Radiological aspects of diffuse alveolar haemorrhage

Aspetti radiologici della emorragia alveolare diffusa

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Abstract

Purpose. This paper describes chest X-ray (CXR) and computed tomography (CT) findings of diffuse alveolar haemorrhage (DAH).

Materials and methods. We retrospectively reviewed 23 episodes of DAH in 20 patients, 17 of known aetiology and three of unknown aetiology. All cases were studied by CXR and 15 also by CT. Parenchymal consolidations and ground-glass opacities were evaluated after dividing each lung into three regions (upper, middle, lower) for a total of six zones.

Results. Consolidations or ground-glass opacities were identified on CXR in 16/20 patients, mainly in the middle fields (73%). In 4/20 patients, all with Wegener’s granulomatosis, CXR was negative or demonstrated only nodular opacities; in two of these cases, CT revealed ground-glass opacities. A complete follow-up was available for ten patients: initially, they showed consolidation opacities in 36/60 zones, which persisted in 16/60 after 7 days and in 11/60 after 15 days. Conversely, ground-glass opacities increased after 7 days owing to the partial regression of consolidation opacities, and they markedly diminished after 15 days.

Conclusions. DAH is radiologically characterised by a nonspecific alveolar-filling pattern. Diagnosis or suspicion of DAH needs to be supported by the evidence of haemoptysis and/or rapid-onset anaemia. CT is superior in detecting ground-glass opacities and is required in cases of suspected DAH with normal CXR findings.

Keywords Lung, haemorrhage • Chest radiology • Lung, CT

Riassunto

Obiettivo. Descrivere i reperti Rx e TC della emorragia alveolare diffusa (EAD).

Materiali e metodi. Studio retrospettivo di 23 episodi di EAD in 20 pazienti, 17 con eziologia identificata, 3 senza causa specifica, studiati tutti con Rx torace e 15 con TC. È stata valutata la presenza di opacità consolidative e ground glass dividendo arbitrariamente in sei zone (superiore, media ed inferiore) sia il polmone destro, sia il polmone sinistro.

Risultati. Opacità consolidative o ground glass erano dimostrate all’Rx, prevalentemente nei campi medi (73%), in 16/20 pazienti. In 4/20, tutti con Wegener, il radiogramma risultava negativo o dimostrava solo lesioni nodulari mentre la TC in 2/4 evidenziava opacità ground glass. Dieci pazienti di cui era disponibile follow-up completo esordivano con opacità consolidate in 36/60 zone, persistenti in 16/60 dopo 7 giorni e in 11/60 dopo 15. Le opacità ground glass aumentavano dopo 7 giorni per l’attenuazione delle consolidazioni, riducendosi nettamente 15 giorni.

Conclusioni. L’EAD presenta aspetti radiologici specifici di occupazione alveolare. Per la diagnosi o il semplice sospetto di EAD è indispensabile la correlazione con i dati clinico-anamnestici di emottisi o di anemia insorta rapidamente. La TC, più sensibile dell’Rx nel riconoscere opacità ground-glass, è indispensabile in pazienti con possibile EAD e quadro Rx negativo.

Parole chiave Polmone, emorragia • Radiografia, toracica • Polmone, TC
Diffuse alveolar haemorrhage (DAH) is a rare clinicopathological syndrome characterised by diffuse intra-alveolar bleeding, which may have an insidious chronic course or may present as an acute event in subjects of any age, including children [1, 2]. DAH must be distinguished from diffuse alveolar aspiration of blood from pulmonary focal lesions (e.g. bronchiectases, tumours, infections), which can usually be identified on radiography [3, 4]. DAH is very often associated with autoimmune processes. The fundamental pathogenetic mechanisms are deposition of immune complexes – formed in the bloodstream or in situ – on the vessel endothelium or walls, production of antineutrophil cytoplasmic antibodies (ANCA) and production of antiglomerular basement membrane (anti-GBM) antibodies [5].

The most frequent histopathological finding (an almost constant finding in systemic vasculitis) is pulmonary capillaritis characterised by fibrin thrombi in the interalveolar capillaries and septa, fibrinoid necrosis of capillaries, granulocyte infiltrates, erythrocytes and haemosiderin in the interstitium. In the absence of damage to the alveolar interstitium, there may be mild alveolar haemorrhage; in the case of recurring haemorrhage, interstitial fibrosis and tissue haemosiderosis may develop [6]. A less frequent histological pattern is diffuse alveolar damage (DAD) characterised by interstitial and alveolar oedema, capillary congestion with microthrombi and, above all, intra-alveolar hyaline membranes [6].

DAH may develop in a number of systemic diseases, as a result of coagulation disorders, inhaled toxins or infections (Table 1), but it may even have no specific cause [5, 6]. In the acute phases, it is characterised by the presence of dyspnoea with hypoxaemia, haemoptysis (in 70% of cases) and sideropenic anaemia [1]. Anaemia is the most constant finding in patients with pulmonary haemorrhage and is present in virtually all patients with Goodpasture’s syndrome [1]. Haemoptysis is the most striking symptom and may be present intermittently for weeks before the acute event or, more commonly, it may manifest or worsen dramatically and suddenly over a few days or even hours. Other symptoms include cough, fever and chest pain.

The radiographic pattern of DAH is characterised by consolidation or ground-glass alveolar-filling opacities of extremely varying size that are usually bilateral and prevalently distributed in parahilar regions. The opacities may be migratory and tend to show rapid changes in site, size and density [7, 8]. After a transient reticular pattern, the opacities resolve rapidly, with the chest X-ray (CXR) returning to normal in less than 2 weeks (Fig. 1). In chronic or recurrent DAH, persistent fibrotic interstitial involvement may develop in the later phases [4].