

Generalised Tonic-Clonic Seizure Causing Spontaneous Pneumothorax - A Rare Case Presentation

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ABSTRACT

Generalised tonic-clonic (GTC) seizures can lead to various complications, including pneumothorax. This is a rare event, although noted in the limited literature. The authors report a young, healthy woman experiencing her first seizure. She showed signs of status epilepticus. Inadequate pre-oxygenation during preparation for rapid sequence intubation prompted the clinicians to perform a bedside ultrasound, which indicated a right-sided pneumothorax. A needle thoracotomy was performed before intubation, followed by tube thoracostomy. Post-intubation imaging confirmed a resolving pneumothorax. This case highlights the rare link between seizures and pneumothorax caused by increased intra-alveolar pressure from Valsalva manoeuvres during convulsions.

Key Words: *Pneumothorax, Seizures, Needle thoracotomy.*

How to cite this article: Kapadia NN, Fasih A, Hashmi SH, Jokhio AA, Akbar TS. Generalised Tonic-Clonic Seizure Causing Spontaneous Pneumothorax - A Rare Case Presentation. *JCPSP Case Rep* 2025; **3**:402-404.

INTRODUCTION

Generalised tonic-clonic (GTC) seizure is defined as an aberrant neuronal electrical activity causing jerking of muscles. It can cause complications, such as aspiration pneumonitis and neurogenic pulmonary oedema.¹

Pneumothorax (PTx) is defined as the accumulation of air in the pleural space. It is labelled as spontaneous PTx in the absence of iatrogenic injury, traumatic injury, or any other clear aetiology.² The combined annual incidence of primary and secondary PTx is approximately 24 per 100,000 for men and 9.8 per 100,000 for women.³

The authors report an uncommon occurrence of post-seizure PTx for emergency physicians to highlight this life-threatening complication requiring proactive measures.

CASE REPORT

A 24-year woman with no prior health issues arrived at the emergency department (ED) with a complaint of involuntary jerky movements that began an hour ago. Her husband found her unresponsive, facing the wall. She experienced tonic-clonic seizures lasting 2-3 minutes, which resolved spontaneously.

However, she did not regain consciousness, prompting her husband to call an ambulance. Further enquiry revealed she had suffered from a headache for the past three days without any fever, vomiting, blurred vision, diplopia, vertigo, or gait abnormalities, with partial relief from oral over-the-counter analgesics. There was no history of any trauma or fall.

During transport, she had two more seizures of a similar nature and arrived at the ED in active GTC seizure, which was aborted with 5 mg of Midazolam. Upon assessment, she was an overweight lady in the postictal phase, exhibiting bilateral dilated pupils and left-sided mouth deviation. She was given a loading dose of Levetiracetam 3 g IV. Intubation was planned, as per the management of status epilepticus, as the patient did not regain consciousness between seizures.

Rapid sequence intubation (RSI) was executed but failed to adequately pre-oxygenate. This prompted the emergency physician to perform a bedside ultrasound, which revealed no lung sliding on the right, and on examination, there was a decreased air entry on auscultation on the right side of the chest, without any signs of external trauma, deformity, or bruises. A needle thoracotomy followed by intubation and tube thoracostomy was performed. The chest x-ray performed post-intubation revealed a resolving spontaneous PTx (Figure 1). The medical ICU team was taken on board, and she was admitted to the ICU. Extubated the next day, she was alert, conscious, oriented to person, place and time, and stable haemodynamically, maintaining oxygen saturation on room air. An x-ray of the chest showed a resolved right-sided PTx, and a plain head CT scan indicated normal findings without any acute pathology. The final impression on discharge was status epilepticus with a resolving PTx.

