



THE EFFECTIVENESS OF NON-INVASIVE CONSERVATIVE MANAGEMENT OF MILD PNEUMOTHORAX AFTER A BLUNT CHEST TRAUMA: A RETROSPECTIVE STUDY AT KING HUSSEIN MEDICAL HOSPITAL

Mutaz Haddadin MD\*, Qasem Alqaisi MD, Saad Alwraikat MD, Suhaib Almaghariz MD, Abdullah Al Hiary MD, Ghidaa Maswadah



\*Corresponding Author: Mutaz Haddadin MD

DOI: <https://doi.org/10.5281/zenodo.21883970>

**How to cite this Article:** Mutaz Haddadin MD\*, Qasem Alqaisi MD, Saad Alwraikat MD, Suhaib Almaghariz MD, Abdullah Al Hiary MD, Ghidaa Maswadah.. (2026). The Effectiveness of Non-Invasive Conservative Management of Mild Pneumothorax After A Blunt Chest Trauma: A Retrospective Study At King Hussien Medical Hospital. European Journal of Biomedical and Pharmaceutical Sciences, 13(8), 304–306.

This work is licensed under Creative Commons Attribution 4.0 International license.



Article Received on 15/07/2026

Article Revised on 05/08/2026

Article Published on 10/08/2026

ABSTRACT

**Objective:** to assess the efficiency of conservative management of simple pneumothorax after a blunt chest trauma. **Methodology:** It's a retrospective study of 120 patients managed conservatively at King Hussein Medical Hospital over 3 years from 20th of March 2022 to 1<sup>st</sup> of April 2025. Data were collected from patients' electronic files (HAKEEM); all patients with mild pneumothorax after trauma were included in our study. The exclusion criteria were patients with simple spontaneous pneumothorax or other causes, rather than trauma, penetrating chest trauma, or if the pneumothorax was associated with other injuries. Diagnosis of pneumothorax was clinical and confirmed radiologically by chest X-ray and chest CT scan. All patients underwent chest X-ray for follow-up. Mild pneumothorax was defined clinically as a stable, asymptomatic patient with a pneumothorax that appeared radiologically only. According to the British Thoracic Society (BTS), less than 2cm from the lung margin to the chest wall by X-ray, or if less than 10% of the lung is collapsed by CT scan. If the pneumothorax was mild and within the criteria, the management was noninvasive without a chest tube and followed by serial daily chest X-ray. Patients' demographic features (age, gender, Weight, height) were collected and recorded, then the patients' clinical parameters (HR, O2 SAT, RR, BP) were registered. Then all data were analyzed statistically using Chi-square or Fisher's exact test, as appropriate, to explore the association between Pneumothorax. SPSS IBM software version 28 was used to analyze the data. **Results:** A total of 120 patients, who were diagnosed with mild pneumothorax. The mean age was 29+0.3 years. A 29 % (n=35) where female patients with higher percentage in male patient (70%, n=85). All patients (100%) were managed conservative initially, 3 patients (0.025%) showed failure of medical management and they need insertion of chest tube with nonsignificant P-value test. Table 1. **Conclusion:** We conclude that, noninvasive and conservative management of simple and mild pneumothorax is cost effective and safe method.

**KEYWORDS:** mild pneumothorax, chest tube.

INTRODUCTION

Generally, we define pneumothorax as the presence of air in the pleural cavity, that increase the pleural pressure and finally causes lung collapse. Clinically, the pneumothorax can be classified into several types. For example, according to severity its classified into mild and severe, while according to the type of trauma its classified into simple, open, continuous, and tension pneumothorax.

Furthermore, pneumothorax is a clinical diagnosis, confirmed radiologically. The diagnosis starts initially when there is shortness of breathing and decreased O2 saturation, which causes decreased air entry and nonequal elevation of the chest wall by breathing. Then, all types are confirmed by X-ray or, more accurately, by CT scan.

