

Children's Mercy Kansas City

SHARE @ Children's Mercy

Research Days

Management of Primary Spontaneous Pneumothorax in Children: A Single Institution Protocol Analysis

Shai Stewart MD

Follow this and additional works at: <https://scholarlyexchange.childrensmercy.org/researchdays>



Part of the [Higher Education and Teaching Commons](#), [Medical Education Commons](#), [Pediatrics Commons](#), [Science and Mathematics Education Commons](#), and the [Surgery Commons](#)

Research Abstract Title

Submitting/Presenting Author (must be a trainee): Shai Stewart, MD
Primary Email Address: sistewart1@cmh.edu

- Medical Student
- Resident/Psychology Intern (≤ 1 month of dedicated research time)
- Resident/Ph.D/post graduate (> 1 month of dedicated research time)
- Fellow

Primary Mentor (one name only): Shawn D St.Peter, MD

Other authors/contributors involved in project: James A. Fraser MD, Rebecca M. Rentea MD, MS, FACS, FAAP, Pablo Aguayo MD FACS, David Juang MD FACS, Jason D. Fraser MD FACS, Charles L. Snyder MD FACS, Richard J. Hendrickson MD FACS, Tolulope A. Oyetunji MD MPH FACS

IRB Number: 16020158

Describe role of Submitting/Presenting Trainee in this project (limit 150 words): Study design, data collection, data analysis and interpretation, abstract writing

Background, Objectives/Goal, Methods/Design, Results, Conclusions limited to 500 words

Background: Primary spontaneous pneumothorax (PSP) affects 3.4 per 100,000 children in the United States. Regardless of the initial management, additional procedures, and prolonged hospital length of stay (LOS) may occur. There is currently no consensus in the pediatric surgical community on the optimal management of these patients, which has resulted in marked variability in management. The Midwest Pediatric Surgery Consortium (MWPC), of which our site is a participant, suggested a management algorithm to include simple aspiration upon presentation, and if this fails, VATS should be considered.

Objectives/Goal: The purpose of this study was to evaluate the outcomes of instituting a simple aspiration protocol for the initial management of PSP in the pediatric population. We hypothesized that there would be a significant reduction in LOS, disease recurrence and morbidity.

Methods/Design: Single institution analysis of prospectively collected data was conducted on all patients between 12 and 18 years who were diagnosed with PSP from January 2016 to January 2021. Patients with pneumothorax secondary to trauma or underlying pulmonary disease, bilateral pneumothorax, hemodynamic instability with tension physiology, small pneumothorax stable under observation (2 cm or less), patients with a previously treated ipsilateral pneumothorax and those referred after initial intervention at another facility were excluded. Initial management consisted of aspiration alone with a $\leq 12F$ percutaneous thoracostomy tube followed by clamping of

the tube and antero-posterior chest radiograph (CXR) at 6 hours. Success was defined as the presence of residual small pneumothorax (less than 2cm distance between the chest wall and lung at the apex) and no air leak when the clamp was released. These patients were discharged. If aspiration failed, VATS was performed next available with the surgeon on call. Patients with a small pneumothorax were observed as an inpatient prior to a decision for intervention.

Results: Fifty-nine patients were included in the analysis. The median age was 16.8 years (IQR 15.9, 17.3). Aspiration was successful in 33% (n=20) patients, and they were subsequently discharged home. VATS was performed in all patients who failed simple aspiration (66%, n=39). The median time from failure of aspiration to VATS was 9.6 hours (IQR 6.1, 13.2). The median LOS for those with successful aspiration was 20.4 hours (IQR 16.8, 34.8), while those who underwent VATS after failing aspiration had a median LOS of 3.1 days (IQR 2.6, 4). Of those who had successful aspiration, 45% (n=9) had recurrent PSP. Of the 39 patients who initially underwent VATS after a failed aspiration, 25% (n=10) had recurrent PSP. The median time to recurrence for the successful aspiration group was shorter than that of the VATS group [16.6 days (IQR 5.4, 19.2) vs. 389.5 days (IQR 94.1, 907.0)].

Conclusions: Simple aspiration of PSP as initial management for children with their first presentation reliably predicts the need for operative intervention. The decision to operate may be made within six hours, allowing for early VATS. Though recurrence rates are high whether aspiration is successful or not, incorporating this management protocol likely minimizes morbidity, hospital length of stay and cost.