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Short reports

Massive haemoptysis caused by spontaneous rupture of a bronchial artery

E A SHEFFIELD, J MOORE-GILLON, A R MURDAY, B J ADDIS

From the Department of Histopathology, Brompton Hospital, and the Departments of Thoracic Medicine and Surgery, London Chest Hospital, London

We report a case of a previously healthy patient, with no apparent predisposing disease, who presented with massive haemoptysis due to spontaneous rupture of a bronchial artery.

Case report

A previously fit, normotensive 71 year old woman coughed "half a pint" of blood. By the time she was reviewed in the accident and emergency department of a teaching hospital the haemoptysis had stopped. A chest radiograph was normal. Reassurance was given and a non-urgent bronchoscopy booked and she returned home. The following day, during assessment at her local hospital, she had a further large haemoptysis of 200 ml. Urgent transfer to this hospital was arranged. Physical examination on arrival showed nothing abnormal except for rheumatoid deformities of both hands. A chest radiograph showed patchy bilateral basal shadowing and a cervical spine radiograph some midcervical instability. In view of the latter, flexible fibreoptic bronchoscopy was performed, with facilities for rigid bronchoscopy and resuscitation immediately available. The lower lobes contained old blood clot but no active bleeding was seen.

Thirty six hours later she coughed a further 200 ml blood and became cyanosed and hypotensive. Combined rigid and fibreoptic bronchoscopy under general anaesthesia localised active bleeding to the left upper lobe and a lobectomy was performed. The bleeding ceased and she made an uneventful recovery.

Address for reprint requests: Dr E A Sheffield, Department of Pathology, Brompton Hospital, London SW3 6HP.

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PATHOLOGICAL FINDINGS

The upper lobe showed fresh blood within and surrounding the apical segmental bronchus, from which multiple sections were taken. These showed a very prominent submucosal bronchial artery, about 1 mm in diameter, projecting into the lumen of the bronchus. The vessel showed eccentric fibroelastic intimal thickening throughout its length, associated with a ridge of longitudinal smooth muscle. The media was represented by a thin residual outer layer of circular smooth muscle. The haemorrhage was due to focal rupture of the artery through an attenuated area of the wall, where the media was replaced by sparse adventitial connective tissue (fig 1).

Several other bronchial arteries in other segmental bronchi showed similar structural changes, although no other site of haemorrhage was identified. Many bronchial arteries, particularly near the hilum, showed prominent medial defects affecting sectors from 25 to 200 μm in length, the media being either very thin or completely absent (fig 2). Many of these were related to bifurcations. The pulmonary arteries and veins were normal.

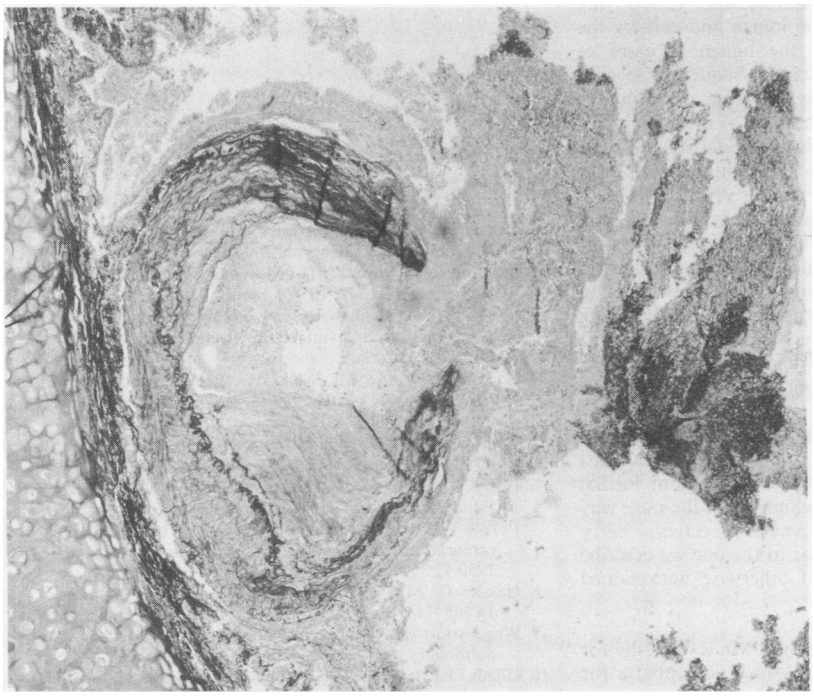

Fig 1 *Section of the bronchial artery showing the site of rupture through an attenuated area of the media. (Elastin van Gieson.)*

