Titel: Chest X-ray compared to computed tomography in the acute management of pediatric trauma patients; a systematic review.

Abstract

Background: Life threatening thoracic injuries are not common in the pediatric population, however they are associated with an increased risk of mortality. In the acute trauma setting, radiologic imaging plays a crucial role. Timely and appropriate imaging can prevent treatment delays and limit further damage in pediatric trauma patients. This study provides a critical assessment of the clinical relevance of conventional chest radiology compared to computed tomography in the initial treatment of pediatric patients in the emergency department.

Methods: Following the PRISMA guidelines, a systematic literature search investigating CXR and CCT for diagnostics and management of thoracic injuries in acute pediatric trauma, was conducted in the electronic databases PubMed, Embase, CINAHL and Cochrane. Deduplication, title/abstract screening and full text screening was independently performed by two researchers. Conflicts were resolved by consensus. Data were extracted from the included articles, regarding demographics, trauma mechanism, injuries, management and outcomes. For data synthesis a narrative synthesis was performed.

Results: The initial searches resulted in a total of 3524 articles, after screening 11 articles fulfilling the criteria of comparing CCT to CXR for the diagnosis and/or management of thoracic injuries in pediatric patients (<18 years old) in the acute setting, were included in this study. The sensitivity of CXR in detecting thoracic injuries in pediatric trauma patients ranged from 20% to 73% and specificity ranged from 82% to 100%. Changes in clinical management following CCT findings occurred in 1% to 17.7% of cases. Commonly missed injuries on CXR were pulmonary contusions and pneumothoraxes, of which 0.5%–11.1% required chest tube placement.

Conclusions: While CCT detects more injuries than CXR, the on CXR missed injuries do not appear to have major clinical consequences on the management of pediatric thoracic injury. Showing CXR to be a fast and reliable first line imaging modality in pediatric blunt trauma cases, providing reliable diagnostics while minimizing radiation exposure.