dilations using 8, 9, and 10mm balloons each for two minutes under visualization of esophageal contour with fluoroscopy
- **Acute changes:** During final endoscopy with insufflation, tidal volumes abruptly decreased to 2-3cc/kg with intermittent drops of SpO<sub>2</sub> to 86-93%.
- **Management:** Tidal volumes improved with manual ventilation. Bilateral but coarse breath sounds were heard with no change in end tidal CO<sub>2</sub>
- **End of procedure:** Blood pressure and heart rate remained stable, so procedure was allowed to finish (Figure 1)
- **Emergence:** He was noted to breathhold and wheeze; lung exam with coarse but bilateral breath sounds. SpO<sub>2</sub> in low 90s. Was extubated once breathing regularly
- **PACU:** Breath sounds were diminished and coarse, SpO<sub>2</sub> around 75%, sternal retractions and crepitus noted on the upper chest; STAT chest x-ray obtained (Figure 3)
- **Return to operating room**

## IMAGES

Figure 1: Intraoperative record for initial procedure

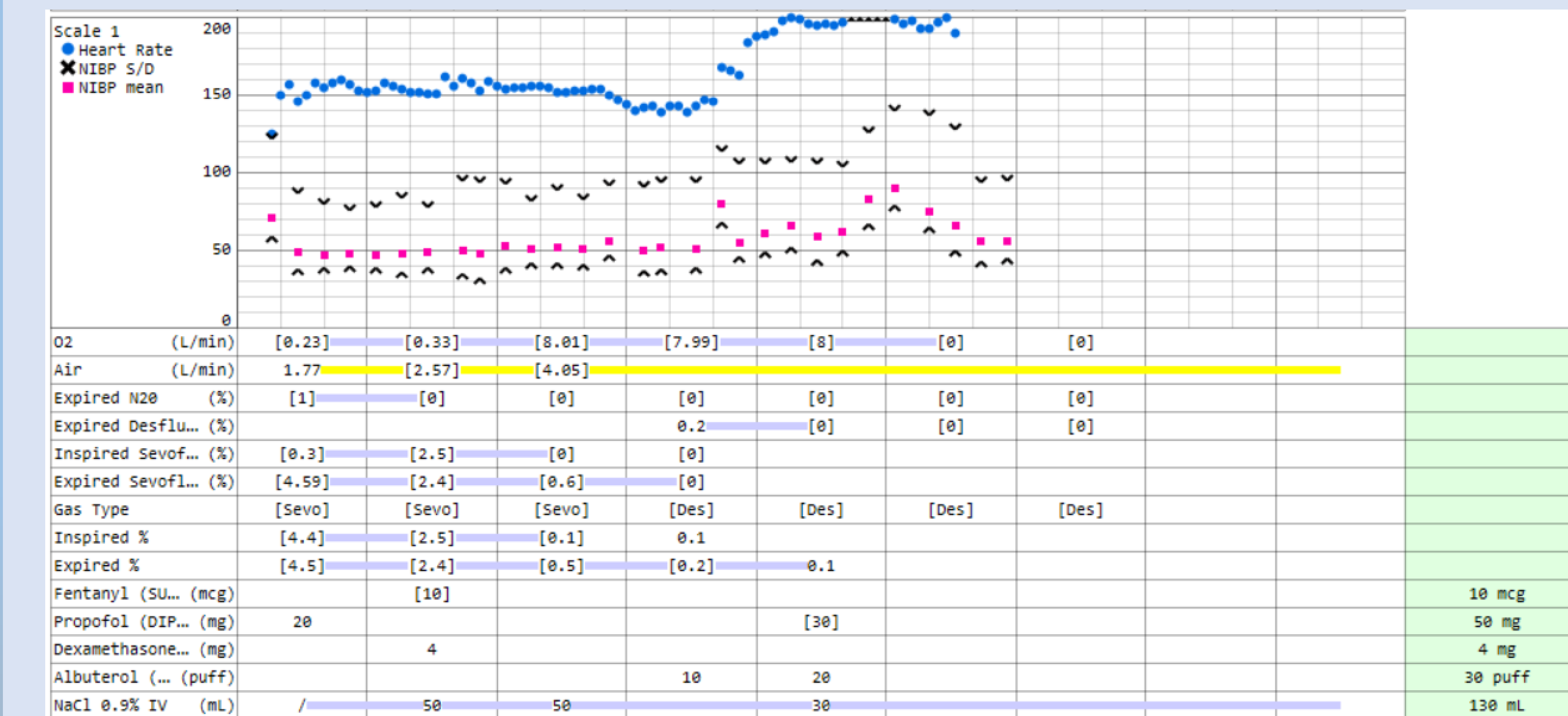


Figure 2 (right): Examples of injury after the ingestion of caustic material. Mild esophageal injury (A) is noted compared with widespread severe injury (B) in the stomach. (C) Diffuse liquefaction necrosis of the entire esophagus is noted after the ingestion of alkaline substances [6]