Management of pneumothorax depends mainly on the severity and type of chest trauma. In case of mild symptoms that can be represented by a rim of

pneumothorax on X-ray, they can be managed by observation and follow-up, while in the case of tension pneumothorax, prompt intervention by insertion of thoracocentesis is required, and in the case of open type needs 3-way tapping dressing. Finally, a chest tube is indicated in moderate cases and in both closed and open types.

Our research aims to clarify the role of conservative management and non-invasive intervention in the case of simple, mild, and asymptomatic pneumothorax, in order to avoid the invasive procedures, which are costly and may cause complications.

## METHODOLOGY

**Study design:** It's a retrospective study at King Hussein Medical Hospital over 3 years, from 20th of March 2022 to 1<sup>st</sup> of April 2025.

**Study population:** 120 patients who suffered from simple and mild pneumothorax were managed conservatively, the study included both male and female patients, aged from 14 to 59 years old.

**Inclusion and exclusion criteria:** the inclusion criteria are, aged from 14-59, without comorbidities, and simple, mild pneumothorax, blunt trauma, isolated chest trauma, The exclusion criteria were patients with simple spontaneous pneumothorax or other causes, rather than trauma, penetrating chest trauma, or if the pneumothorax was associated with other injuries.

**Data collection:** Data were collected from patients' electronic files (HAKEEM); all patients with mild pneumothorax after trauma were included in our study. Diagnosis of pneumothorax was clinical and confirmed radiologically by chest X-ray and chest CT scan. All patients underwent chest X-ray for follow-up. Mild pneumothorax was defined clinically as a stable, asymptomatic patient with a pneumothorax that appeared radiologically only. According to the British Thoracic Society (BTS), less than 2cm from the lung margin to the chest wall by X-ray, or if less than 10% of the lung is collapsed by CT scan. If the pneumothorax was mild and within the criteria, the management was noninvasive without a chest tube and followed by serial daily chest X-rays.

Patients' demographic features (age, gender, Weight, height) were collected and recorded, then the patients' clinical parameters (HR, O<sub>2</sub> SAT, RR, BP) were registered. Then all data were analyzed statistically using Chi-square or Fisher's exact test, as appropriate, to explore the association between Pneumothorax. SPSS IBM software version 28 was used to analyze the data.

**Outcomes:** all targeted patients were observed for 48 hours, inside the hospital, and followed for 2 weeks as outpatients in a clinic. The follow-up was conducted

clinically by observing the vital signs and doing a daily chest X-ray.

**Statistical analysis:** SPSS IBM software version 28 was used to analyze the data.

**Ethical approval:** The study was approved for publication by the ethics committee of the Royal Medical Service, reference number 47/8/26.

## RESULTS

A total of 120 patients were diagnosed with mild pneumothorax. The mean age was 29±0.3 years. A 30 % (n=35) were female patients, with a higher percentage of male patients (70%, n=85). Table 1.

All patients (100%) were managed conservatively initially; 3 patients (0.025%) failed medical management and required chest tube insertion, with a nonsignificant P-value. Table 1.

## DISCUSSION

Pneumothorax is a common pulmonary disease that affects male and young patients more than females and the elderly, as published by Selvin Jacob in 2024, and he noticed a higher percentage among younger and male patients. They advised non-invasive management if pneumothax is less than 2cm in thickness.<sup>[4]</sup>

Ennis SI and Dobler CC, in their paper, argued that mild pneumothorax is easily managed conservatively without need for chest tube, specially if it was isolated and not associated with other chest or abdominal injuries. The air in the pleural space can be absorbed easily without complication within 48 hours.<sup>[5]</sup>

In the meta-analysis study that was published in the New England Journal of Medicine in 2022, Simon G.A. Brown showed an 84% success rate of noninvasive management of mild isolated pneumothorax, which supports our argument.<sup>[6]</sup>

