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Images of Interest / Imagens de Interesse

Benign Post-Traumatic Pseudopneumoperitoneum: A Diagnostic Pitfall in Blunt Trauma

Pseudopneumoperitoneu Benigno Pós-traumático: Um Desafio Diagnóstico em Contexto de Trauma

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Abstract

Benignpost-traumaticpseudopneumoperitoneum is an uncommon imaging finding that may mimic true pneumoperitoneum in trauma patients. It is typically characterized on computed tomography by an isolated pocket of air between the fifth and tenth intercostal spaces, usually near the costochondral junction. The pathogenesis of benign post-traumatic pseudopneumoperitoneum is uncertain but may relate to a vacuum phenomenon induced by tissue pressure changes. Recognition of this benign entity is essential to differentiate it from true pneumoperitoneum, which often requires surgical exploration, thereby avoiding misdiagnosis and inappropriate intervention.
We report a case of a patient in the context of blunt thoracoabdominal trauma, in which computed tomography demonstrated intercostal ectopic air anterior to the liver, which was diagnosed as benign post-traumatic pseudopneumoperitoneum. The patient remained stable and was managed conservatively, avoiding unnecessary laparotomy.

Keywords

Pneumoperitoneum; Nonpenetrating wounds; Traffic collision; Multidetector computed tomography; Emergency medicine.

Resumo

O pseudopneumoperitoneu pós-traumático benigno é um achado imagiológico raro que pode mimetizar um pneumoperitoneu verdadeiro em doentes com contexto de trauma. É tipicamente caracterizado na tomografia computorizada por focos de ar entre o quinto e o décimo espaços intercostais, normalmente ao nível da junção condrocostal. A sua fisiopatologia não é clara, mas pode estar relacionada com um fenómeno de vácuo induzido por alterações de pressão tecidular. O reconhecimento desta entidade benigna é essencial para a diferenciar de um pneumoperitoneu verdadeiro, que frequentemente implica um procedimento cirúrgico, permitindo deste modo evitar erros de diagnóstico e intervenções desnecessárias.
No presente artigo relatamos um caso de um doente no contexto de trauma toracoabdominal fechado, em que a tomografia computorizada revelou um foco gasoso ectópico intercostal, anterior ao fígado, diagnosticado como pseudopneumoperitoneu pós-traumático benigno. O doente manteve-se estável e foi tratado de forma conservadora, permitindo evitar uma laparotomia exploradora desnecessária.

Palavras-chave

Pneumoperitoneu; Feridas não-penetrantes; Acidente de viação; Tomografia computorizada; Medicina de urgência

Case

We present a case of a 30-year-old man who was evaluated in the emergency department after a high-velocity motorcycle accident involving a head-on collision. The patient was fully awake, with an oxygen saturation of 97% on ambient air, a blood pressure of 115/67 mmHg, and a heart rate of 85 bpm. He reported right-sided thoracic and upper abdominal pain. Laboratory tests showed no significant findings. A thoracic-abdominal-pelvic computed tomography (CT) revealed pulmonary contusion (Figure 1A) and a grade II liver laceration (according to the American Association for the Surgery of Trauma liver injury scale) associated with perihepatic blood (Figure 1B), but no signs of active

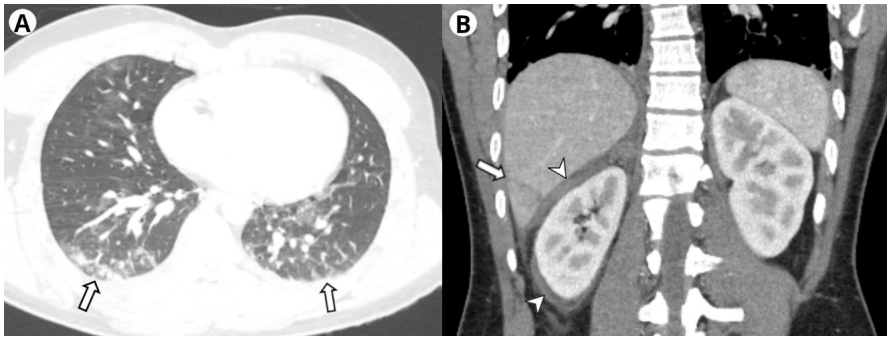

Figure 1 – A. Computed tomography (axial view) shows focal peripheral areas of parenchymal opacity and ground-glass opacity (arrows), consistent with pulmonary contusion. B. Computed tomography (coronal view) shows a hepatic capsular tear with 2 cm parenchymal depth, consistent with a grade II liver laceration, associated with perihepatic blood (arrowhead).

hemorrhage. There was also no evidence of rib fractures, pneumothorax, or pneumomediastinum. Notably, the CT showed a pocket of air in the sixth right intercostal space anterior to the liver (Figure 2 and Figure 3), to which the surgical team inquired about the possibility of a pneumoperitoneum.