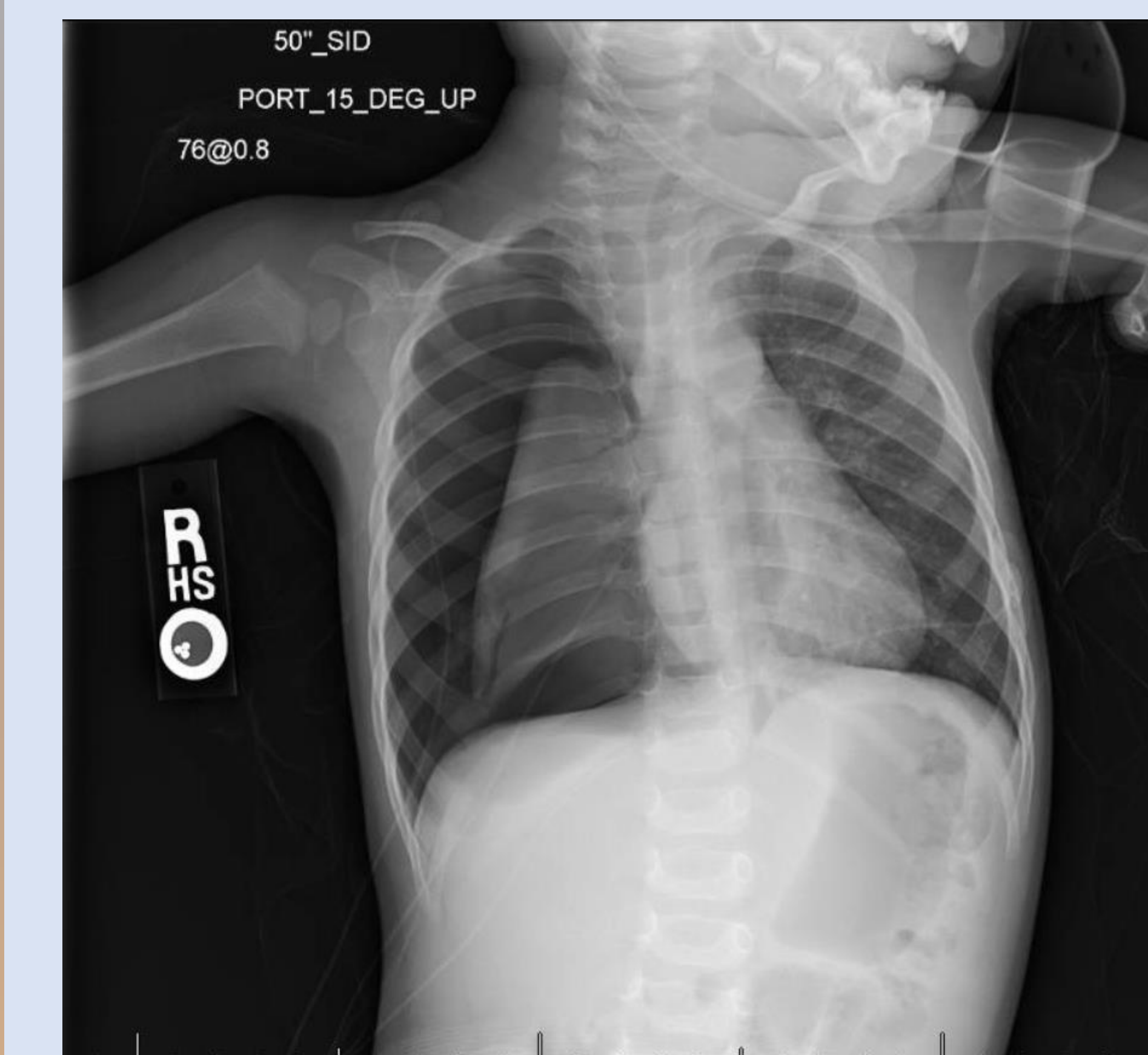
