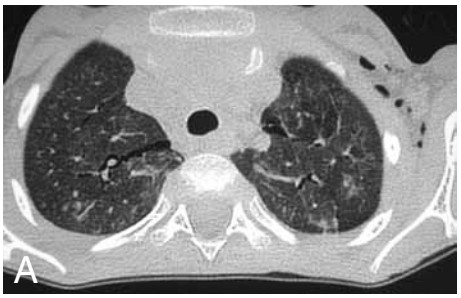
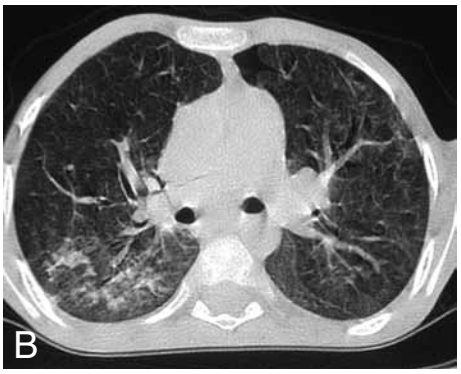
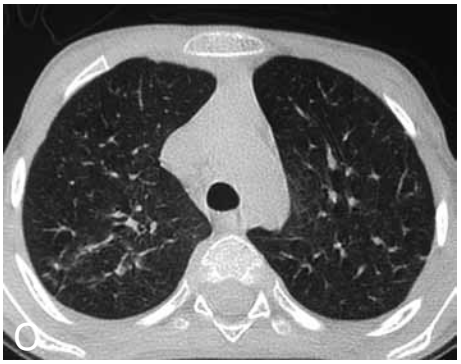
JBR–BTR, 2011, 94: 84.

IMAGES IN CLINICAL RADIOLOGY







Complicated pulmonary interstitial emphysema

C. Altay[1]

A 6-year-old boy with known acute lymphocytic leukemia was referred for radiologic evaluation of his complaints of newly onset cough, high fever, dsypnea and general situation worsening. The patient underwent invasive mechanical ventilation through an endotracheal tube in the intensive care unit. The patient's symptoms resolved within 7 days of initiating therapy and he was extubated, however left axillary crepitation and left side chest pain began. HRCT examination revealed irregular-shaped air spaces along the medium sized bronchovascular sheaths noted in the apices of both lungs (pulmonary interstitial emphysema) with localised pneumothorax in the left upper thorax and subcutaneous emphysema in the left axillary region additional to the diminished patchy ground-glass opacities (Fig. A, B). Most of these free air spaces were along the bronchovascular sheaths measured less than 1 cm in diameter. Pleural effusion and pneumomediastinum was not present in limited HRCT examination. There was marked clinical improvement at three-weeks follow-up. HRCT (Fig. C) done at the time of the three-weeks follow-up visit showed significant resolution of the pulmonary opacities and free air of the interstitium and subcutaneous tissue.

Comment

Pulmonary interstitial emphysema (PIE) typically occurs as a complication of barotrauma secondary to most commonly possitive pressure mechanical ventilation. Rupture of overdistended pulmonary alveoli leads to entry of air into the pulmonary interstitium. PIE is recognized commonly in the premature newborns who have surfactant deficient disease but rarely in younger childhood. More rarely it could develop with air tapping by obstruction due to meconyum aspiration or pulmonary hypoplasia requiring high ventilatory pressure. Radiologic imaging can assist by determining the presence and dissemination of PIE. This condition may occur diffusely throughout the lung, or it may be unilateral or lobar in occurrence. The HRCT findings of PIE includes free air along the bronchovascular sheaths and occasionally complicated with pneumomediastinum, pneumothorax and subcutaneous emphysema. Radiologic imaging is also useful in monitoring for the potential complication of pneumothorax. Interstitial changes are initially linear but may become more cystic as the air in the interstitium congregates locally. In most patients, PIE is transient, lasting only for several days and rarely, it can persist and form expanding, radiolucent masses.

Rarely PIE be complicated with pneumothorax and subcutaneous emphysema. PIE results either from increased intra-alveolar pressure or from decreased interstitial pressure. As a conclusion air flows from the alveolar space into the interstitial and pleural space. In some cases PIE can lead to the development of secondary pneumothorax. This differs from primary and iatrogenic pneumothorax. Spontaneous subcutaneous emphysema is thought to result from increased pressures in the lung that cause alveoli to rupture. In spontaneous subcutaneous emphysema, air travels from the ruptured alveoli into the interstitium and along the blood vessels of the lung, into the mediastinum and from there into the tissues of axillary.

In conclusion, PIE is a rarer condition in elderly ages than in newborns and HRCT findings of PIE are fairly specific. PIE should be included in the differential diagnosis of pulmonary air leak conditions especially who treated with positive-pressure mechanical ventilation.

Reference

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