Systemic artery: pulmonary artery fistula after closed chest cardiac massage

Fistulae involving the internal mammary artery are rare. In a recent review¹ only 26 cases were found. We report an unusual example of this lesion which appeared to develop after cardiac resuscitation.

Case report

A 46-year-old doctor from India presented with minimal breathlessness on exertion and a chest murmur of recent onset. Four years previously he had suffered a cardiac arrest after an otherwise uneventful appendicectomy. He rapidly recovered after closed chest cardiac massage. No murmur was detected at that time. Examination showed no abnormality apart from a murmur continuous throughout the cardiac cycle heard loudest at the left sternal margin. Chest x-ray films, electrocardiograms, and pressure and oximetry data obtained at cardiac catheterisation were normal. Contrast medium injected at the aortic root showed a large, tortuous left internal mammary artery which supplied two knots of vessels in the anterior segment of the upper lobe (see fig). Both drained into a segmental branch of the pulmonary artery.

Resection of the lesion was recommended in view of the possible hazards of infection and haemorrhage. At left lateral thoracotomy the internal mammary artery was found to be dilated and tortuous and to disperse into a myriad of small vessels which entered the fistula. Dense vascular adhesions between the anterior segment of the left upper lobe and the adjacent chest wall were present at the site of the fistula, which lay at the level of the fourth intercostal space. There was no evidence of rib fracture or costochondral dislocation. No other abnormal arterial communications were seen. The internal mammary artery was ligated and the entire vascular anomaly resected with a wedge of surrounding lung. Histologically, the vessels of the fistula had a character intermediate between a systemic and pulmonary artery with increased medial elastic tissue.

Comment

Fistulae from the internal mammary artery may drain via the intercostal, phrenic, or pericardial arteries or the pulmonary veins. Only six of the 26 cases reviewed¹ by Cohen *et al* were drained by pulmonary vessels. Among these, isolated communication with the pulmonary artery was exceptional, with only one recorded instance.² Several causes have been adduced. Inflammatory adhesions after tuberculosis¹ and pleurisy³ have been suggested while in other patients the absence of a relevant history has implied a congenital origin.⁴ In six of the reports listed in another review⁵ fistulae were attributed to blunt or sharp injury to the chest.

The recent onset of the murmur and the history of chest trauma strongly suggest that the fistula in this patient was acquired rather than developmental. The adhesions between the pleura of the affected segment and the chest wall make it probable that the damage associated with closed chest cardiac massage was responsible. With such resuscitation now common and improved long-term survival after cardiac arrest this complication may be more widely recognised in the future.

¹ Cohen, E M, Leow, D E, and Messer, J V, *American Journal of Cardiology*, 1975, **35**, 103.

² Voll, A, Marstrander, F, and Wexels, P, *Diseases of the Chest*, 1964, **45**, 396.

³ Burchell, H B, and Clagett, O T, *American Heart Journal*, 1947, **34**, 151.

⁴ Stafford, R W, *et al*, *American Journal of Cardiology*, 1969, **24**, 414.

⁵ Kiphart, R J, *et al*, *Journal of Thoracic and Cardiovascular Surgery*, 1967, **54**, 113.

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Aortic root injection in right anterior oblique projection. Line diagram summarises information derived from several frames.