

Point of Care Ultrasound in Suicidal Hanging Scenario: A Case Report

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Abstract

In the emergency department, swift and comprehensive management is crucial for a patient with a history of suicidal hanging due to the potential life-threatening consequences. Upon arrival exhibiting signs of unconsciousness and gasping respirations, the individual indicates severe hypoxia and impending respiratory failure. Immediate assessment is essential to address hanging-related injuries and potential increased intracranial pressure (ICP). The initial focus includes securing the airway, ensuring oxygenation, and providing circulatory support. Point-of-care ultrasound (POCUS) emerges as a vital tool for rapid identification of structural brain abnormalities, aiding in the assessment of raised ICP. Addressing raised ICP involves integrating therapeutic interventions guided by POCUS findings, including measures to reduce cerebral edema, optimize perfusion, and prevent secondary brain injury. POCUS's portability and immediacy seamlessly integrate into emergency resuscitation, providing valuable insights for tailored therapeutic strategies. Emphasizing a rapid and multidisciplinary approach is essential for optimal patient outcomes.

Keywords: Suicidal hanging, Medico legal, POCUS,

Background:

The exploration of Point of Care Ultrasound (POCUS) in the context of suicidal hanging scenarios addresses a critical dimension of emergency medicine and trauma care.^[1] Suicidal hanging

poses a substantial public health concern globally, contributing significantly to morbidity and mortality rates.^[2] According to various epidemiological studies, hanging is a prevalent method of suicide, accounting for a notable portion of suicide-related

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incidents (World Health Organization, 2019).^[3] Despite the gravity of this issue, the nuances of its immediate and profound physiological impacts, especially regarding intracranial dynamics, demand focused investigation.^[4] The manuscript delves into the unique challenges posed by suicidal hanging, emphasizing the necessity for swift and accurate diagnostic tools. POCUS emerges as a technology with the potential to revolutionize the assessment of patients in these scenarios. Its portability and real-time imaging capabilities position it as an invaluable tool in the emergency setting, allowing for rapid evaluation of structural and functional aspects, particularly in the identification of raised intracranial pressure (ICP) and associated traumatic brain injuries.^[5] By elucidating the distinctive context of suicidal hanging and highlighting the role of POCUS, this manuscript aims to contribute valuable insights to the broader discourse on trauma management and emergency care.

Case presentation

In his 20s, a patient with a history of suicidal hanging, presented to the Emergency Department (ED) exhibiting critical signs and symptoms. On arrival, he displayed unconsciousness and gasping respirations, suggestive of severe hypoxia and impending respiratory failure. Immediate attention was directed towards securing the airway, ensuring oxygenation, and providing circulatory support. A comprehensive medical history revealed a recent episode of profound psychological distress, prompting an attempt at self-harm through hanging. This information underscored the urgency of assessing both hanging-related injuries and the potential for raised intracranial pressure (ICP). Given the critical nature of the case, Point of Care Ultrasound (POCUS) was employed as a diagnostic tool. POCUS swiftly identified structural brain abnormalities, including cerebral oedema or haemorrhage, contributing to the assessment of raised ICP (Figure-1). Real-time imaging allowed for a dynamic evaluation of intracranial dynamics, facilitating prompt decision-making in the management of traumatic brain injuries. Findings from POCUS guided therapeutic interventions aimed at reducing cerebral oedema, optimizing cerebral perfusion, and preventing secondary brain injury (Figure-2).



Figure No.1 Lower horizontal marking optic nerve sheath diameter before



Figure No.2 Lower horizontal marking Optic nerve sheath diameter after treatment

The patient's response to these interventions was closely monitored, and adjustments were made as necessary. POCUS played a pivotal role in this ongoing assessment, providing valuable insights into the patient's neurologic status. The integration of POCUS into the management of the patient highlighted its significance as a rapid and effective tool for evaluating and responding to the complex challenges presented by suicidal-hanging incidents, contributing to a more informed and tailored approach to patient care.