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Received: May 29, 2025; Revised: July 07, 2025;
Accepted: July 28, 2025
DOI: <https://doi.org/10.29271/jcpspcr.2025.402>

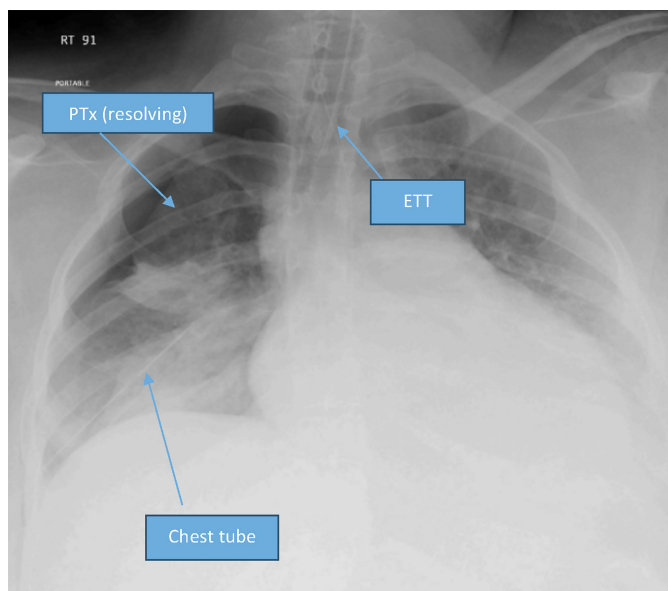


Figure 1: Post-intubation chest x-ray showing the right-sided resolving pneumothorax, with chest tube and endotracheal tube (ETT) in place (arrows).

DISCUSSION

Seizures have their complications, which are either directly associated with convulsions, such as depression, anxiety, and sudden unexplained death or by reduction in consciousness, such as burns, drowning, head injuries, fractures, motor vehicle collisions, and falls.⁴ Complications associated with the respiratory system include aspiration pneumonitis and neurogenic pulmonary oedema. A PTx occurring in cases in which an individual does not have any underlying pulmonary disease is termed as a primary PTx. Risk factors for developing a primary PTx are smoking, family history, and having a tall, thin body, as often seen in the Marfan syndrome.⁵ On the contrary, a secondary PTx occurs because of an underlying pulmonary disease such as chronic obstructive lung disease, bronchogenic carcinoma, tuberculosis, sarcoidosis, and idiopathic pulmonary fibrosis.³ The relation between pneumothorax and GTC seizures is not well described in the literature. To the best of the authors' knowledge, only a couple of cases have been reported.^{1,3,6} The mechanism related to increased intra-alveolar pressure is generated by expiratory effort against a closed glottis during seizure.⁷ It was hypothesised to be caused by rupture of alveoli at the lung periphery, which causes air to escape into the pleural space.³

During a GTC seizure, an intense Valsalva manoeuvre may have resulted in the development of PTx in this patient. The authors applied continuous oxygen therapy along with tube thoracotomy, and after three days, a repeat follow-up chest x-ray showed resolved PTx. Subsequently, continuous oxygen inhalation was recommended for the treatment as oxygen increases the diffusion pressure of interstitial nitrogen and promotes the absorption of free air in the pleural cavity.⁶

This case highlights a rare presentation of spontaneous PTx in a young female patient experiencing seizures, emphasising the importance of thorough evaluation in emergency settings. The association between seizures and the development of PTx, although uncommon, underscores the need for clinicians to foster a cautious outlook for potential complications during acute neurological events. Furthermore, it also highlights the importance and relevance of bedside ultrasound in the developing field of emergency medicine in order to prevent complications and delays in management.

PATIENT'S CONSENT:

Informed consent was taken from the patients to publish the data concerning this case.

COMPETING INTEREST:

The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:

NNK: Conception, design of the work, analysis, interpretation, and drafting of the manuscript.

AF: Design of the work, interpretation, and drafting of the manuscript.

SHH: Design of the work, acquisition, and critical analysis.

AAJ, TSA: Analysis, interpretation, and drafting of the manuscript.

All authors approved the final version of the manuscript to be published.

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