

ROENTGENOGRAPHIC FEATURES OF THYMOLIPOMA*

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THYMOLIPOMA is an uncommon benign tumor of the anterior mediastinum. Approximately 50 case reports¹¹ have been published, virtually all in the non-radiologic literature. In most of these reports the roentgenographic features of the tumor have not been emphasized or analyzed in detail. Although certain roentgenographic findings are often quite characteristic of thymolipoma, diagnosis prior to surgery or autopsy has been unusual.

A review of the roentgenographic findings discloses some distinctive and characteristic features that may often suggest the diagnosis.

REPORT OF A CASE

A 50 year old white woman, in good health until 6 months prior to her hospitalization, began experiencing recurring pain and swelling in the right calf. Phlebitis was diagnosed and treatment with anticoagulants was instituted. Subsequently, pain developed in the right foot, right ring finger tip and left forearm. Recurrent night sweats and fever also developed.

On hospital admission the patient appeared ill and had a temperature of 100° F. Physical examination disclosed slight splenomegaly, a Grade 2 to 4 systolic ejection murmur, petechial hemorrhages in the conjunctiva, calf tenderness and a tender finger pad. Biochemical and bacterial studies confirmed the clinical impression of subacute bacterial endocarditis; 6 consecutive blood cultures were positive for *Streptococcus viridans*.

Chest roentgenograms (Fig. 1, A-C) were interpreted as pericardial and possibly pleural effusion.

While under treatment with high doses of penicillin, signs of aortic insufficiency developed, suggesting rupture of an aortic leaflet. Progressive cardiac failure could not be con-

trolled, and the patient died 64 days after admission.

At autopsy the heart was moderately enlarged, showing evidence of verrucous endocarditis of the aortic valve and a perforation of a valve leaflet.

Between the lungs and the diaphragm there was a multilobular mass of fat yellowish-gray tissue, extending in the anterior mediastinum, anteriorly to the pericardium. This mass was entirely intrathoracic and caused an upward displacement of both lungs. The entire mass weighed 2,400 gm. This mass was covered by pleura; it was intrapleural bilaterally and was located anteriorly. It was very easily separated from the lungs and showed a multilobular appearance. The cut surface demonstrated yellowish-grayish tissue which in some areas was hemorrhagic (Fig. 2, A and B).

Histologically, the tumor revealed extensive areas of a mature adult type of adipose tissue interspersed with islands of residual thymic tissue with characteristic Hassall's corpuscles and small thymocytes. Delicate strands of fibrous connective tissue separated the adipose tissue in irregular lobules. A thin but well defined capsule was identified (Fig. 2C). Pathologic diagnosis: thymolipoma; subacute bacterial endocarditis.

DISCUSSION

Thymolipoma comprises 2-9 per cent of thymic tumors.^{9,11} Mediastinal lipomas of nonthymic origin are somewhat more common.¹¹ The earliest description of thymolipoma was by Lange in 1916; subsequently about 50 case reports have been published. The tumor has no sex predilection, and can occur at any age. The youngest patient was 4 years of age, the oldest 54 years; the average age at time of discovery was 22 years.⁸