Investigations:

We prioritized a comprehensive assessment for this patient, utilizing routine blood and serum investigations. Complete blood count (CBC) and basic metabolic panels were sent to evaluate haematological parameters, check for signs of anaemia or infection, and assess electrolyte balance and organ function, coagulation status, and liver function, among other factors. We emphasized the integration of Point of Care Ultrasound (POCUS) as a pivotal diagnostic tool in suicidal hanging. POCUS provided immediate insights into intracranial dynamics, enabling real-time evaluation of structural and functional aspects of the brain. This facilitated the prompt identification of cerebral oedema. The strategic inclusion of POCUS in the diagnostic protocol significantly enhanced the

efficiency and accuracy of assessments, guiding timely therapeutic interventions within the confines of the emergency setting. POCUS ensured a comprehensive and precise approach to evaluating and managing patients following suicidal-hanging incidents.

Differential diagnosis:

It is a confirmed case of suicidal hanging based on the history and clinical features.

Treatment and outcome:

On arrival at the Emergency ward, we immediately initiated a rapid assessment and secured the airway promptly. Endotracheal intubation was done to ensure adequate ventilation. Supplemental oxygen and Mechanical ventilation were given to maintain adequate oxygenation. The patient was stabilized hemodynamically by ensuring adequate fluid resuscitation. Inotropic support was given for cardiovascular support. Continuous monitoring of vital signs, including heart rate, blood pressure, and oxygen saturation was done. Frequent neurological assessments were done to detect any changes in the patient's neurological status. Continuous neurologic monitoring was done to assess for signs of increased intracranial pressure (ICP) or neurological deterioration. Point of Care Ultrasound (POCUS) played a vital role in the real-time evaluation of intracranial dynamics, assisting in the identification of cerebral oedema. We employed strategies to manage elevated ICP, such as maintaining head elevation and administering osmotic agents (e.g., mannitol). Treatment in the context of point-of-care ultrasound in suicidal hanging scenarios involves a meticulous blend of emergency and intensive care strategies. The integration of POCUS allowed for real-time neurological assessment, contributing to the prompt identification of intracranial complications and facilitating targeted interventions to optimize patient outcomes.

Discussion

Monitoring changes in ICP is essential for guiding therapeutic interventions and optimizing patient outcomes. POCUS provides a non-invasive means of assessing ICP dynamics, contributing to the ongoing surveillance of patients at risk for increased intracranial pressure. By offering critical information swiftly, POCUS aids in the early identification of complications and supports a proactive approach to patient management [6].

The integration of POCUS into the management of suicidal hanging and raised ICP underscores its role as a versatile and indispensable diagnostic tool. Its ability to provide rapid, accurate information contributes to a more nuanced understanding of the patient's condition, enabling healthcare professionals to tailor interventions based on real-time assessments.

Take home message:

- **Shift in Paradigm:** POCUS revolutionises the handling of emergency and critical care in cases of suicidal hanging.
- **Quick Decision-Making:** Brain abnormalities are detected by real-time imaging, which facilitates quick and well-informed decision-making.
- **Best Results:** POCUS directs customised tactics that minimise cerebral oedema, maximise perfusion, and guard against secondary brain damage.

Conflicts of interest: Nil

Informed Consent: Informed consent as obtained after explaining the purpose of research to the family member.

Source of funding: None

Ethical Clearance: Not required as it is a case report.

References

1. Huang E. NUEM Blog NUEM Blog.
2. Bachmann S. Epidemiology of suicide and the psychiatric perspective. *International journal of environmental research and public health*. 2018 Jul;15(7):1425.
3. World Health Organization. *Suicide in the world: global health estimates*. World Health Organization; 2019.
4. Döbler NA, Carbon CC. Adapting Ourselves, Instead of the environment: An inquiry into human enhancement for function and beyond. *Integrative Psychological and Behavioral Science*. 2023 Aug 19:1-49.
5. Lee L, DeCara JM. Point-of-care ultrasound. *Current Cardiology Reports*. 2020 Nov;22:1-0.
6. Tessaro MO, Friedman N, Al-Sani F, Gauthey M, Maguire B, Davis A. Pediatric point-of-care ultrasound of optic disc elevation for increased intracranial pressure: A pilot study. *The American Journal of Emergency Medicine*. 2021 Nov 1;49:18-23.