Case report

Mediastinal hibernoma

Z.F. Udwadia, Nand Kumar, Anita S. Bhaduri

Department of Medicine, P.D. Hinduja National Hospital and Medical Research Center, Veer Savarkar Marg, Mahim, Bombay 400016, India
Department of Cardiothoracic Surgery, P.D. Hinduja National Hospital and Medical Research Center, Veer Savarkar Marg, Mahim, Bombay 400016, India
Department of Surgical Pathology, P.D. Hinduja National Hospital and Medical Research Center, Veer Savarkar Marg, Mahim, Bombay 400016, India

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Abstract

A 46-year-old asymptomatic male was detected to have a posterior mediastinal mass on a routine check-up. He underwent thoracotomy to remove the mass, which was found to be a hibernoma. The mediastinum is an extremely rare site for an even rarer tumor like the hibernoma. An additional unique feature was the very large tumor size despite which the patient was asymptomatic. Imaging studies are not helpful in revealing its clinically indeterminate nature, hence a surgical specimen is necessary to establish the correct diagnosis. Total excision is advocated for cure, as there is no known malignant potential. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

Hibernoma is an uncommon tumor of soft tissues originating from remnants of fetal brown fat. Shaw [1] was the first to demonstrate that in humans the axillary and subpleural fat is brown as opposed to the yellow subcutaneous fat. Hence, the distribution of these tumors as seen in the literature follows the sites of persistence of brown fat. Out of 115 cases described in world literature, seven were intrathoracic but only two were mediastinal [2,3]. These can be seen in either sex from the second to seventh decade of life with a peak in the third decade. The salient features are described in our report.

2. Case report

An asymptomatic 46-year-old non-smoking male was detected to have a posterior mediastinal mass in the left lower zone on a chest radiograph (Fig. 1a). This was carried out as part of a pre-employment health check in December 1994. There was no past history of any chest problem. Physical examination was normal, apart from an impaired percussion note at the left base with diminished intensity of breath sounds in this area. Routine hematological and biochemical profile was normal. A dynamic chest CT scan (Fig. 1b) revealed a homogeneous mass in the posterior mediastinum, which was probably benign, but its exact nature could not be determined. At bronchoscopy, an extrinsically distorted left lower lobe bronchus was seen. Blind transbronchial biopsies from the left lower lobe were non-contributory. A CT-guided fine needle aspirate was also inconclusive. Therefore, a thoracotomy was performed on 19th December 1994, through a left posterior approach. A large, encapsulated grayish white mass weighing 1200 g and measuring 15 cm in diameter (Fig. 2) was removed from the posterior mediastinum. The patient made an uneventful recovery and was discharged home on the seventh postoperative day. The chest X-ray at discharge was normal. There has been no recurrence after a 4-year follow-up to date.
Histopathological analysis of the tumor showed a tan brown lobulated surface with few myxoid areas and large gaping vessels. At microscopy, lipocytes with a small central nucleus in vacuolated, eosinophilic granular cytoplasm were seen in a focally myxoid stroma. There were focal aggregates of lymphocytes in the tumor. No atypical mitoses were observed (inset of Fig. 2) and a diagnosis of mediastinal hibernoma was made without much difficulty.

3. Comment

Benign soft tissue tumors derived from a specialized form of brown fat (remnants of fetal brown fat in both hibernating and non-hibernating animals) are recognized as hibernomas. Out of a 115 cases reported so far in world literature, only seven were seen to be intrathoracic and just two located in the mediastinum [2,3]. In comparison with the ‘yellow’ fat of subcutaneous tissue, the axillary and subpleural fat is brown in the human fetus, due to its increased vascularity and high cytochrome content.

In adults, brown fat is seen in scattered foci as persisting vestigial remnants along the esophagus, trachea, posterior neck, and inter-scalpular area and around the great vessels of the mediastinum [1]. Hence, hibernomas are usually seen at one of these sites. However, literature reviews reveal isolated reports of cases documented at unusual sites like intracranial, intraspinal, intraatrial, retroperitoneal, gluteal, popliteal, breast, scalp and pericardial [1,2]. There are various hypotheses put forward to explain their origin at such sites where brown fat is not present in adults. It is believed that these tumors either arise from aberrant differentiation of mesenchyme or by ectopic growth or migration of adipose tissue.

The largest size of a hibernoma reportedly has been 23 cm [1]. These tumors are well encapsulated, firm, non-tender and do not show infiltrative activity. However, some have shown endocrine activity and steroid hormone content [4]. Since there is no known malignant potential, total excision remains the treatment of choice. However, in some instances extensive vascularity may cause troublesome bleeding at surgery or during fine needle aspiration biopsy [1]. Hibernomas have CT and MRI appearances similar to other fibrous and lipomatous tumors, i.e. a well defined mass which is isointense in T1 weighted images, hyperintense on T2 weighted images and enhances homogeneously with gadolinium [5]. As such, these are seldom diagnosed correctly by imaging techniques and a surgical specimen is necessary to arrive at the diagnosis [1].

Histological diagnosis is usually straightforward but may occasionally pose problems in differentiating benign from malignant tumors. Cytogenetic analysis of tumor tissue may then be of help in such histologically borderline cases. About 84% of lipomatous tumors reveal clonal karyotypic abnormalities, which correlate to their morphologic subtype [6]. The sole chromosomal abnormality reported most often in hibernomas has been complex translocation of bands 1p36, 2q33 and 5q22 [6–8]. Non-random rearrangements of 11q13 have recently been described as distinctive of hibernomas [7,8].

Ultrastructural examination [1,5] has shown large polygonal cells in close apposition surrounded by capillaries. There are undulating invaginations of the plasmalemma, pleomorphic mitochondria, scarce Golgi apparatus and endoplasmic reticulum with rich lipid granule secretions, lysosomes and pinocytotic vesicles [4,5,9,10].

As the incidence of routine use of chest X-rays increases, most such tumors will be detected as asymptomatic opacities as in our case described above. However, in our 10-year experience at this tertiary care center, this is the first case of a hibernoma seen at any site in the body. This may well be the first documented case of a
mediastinal hibernoma seen from India to the best of our knowledge with only one other previous report of a cervical hibernoma and another scalp hibernoma [10] being reported earlier. Its massive size and unusual location remaining clinically silent add to the interest of our case.

References


Fig. 2. Gross appearance of tumor showing the tan brown mass with gaping vessels. Inset: microscopic appearance of vacuolated lipocytes (H&E ×400).