The tumor originates in the anterior

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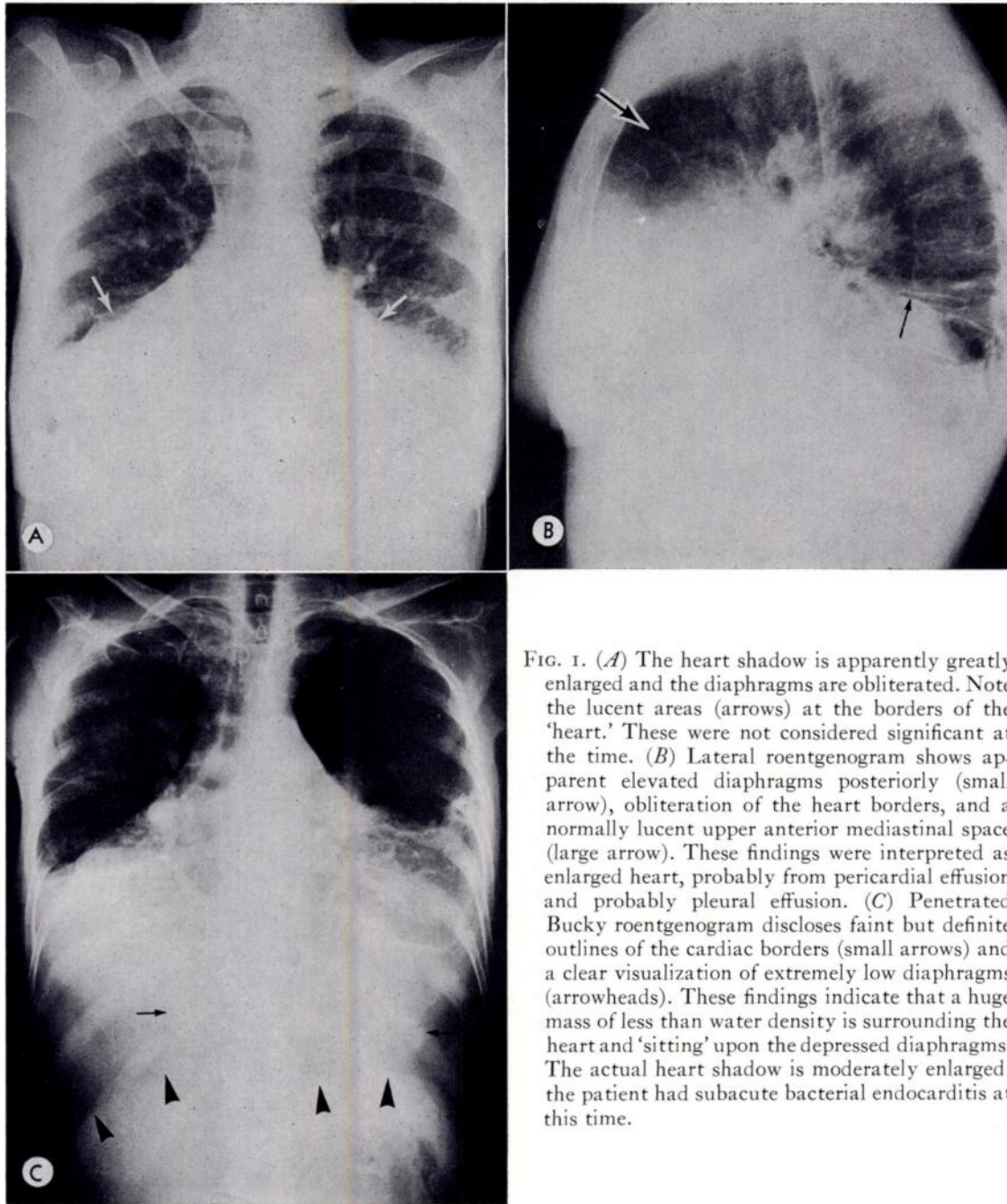


FIG. 1. (A) The heart shadow is apparently greatly enlarged and the diaphragms are obliterated. Note the lucent areas (arrows) at the borders of the 'heart.' These were not considered significant at the time. (B) Lateral roentgenogram shows apparent elevated diaphragms posteriorly (small arrow), obliteration of the heart borders, and a normally lucent upper anterior mediastinal space (large arrow). These findings were interpreted as enlarged heart, probably from pericardial effusion and probably pleural effusion. (C) Penetrated Bucky roentgenogram discloses faint but definite outlines of the cardiac borders (small arrows) and a clear visualization of extremely low diaphragms (arrowheads). These findings indicate that a huge mass of less than water density is surrounding the heart and 'sitting' upon the depressed diaphragms. The actual heart shadow is moderately enlarged; the patient had subacute bacterial endocarditis at this time.

mediastinum, and is attached to the base of the heart by a vascular pedicle. Grossly, the tumor is always yellowish, soft and pliable; often it is lobate with thin edges. It can attain huge proportions: 68 per cent were over 500 gm.; 23 per cent over 2,000 gm., and 1 tumor weighed over 12,000 gm.¹¹

In our patient, the tumor weighed 2,400 gm.

Since the tumor is soft and pliable, the larger thymolipomas slump onto the diaphragms and adapt themselves to the diaphragmatic contours, thus becoming largely an inferior anterior mediastinal lesion. His-

tologically, all the tumors consist of adult adipose tissue interspersed with areas of normal, hyperplastic or atrophic thymic tissue.

