

exam. While on the surface this study seems to support reducing whole body imaging in similar patients, this is a retrospective review with considerable bias and small sample size. 12% of patients had torso injuries with a normal physical exam, and while it appears the majority of these did not need surgical intervention, the frequency of missed injuries is concerning. Furthermore, the confidence intervals of the elements with the highest positive and negative predictive values are wide. I would encourage emergency physicians to interpret these data with caution, as higher quality trials are needed on this topic to determine if reducing whole-body CT would be appropriate in these patients.

□ **OBSERVING PNEUMOTHORACES: THE 35-MILLIMETER RULE IS SAFE FOR BOTH BLUNT AND PENETRATING CHEST TRAUMA.**



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With the increased use of chest computed tomography (CT) in trauma patients, providers are detecting occult pneumothoraces more frequently. While standard practice has been to place a chest tube in all patients with a traumatic pneumothorax, more recently providers are observing some hemodynamically stable patients with pneumothoraces. Prior trials have concluded that using a cut-off of pneumothoraces <35mm could predict successful observation. This study aimed to demonstrate that there is an objective measurement that can be used to determine which traumatic pneumothoraces can be safely observed without requiring placement of a chest tube.

This was a single center retrospective study of patients admitted to a level 1 trauma center between 2011 and 2016. Inclusion criteria consisted of patients over age 18 that had chest CT at the time of admission following trauma. Exclusion criteria included patients who had no chest CT performed, had an ipsilateral hemothorax or hemopneumothorax, had a chest tube inserted before doing a chest CT, and patients who were mechanically ventilated during their index admission. To obtain the measurement for the cutoff value, study authors measured the distance between the parietal pleura and the mediastinum in a line perpendicular to the chest wall, measuring the largest air pocket. Measurements were categorized into those with a measurement greater than or less than 35mm. Patient management was categorized into those who were observed or those who had placement of a chest tube. Observation was defined as not requiring a chest tube within 4 hours of presentation to the emergency department (ED). The primary outcome was successful observation of the pneumothorax. Failure of observation included interventions such as delayed chest tube placement, video assisted thoroscopic surgery (VATS), intrapleural tissue plasminogen activator, or thoracotomy. Secondary outcomes included hospital length of stay and intensive care unit (ICU) length of stay.

1,767 patients with a traumatic pneumothorax were identified in the institution's trauma registry, of which 935 were immediately excluded due to presence of hemothorax or hemopneumothorax, 116 excluded due to initiation of mechanical ventilation, resulting in 336 eligible patients with CT identified

occult pneumothorax. 94.3% of the patients had a blunt mechanism of injury. The median measurement of pneumothoraces was 10.4mm, with 293 (87.2%) of the pneumothoraces measuring 35mm or less. The median length of stay in the hospital was 4 days. 47 patients received a chest tube within the first 4 hours and 257 (89%) were observed. There were 272 patients in the trauma registry with pneumothorax \leq 35mm; of these, 25 patients (9%) failed observation. There were 17 patients with a pneumothorax of >35mm, of which 41% failed observation. Reasons for failure included progression of pneumothorax, development of pleural effusion, tension pneumothorax, and hemothorax. In those with a pneumothorax of 35mm or less, there was a positive predictive value of successful observation of 90.8%, with a negative predictive value of 41.2%. Significant predictors for failing observation included: pneumothorax measurement category (\leq 35 mm vs. >35 mm) ($P < 0.0001$), GCS ($p = 0.012$), and number of rib fractures ($p = 0.048$) in a univariate logistic regression analysis, but in a multivariate logistic regression analysis, the size of pneumothorax \leq 35mm was the single predictor of success (OR for failure 0.142, 95% CI 0.047-0.428).

The authors of the article conclude that although Advanced Trauma Life Support (ATLS) suggests the placement of a chest tube for all traumatic pneumothoraces to prevent the development of a tension pneumothorax, given the lack of guidelines the decision to place a chest tube in these pneumothoraces should be balanced between the risks and benefits to potentially spare patients the avoidable morbidity and even mortality. The authors concluded that this study adds validity to the use of the 35-mm rule in guiding decisions to observe stable patients with pneumothoraces based on their low failure rate of 9% and use of the rule at a different institution and with a different practice group than prior studies. The limitations of the study include determination of a 4 hour cut-off for observation based on institution physician practice patterns, unclear reasons for placing the chest tube in 34.4% of the patients, visual measurement of the largest air pocket on CT, and imbalance between incidence of blunt (94.3%) and penetrating trauma. The latter raises the question as to whether the results are generalizable to penetrating trauma resulting in isolated pneumothorax.

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Commentary: Avoiding unnecessary chest tube placement in traumatic pneumothorax is a no-brainer. This study showed that pneumothorax size \leq 35mm was an independent predictor of successful observation without chest tube placement. However, the retrospective nature of this study does limit its applicability. Significant selection bias exists and it is not clear which of the patients who had physiologic deterioration or required a second intervention were in the observed cohort \leq 35mm and or not. A prospective observational or randomized trial will be needed before this suggested algorithm should be adopted for all traumatic pneumothorax.