



Pathology/Biology Section - 2015

H57 The Utility of CT Imaging in Determining Cause of Death in a Case of Iatrogenic Barotrauma

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After attending this presentation, attendees will understand how postmortem Computed Tomography (CT) imaging: (1) can be used in detecting air within the body cavities, tissues, and vessels; (2) can add valuable pre-dissection information; and, (3) is useful in guiding postmortem dissection.

This presentation will impact the forensic science community by bringing to light the value of CT imaging as an adjunct to postmortem examination and by bringing attention to certain postmortem cases which would benefit from having pre-autopsy imaging.

Advanced postmortem imaging is increasingly being utilized in the field of forensic pathology with many centers worldwide currently incorporating Postmortem Computed Tomography (PMCT) into their daily practice. One of the myriad advantages of PMCT imaging is its ability to detect air in body cavities, tissues, organs, and blood vessels which can be challenging to appreciate during routine dissection. CT scan provides nearly 100% sensitivity and specificity for the diagnosis of pneumothorax. Tension pneumothorax and other iatrogenic barotraumas such as air emboli and subcutaneous emphysema are known complications of mechanical ventilation. A case of iatrogenic barotraumas is reported, demonstrating the advantages of PMCT imaging in assisting with determining the cause and mechanism of death.

A 21-year-old man with Duchenne Muscular Dystrophy (DMD) was admitted to the hospital and treated for pneumonia. His pneumonia progressed to respiratory failure and, after several unsuccessful attempts at intubation, he lost vital signs. A postmortem examination was conducted to determine the cause of death. Prior to the autopsy, a full body CT scan was performed which revealed a large right-sided tension pneumothorax with left mediastinal shift, a completely collapsed right lung, subcutaneous emphysema, and air emboli within the heart and cerebral vasculature. At autopsy, the body was that of a young adult male with obvious atrophy of the upper and lower limbs. The imaging findings allowed for modification of the postmortem dissection technique in order to demonstrate air within the body cavities. A needle thoracostomy expressed a large volume of air from the right pleural space. The lungs showed bilateral collapse with acute bronchopneumonia and the heart showed DMD-associated cardiomyopathy histologically.

Barotrauma is an uncommon but well-recognized complication of mechanical ventilation; when it occurs, the mortality rate can be significantly high. This case highlights some of the advantages of PMCT as an adjunct to dissection, particularly for visualization and documentation of suspected barotrauma. In conjunction with dissection, PMCT added valuable pre-dissection information and assisted with the completion of a thorough, reviewable forensic autopsy. The advantages of PMCT in detecting air can be applied to several other case types including some SCUBA-related fatalities and sharp force injuries to the chest and neck.

CT Imaging, Postmortem, Barotrauma