

Commentary: Prediction Model of Delayed Hemothorax in Patients with Traumatic Occult Hemothorax Using a Novel Nomogram

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See Article page 519

Delayed onset hemothorax (dHTX), also known as the delayed development of hemothorax, describes instances where initial imaging studies show no signs of hemothorax, but it becomes apparent during follow-up. This term can also apply to cases where an occult hemothorax, visible only on computed tomography scans and not on plain X-rays, enlarges in subsequent imaging [1].

Although traumatic hemothorax is classified as either acute or delayed onset (dHTX) based on the timing of presentation or diagnosis, dHTX is associated with ongoing bleeding from previously undetected injuries, lacerations of thoracic organs due to displaced rib fractures, or expectant management of initially minimal hemothorax [1-5].

The clinical spectrum of dHTX, such as acute traumatic hemothorax, can vary significantly, ranging from asymptomatic to life-threatening. This variation depends on several factors, including the rate of blood accumulation, the volume of hemorrhage in the pleural cavity, the presence of associated injuries, the adequacy of management, and the patient's overall condition [2,6-8]. Additionally, complications associated with untreated or undrained dHTX can include acute respiratory failure in the early stages, pro-

gressing to empyema and fibrothorax in later stages [9].

dHTX is estimated to account for approximately 7.4% to 11.8% of traumatic hemothorax cases, although this percentage may vary based on the study population and the duration of follow-up [2,3,9-11]. Research indicates that dHTX can manifest as late as 16 to 30 days post-injury [2,5].

Numerous studies have examined the impact of thoracic trauma, particularly focusing on multiple and displaced rib fractures, on patient outcomes. The evidence indicates that these injuries are markers of trauma severity and are correlated with increased mortality and morbidity [12,13]. Additionally, displaced rib fractures are recognized as indicators of the occurrence of dHTX [14].

Although numerous researchers have analyzed various risk factors contributing to dHTX, developing a prediction model for dHTX in trauma patients remains challenging. This difficulty arises from the complexity and subtlety of the contributing factors, which are influenced by the diversity of trauma patients.

Despite its limitations and the need for validation through a large-scale prospective study, this new nomogram and prediction model are expected to contribute to reducing

the morbidities associated with delayed hemorrhage [15].

In conclusion, even patients with relatively minor injuries from thoracic trauma require careful observation and follow-up to prevent complications. It is essential to recognize early signs of worsening hemothorax or effusion during expectant management. To achieve this, close monitoring and a strict follow-up schedule using multimodal diagnostic tools are fundamental. Additionally, appropriate management, guided by predictions for high-risk patients, is fundamental for preventing morbidity.

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Conflict of interest

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