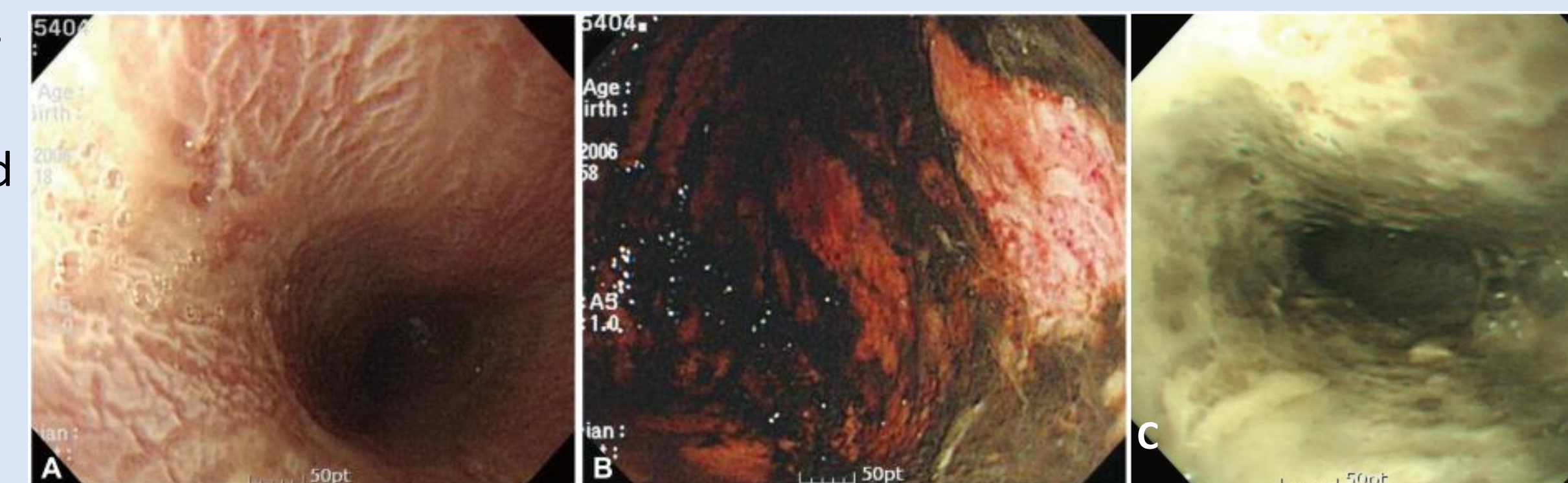