The British Thoracic Society supports the theory of non-invasive management, and their recommendation, published in the National Library of Medicine PMC 2020, recommends that mild pneumothorax with a thickness of less than 2 cm in the pleural space can be managed spontaneously without risks, and at the same time it helps in the avoidance of thoracocentesis complications.<sup>[7,8,9,10]</sup>

Hernandez MC and his colleague published a study in 2018, that delineate the risk of chest tube insertion and argues that nearly 20% of cases will develop complications during insertion, which is a significant percentage.<sup>[2,8,10]</sup>

**Table 1: demographic features and the percentage of successful management.**

| Variable         | value | Conservative management | Invasive management |
|------------------|-------|-------------------------|---------------------|
| Age more than 50 | 15%   | 90%                     | 10%                 |
| Male patients    | 70%   | 100%                    | 0                   |
| Female patients  | 30%   | 99%                     | 1%                  |

**CONCLUSION**

We conclude that noninvasive, conservative management of simple and mild pneumothorax is a safe, cost-effective approach.

**REFERENCES**

- Balta C, Kuzucuoglu M. Conservative Treatment Approach in Primary Spontaneous Pneumothorax. J Coll Physicians Surg Pak., Feb. 2020; 30(2): 168-171. doi: 10.29271/jcpsp.2020.02.168. PMID: 32036825.
- Hernandez MC, El Khatib M, Prokop L, Zielinski MD, Aho JM. Complications in tube thoracostomy: Systematic review and meta-analysis. J Trauma Acute Care Surg, Aug. 2018; 85(2): 410-416. doi: 10.1097/TA.0000000000001840. PMID: 29443856; PMCID: PMC6081248.
- 3-Chan L, Reilly KM, Henderson C, Kahn F, Salluzzo RF. Complication rates of tube thoracostomy. Am J Emerg Med., Jul. 1997; 15(4): 368-70. doi: 10.1016/s0735-6757(97)90127-3. PMID: 9217527.
- Selvin Jacob, Raghu Seethal An Approach to Airway Management and Acute Respiratory Failure, Techniques in Vascular and Interventional Radiology, 2026; 29(2): (101113).
- Ennis SL, Dobler CC. Conservative *versus* interventional treatment for spontaneous pneumothorax. Breathe (Sheff), Sep. 2020; 16(3): 200171. doi: 10.1183/20734735.0171-2020. PMID: 33447279; PMCID: PMC7792830.
- Simon G.A. Brown, Ph.D. <https://orcid.org/0000-0002-9961-0890>, Emma L. Ball, F.R.A.C.P., Kyle Perrin, Ph.D., Stephen E. Asha, F.A.C.E.M., Irene Braithwaite, Ph.D. <https://orcid.org/0000-0001-5327-3027>, Diana Egerton-Warburton, M.P.H., Peter G. Jones, Ph.D., +12, for the PSP Investigators\* Author Info & Affiliations, Published January 29, 2020 N Engl J. Med., 2020; 382: 405-415. DOI: 10.1056/NEJMoa1910775. 382 NO. 5 Copyright © 2020.
- Ennis SL, Dobler CC. Conservative *versus* interventional treatment for spontaneous pneumothorax. Breathe (Sheff), Sep. 2020; 16(3): 200171. doi: 10.1183/20734735.0171-2020. PMID: 33447279; PMCID: PMC7792830.
- Deneville M. Morbidity of percutaneous tube thoracostomy in trauma patients. Eur J Cardiothorac Surg, Nov. 2002; 22(5): 673-8. doi: 10.1016/s1010-7940(02)00478-5. PMID: 12414029.
- Kesieme EB, Dongo A, Ezemba N, Irekpita E, Jebbin N, Kesieme C. Tube thoracostomy: complications and its management. Pulm Med., 2012; 2012: 256878. doi: 10.1155/2012/256878. Epub 2011 Oct 16. PMID: 22028963; PMCID: PMC3195434.
- Chan SS. Current management of spontaneous pneumothorax. Hong Kong Med J., 2014; 20(5): 443-448.