The thymolipoma causes few or no symptoms, even when quite large. In some patients there were episodes of cough and dyspnea, but chest pain was exceedingly rare.¹ Neither myasthenia gravis nor any other syndrome is associated with thymolipoma. Fortuitous association of the tumor with other conditions, of course, can occur, such as endocarditis in the above reported case, or Graves' disease in Trites' patient.¹³ In fact, almost all thymolipomas were incidental discoveries on chest roentgenograms made routinely or for an unrelated illness. The average interval between diagnosis and removal was 4 years, attesting to the lack of symptoms.

ROENTGENOGRAPHIC FEATURES

The thymolipoma apparently originates in the atrophic thymus, and, when still small, appears as a sharply circumscribed

round or oval mediastinal density, anterior to the base of the heart.¹ Its roentgenographic density is less than that of a non-fatty mass, but this may be difficult to appreciate when the tumor is entirely surrounded by air-bearing tissue. As the tumor enlarges, it almost extends caudad, probably due to gravity, and the moderately large lesion appears as a circumscribed density, overlying one or both sides of the heart in the frontal view.^{14,18} Calcification has never been reported. The tumor does not cause pleural effusion.

The large thymolipomas, which constitute the majority of the reported tumors,¹¹ produce the more interesting roentgenographic findings. As the soft, pliable mass enlarges, it molds and accommodates itself to the potential spaces between the lungs and the heart, diaphragms, or anterior mediastinum. It becomes an anterior inferior mediastinal mass, but produces little or no compromise of respiratory or cardiac activity; it causes no significant cardiac displacement. Because of this accommoda-

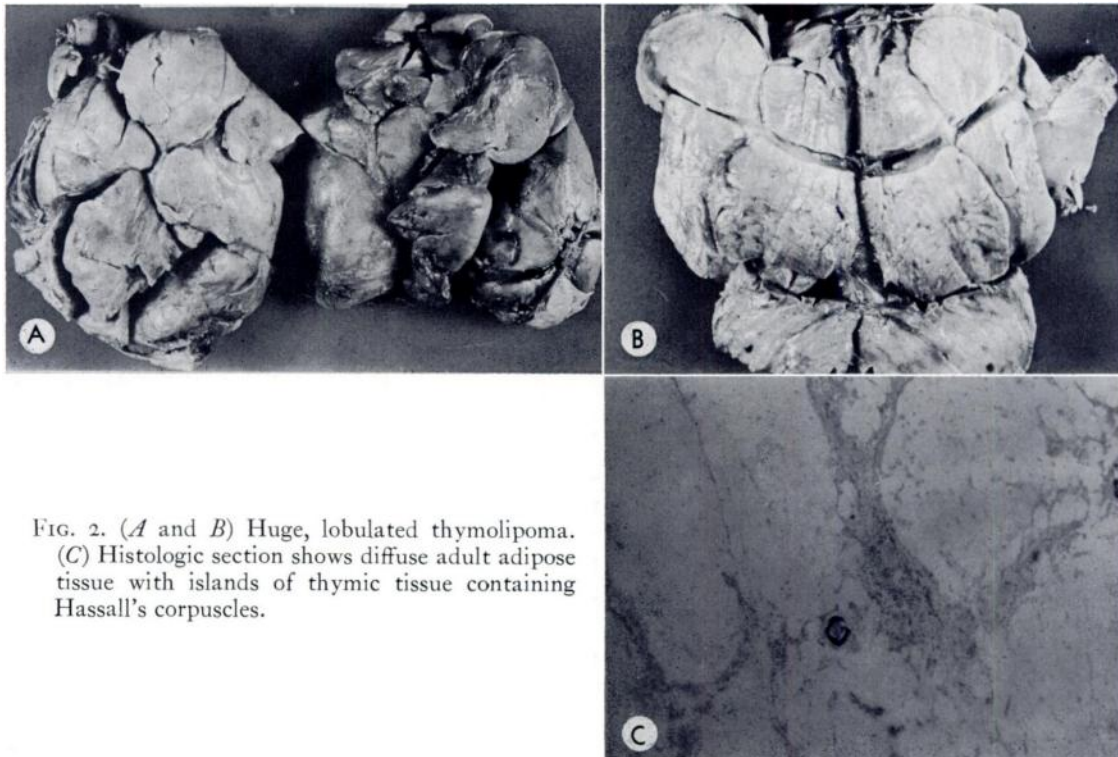


FIG. 2. (A and B) Huge, lobulated thymolipoma. (C) Histologic section shows diffuse adult adipose tissue with islands of thymic tissue containing Hassall's corpuscles.