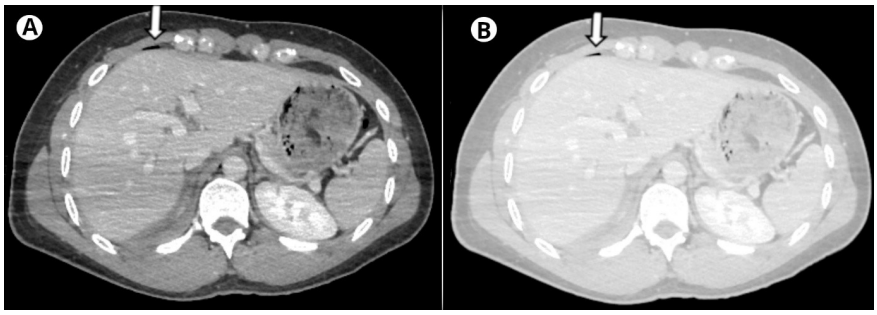

Figure 2 – Computed tomography (axial view) in a soft tissue window (2A) and lung window (2B) shows a small pocket of air (arrow) in the right sixth intercostal space anterior to the liver.

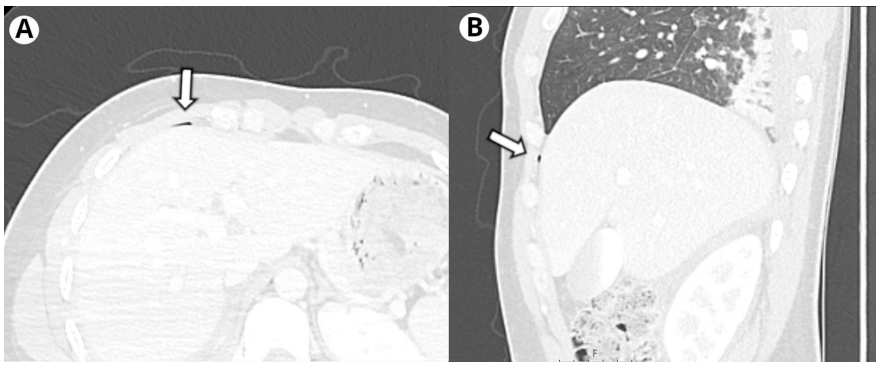

Figure 3 – Computed tomography reconstructions in the lung window in the axial (3A) and sagittal (3B) views, zoomed in on the small pocket of air (arrow).

Diagnosis and Discussion

Benign post-traumatic pseudopneumoperitoneum was diagnosed in this patient based on the presence of a single air pocket in the right sixth intercostal space, with no additional findings to suggest pneumothorax, pneumoperitoneum, or bowel perforation. Conservative management was adopted, and surgical exploration was avoided.

This entity, though uncommon, has been described in trauma patients and is characterized by isolated ectopic air between the fifth and tenth intercostal spaces, often near the costochondral junction.[1] Currin et al. reported this finding in 5.2% of patients who underwent CT scans after trauma.1 Its pathogenesis remains uncertain, but the most accepted theory is that it is a vacuum phenomenon caused by sudden changes in tissue pressure, although alternative mechanisms have also been suggested.[1,2]

The main clinical challenge lies in distinguishing pseudopneumoperitoneum from true pneumoperitoneum due to bowel perforation, which usually requires urgent laparotomy.[3] Unlike pneumoperitoneum, pseudopneumoperitoneum does not present as free intraperitoneal air beneath the diaphragm and remains localized to the intercostal region.[1] Awareness of these imaging features is crucial to suggest the diagnosis and manage the patient conservatively, thus preventing unnecessary invasive procedures.

Ethical Disclosures / Divulgações Éticas

Conflicts of interest: The authors have no conflicts of interest to declare.

Conflitos de interesse: Os autores declaram não possuir conflitos de interesse.

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Confidentiality of data: The authors declare that they have followed the protocols of their work center on the publication of data from patients.

Confidencialidade dos dados: Os autores declaram ter seguido os protocolos do seu centro de trabalho acerca da publicação dos dados de doentes.

Protection of human and animal subjects: The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Protecção de pessoas e animais: Os autores declaram que os procedimentos seguidos estavam de acordo com os regulamentos estabelecidos pelos responsáveis da Comissão de Investigação Clínica e Ética e de acordo com a Declaração de Helsínquia da Associação Médica Mundial.

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