The British Journal of Radiology, 73 (2000), 451–452

Case of the month
Intrapulmonary or extrapulmonary?

M VÖLK, MD, M STROTZER, MD and S FEUERBACH, MD

Department of Diagnostic Radiology, University Hospital, 93042 Regensburg, Germany

A chest radiograph was performed on a man with recurrent pulmonary embolism. The only abnormality was a mass, shown in Figure 1. Is this mass intrapulmonary or extrapulmonary in situation?

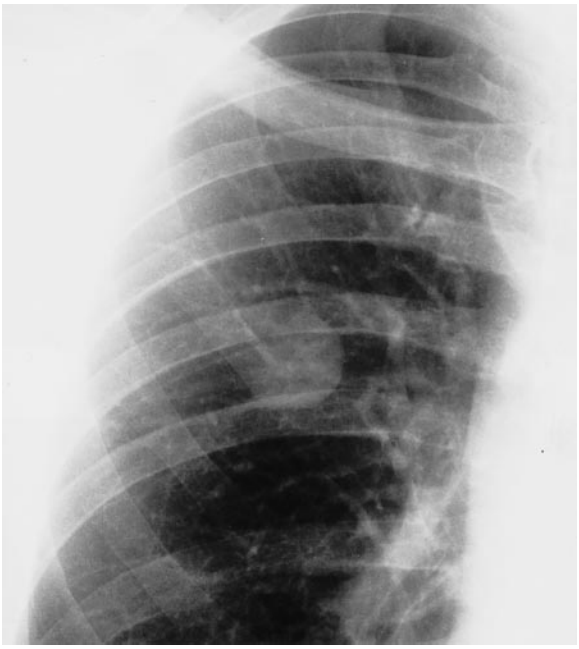

Figure 1.

Received 1 April 1999 and in final form 16 June 1999, accepted 28 June 1999.

The margin of this mass is partially sharp and partially unsharp, giving rise to the so called "incomplete border sign", which is due to an extrapulmonary mass simulating a pulmonary parenchymal lesion when seen partially *en face*. A CT examination performed 2 days later proved that the mass was extrapulmonary in origin (30 Hounsfield units). The pleura is displaced toward the lung by the central part of the mass (Figure 2) [1]. A follow-up CT examination 2 months later showed the pleural lesion was about half the size compared with the initial CT examination (Figure 3).

Extrapulmonary masses usually appear as lesions convex towards the lung and are sharply defined as the overlying pleura smooths out minor surface irregularities [1]. An extrapulmonary mass may be seen as soft tissue density with loss of definition of its otherwise sharp border where the mass is continuous with the chest wall of pleura. The border is produced by the interface of the mass with air and is lost where the mass is continuous with the chest wall [2].

The most common extrapulmonary chest lesions are loculated pleural effusions, rib lesions (fractures, primary or metastatic tumours, and plasmocytoma), mesenchymal tumours, neural tumours, haematomas, cutaneous lesions and nipples [1, 3]. Any extrapulmonary pathological process may present the incomplete border sign, but the most common reason is a rib metastasis [4]. The presence of rib involvement confirms the extrapulmonary location of the mass [1]. Mediastinal masses may also exhibit an incomplete border sign. Intrathoracic lesions are radiologically visible because of their interface with ventilated lung tissue. The incomplete border sign

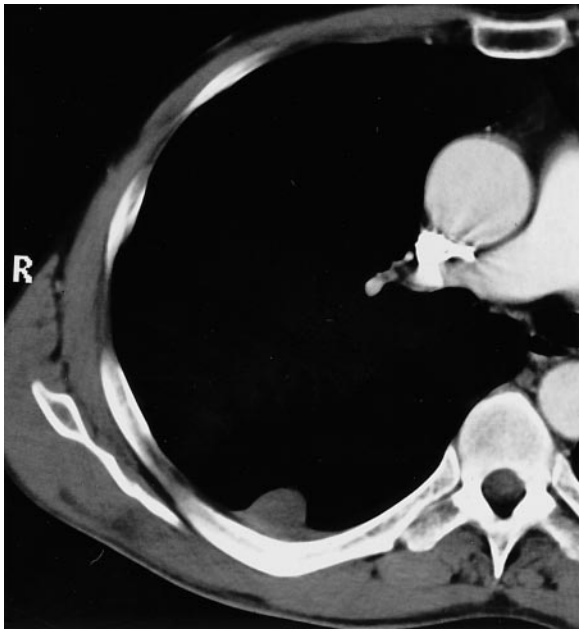

Figure 2. Contrast enhanced CT with the lesion on the right dorsal thoracic wall.

Figure 3. Unenhanced follow-up CT with the lesion on the right dorsal thoracic wall, interpreted as a decreasing pleural fluid collection.

can be helpful in distinguishing between extrapulmonary and intrapulmonary lesions, but is not useful for differentiating cutaneous from intrathoracic chest wall lesions. However, cutaneous lesions or masses of the external chest wall showing an incomplete border can easily be identified by physical examination. An intrapulmonary nodule may be simulated by a nipple shadow, but the correct diagnosis is suspected by its location. The nipple shadow commonly has a sharp outer border and an ill defined inner margin. This occurs when the nipples bulge outward when pressed against the film cassette [5].

Tapered superior and inferior borders are valuable signs for confirming an extrapulmonary lesion. However, the incomplete border sign is also fallible: even the tapered border may not be observed if the lesion is seen *en face*. Before the CT era, coned lateral and oblique projections were thought to be helpful in eliciting this sign [3].

To summarize, if the incomplete border sign is visible on a chest radiograph it is highly suggestive of an extrapulmonary lesion.

References

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