Figure 3: Immediate post-procedure right-sided tension pneumothorax

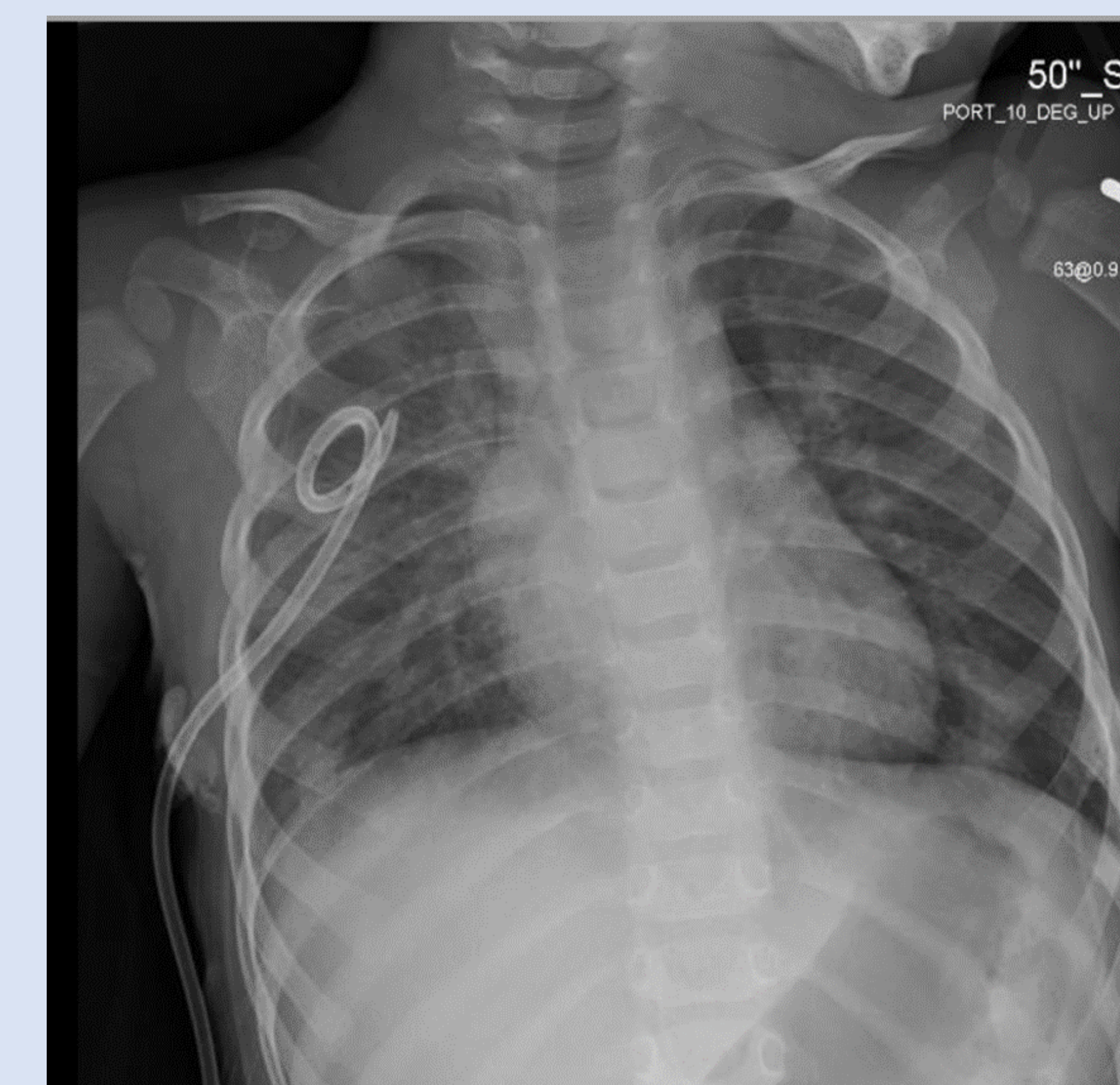


Figure 4: Right lung expansion after pigtail placement

## CASE OUTCOME

- Taken back to OR for emergent pigtail placement under mask general anesthesia
- Bloody saliva was observed on syringe suctioning before pigtail secured, concerning for **esophageal perforation**
- Sent to PICU after repeat chest x-ray (Figure 4)
- Started on Ceftriaxone, Flagyl, made NPO and started on TPN, NGT placed
- **POD #1:** Fevers. Right sided pleural effusion with no drainage from chest tube; additional right intercostal salem sump was placed under fluoroscopy
- **POD #5:** Transitioned to Zosyn for fevers and pan-cultures that remained negative. Chest CT showed right loculated hydropneumothorax so additional chest tube placed
- **POD #6:** Esophagram negative for leak. NGT was later clamped and removed
- Eventually transitioned to clear liquid diet, Pediasure, and full liquids with chest tube removal on **POD #9**
- **POD #11:** Pigtail removed and Zosyn stopped
- **POD #13:** Discharged home on Amoxicillin-Clavulanate.
- Has undergone four additional dilations with one also complicated by perforation

## DISCUSSION

- **Perforation followed by a tension pneumothorax in this setting is extremely rare**
- Once recognized, initial management of a **pneumothorax** should be with needle thoracostomy or chest tube placement with cardiopulmonary support as needed
- **Esophageal perforation complications:** mediastinitis, abscesses, sepsis, multiorgan failure or death [7]
- There is a higher risk of perforation from caustic injury in more complex strictures, with underlying poor tissue integrity, or difficulty in dilation requiring additional interventions [2,3,5]
- Management in pediatrics favors a conservative approach due to thin pleural space that can spontaneously leak air, and can be cleared with chest tubes
- Additional treatment: NGT, TPN, enteral nutrition, antibiotics for anaerobic, gram-positive and gram-negative coverage [7]
- **Perioperatively, it is essential to recognize patients with a higher risk of perforation, and anticipate impending cardiorespiratory collapse from a tension pneumothorax**

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