Discussion

Haemorrhage originating from the bronchial circulation is frequently associated with bronchiectasis, tumours, pulmonary cavities, and cystic fibrosis. There are also occasional reports of bleeding from aneurysms,[1] mucosal telangiectases,[2] arteriovenous or bronchopulmonary shunts,[3] and radiation induced vascular abnormalities.[4] None of these features was present in our case. In particular, serial sections of the site of rupture showed no evidence of aneurysm formation and there were no features to indicate previous infarction, a cause of increased bronchial artery supply.[5]

The bronchial artery lesions seen in this patient seem to be unrelated to her rheumatoid disease. This disease may be associated with intimal fibroelastosis, in areas of interstitial fibrosis, or vasculitis of immune complex type, usually affecting small pulmonary arteries and venules. These features were not present in the resected lobe.

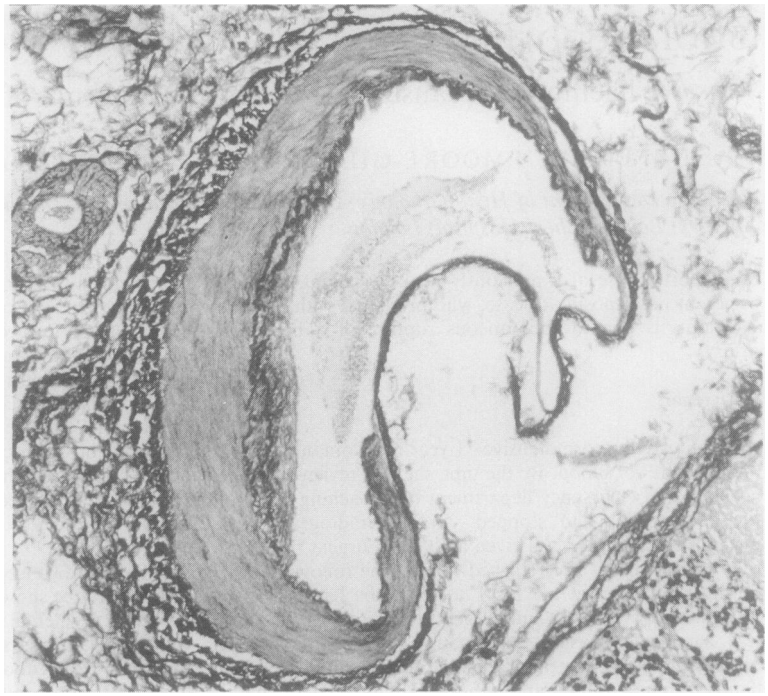

Fig 2 *A large medial defect in a bronchial artery lying close to a point of branching. (Elastin van Gieson.)*

The mucosal artery described is unusual as vessels of this size generally lie in peribronchial connective tissue, sending small branches between cartilage plates to supply the mucosa.[6] We have, however, seen similar large vessels lying between the cartilage plate and the lumen and causing the overlying mucosa to bulge into the lumen in cases of bronchiectasis. Longitudinal muscle is frequently seen in normal bronchial arteries, usually forming a continuous subintimal layer with associated thinning of medial circular muscle.[5] In our case bundles of longitudinal muscle were present within the eccentrically thickened intima, forming a ridge similar to that normally seen in hilar vessels.[6]

Prominent medial defects related to bifurcation occur in cerebral[7] and other systemic arteries.[8] A recent report describes areas of abrupt thinning of pulmonary arteries and veins unrelated to sites of branching.[9] Both types of lesion were present in our case and we are not aware of their having been described previously in bronchial arteries. We have observed eccentric thick walled bronchial arteries with areas of medial thinning in cases of bronchiectasis but have not identified them in normal lungs.

Our conclusion is that they indicate an area of weakening which predisposes to rupture. Bronchial artery aneurysms are rare and tend to occur more proximally,[1] but medial defects may predispose to their development in the same way that they contribute to the pathogenesis of cerebral berry aneurysms.[10] Possibly lesions similar to the one we describe are responsible for some cases of otherwise unexplained haemoptysis.

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