

Surgical Management Patterns for Spontaneous Pneumothorax in Adolescents and Young Adults

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Background

- Spontaneous pneumothorax is one of the most common thoracic diseases affecting adolescents and young adults.
- A primary spontaneous pneumothorax (or PSP) occurs in the absence of pre-existing pulmonary conditions or traumatic mechanisms.
- Traditionally, most patients with PSP receive a chest tube for initial management. However, variability remains in the optimal approach, including the role of cross-sectional imaging, the use of drainage procedures such as aspiration or chest tube placement, and the timing of surgical intervention, which remains debated.

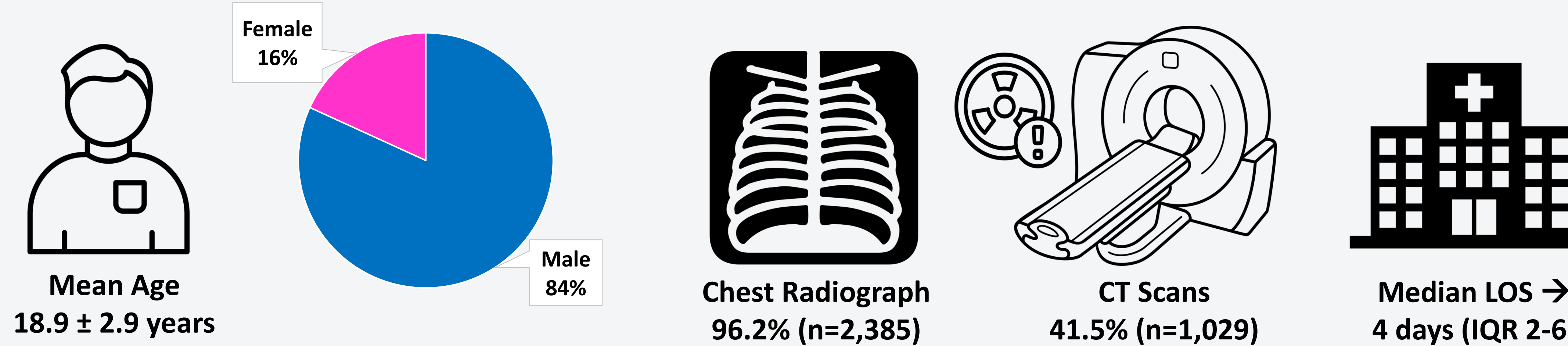
Hypothesis

- Given these evolving recommendations, our study aimed to evaluate national trends in the management of PSP over the past decade.
- We hypothesized that treatment strategies have shifted toward less cross-sectional imaging and earlier surgical intervention, potentially leading to a reduction in the overall hospital length of stay (LOS).

Methods

- 10-year retrospective analysis: MarketScan claims database (IBM Watson Health)
- Adolescents and young adults (10–24 years old) diagnosed with PSP (2012–2021)
 - Excluded: traumatic pneumothorax, hemothorax
- Outcomes during the index admission and any recurrence within one year were examined.
 - Imaging studies, procedures (i.e. aspiration or tube thoracostomy), surgeries, and length of stay (LOS).
 - 30-day post-operative outcomes → complications, ED visits, readmission, and return to the OR.

Results – Index Admission Characteristics (N=2,480)



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	Total (N=2,480)	Length of Stay Median (IQR)
Observation only	647 (26.1%)	2 (1-4)
Aspiration/chest tube only	1,032 (41.6%)	3 (2-5)
Surgery only	322 (13.0%)	5 (4-7)
Aspiration/chest tube and surgery	479 (19.3%)	7 (5-10)

Results – Index Admission Outcomes (N= 2,480)

	No Surgery (N=1,679)	Surgery (N=801)	P-value
Readmission within 30 days	333 (19.8%)	39 (4.9%)	<0.001
ED visit within 30 days	364 (21.7%)	101 (12.6%)	<0.001
Return to OR within 30 days	----	51 (6.4%)	----

Trends Over Past Decade

No significant changes over time were noted in the use of CT scans, the rate of surgery, and the day of surgery for the index hospitalization, typically occurring around hospital day 4.

Discussion

- Recent high-impact studies, including a multicenter trial, support conservative management of PSP as noninferior to chest tube placement, highlighting a shift toward less invasive strategies with fewer complications.
- Both the Midwest Pediatric Surgery Consortium and institutions like Nationwide Children's Hospital have shown that aspiration-based protocols and standardized pathways can reduce interventions, length of stay, imaging use, and overall costs without compromising outcomes.
- The APSA Outcomes Committee's 2023 systematic review provides evidence-based recommendations, discouraging routine CT use and advocating for earlier VATS intervention with blebectomy and pleural procedures in cases of persistent air leak.

Conclusions

- PSP management in adolescents and young adults demonstrates substantial variability.
- Reducing CT utilization and expediting the decision-making process for proceeding to the operating room may serve as potential targets for optimizing healthcare resource utilization.

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