tion and the absence of symptoms, the thymolipoma, although slow growing, is frequently quite large at the time of discovery. Moigneteau and Cornet¹¹ indicate that this large fatty mass will show changes in shape on postural roentgenograms, which may be a clue to its plastic character. This large anterior inferior mediastinal density often simulates an enlarged heart shadow (Fig. 1A) in the frontal view. In the lateral view, the tumor mass overlies the heart shadow; larger tumors extend posteriorly between the lung and the diaphragm, simulating elevation of one or both diaphragms (Fig. 1B). The lucent upper anterior mediastinal space may be unaffected, which is quite unusual in other sizeable anterior mediastinal masses. Unexplained cardiac enlargement was the original roentgenographic impression in many of the larger thymolipomas.^{1,5,7,8,10-14} However, a normal position of the barium filled esophagus on the lateral roentgenogram is strong evidence against cardiomegaly.

In many of the cases, angiocardiology was utilized^{1,8,12,13} to determine the nature of the puzzling and sometimes bizarre appearing 'cardiac enlargement.' In a review of 24 case reports, Benton and Gerard¹ observed that angiocardiology had been done in 7 patients to rule out cardiac enlargement. When a large thymolipoma extends unilaterally, one side of the heart shadow is obscured and the appearance may simulate a large pleural tumor³ or, in 1 case, a basal atelectasis.⁴ Diagnostic pneumomediastinum will show the mass to be distinct from the heart and lungs.^{4,11}

However, we believe that the density can be identified as a large anterior mediastinal fatty mass from the plain chest roentgenograms, if the difference in density between the more lucent fatty mass and contiguous water-density structures is observed and evaluated. In addition, the thin periphery of a thymolipoma often appears considerably more lucent than its thicker central portion,^{11,12} and the lucent edges (Fig. 1A) should suggest that these are *not* the borders of an enlarged heart. More significant

findings, however, will be seen on a well penetrated Bucky roentgenogram (Fig. 1C). The tumor, lying directly over the heart and diaphragms, will obscure these structures on conventionally exposed chest roentgenograms, but on properly penetrated films, the decreased roentgenographic density of the fatty mass will allow recognition of the true underlying cardiac borders and the diaphragmatic shadows. This significant and virtually diagnostic finding is strikingly illustrated in our patient. The conventional roentgenograms (Fig. 1, A and B) revealed an apparently enlarged cardiac shadow and elevated diaphragms. On the penetrated Bucky roentgenogram (Fig. 1C) faint but definite heart borders are perceived and the actual diaphragmatic shadows, considerably depressed by the huge mass, are visualized. Such findings can only occur if a large fatty mass is surrounding the heart and is in contact with the diaphragms. Similar findings were also observed by Trites,¹³ and by Rubin and Mishkin¹² on penetrated roentgenograms made during angiography. Benton and Gerard,¹ and Moigneteau and Cornet¹¹ also have noted the decreased density of the thymolipoma. In the majority of the other reported cases, however, either well penetrated roentgenograms were not made or the fatty density on such roentgenograms was not appreciated; roentgenologic diagnosis of a mediastinal lipoma or thymolipoma was exceedingly rare.^{3,8,13}

The roentgenographic differential diagnosis of the smaller thymolipoma includes thymic cyst, thymoma, teratoma and non-thymic mediastinal lipoma. The large thymolipoma must also be distinguished from cardiac enlargement, pericardial effusion, pericardial cyst or tumor and atelectasis of a lobe. Angiocardiology or pneumomediastinum will eliminate these latter possibilities. If the fatty density is appreciated roentgenographically, only a simple lipoma and liposarcoma may have to be considered. The former rarely becomes as large as a thymolipoma; the latter usually causes severe chest symptoms, signs of

mediastinal compression and frequently pleural effusion.^{2,12,15}

CONCLUSION AND SUMMARY

1. The thymolipoma usually begins in young individuals and, being virtually asymptomatic, may attain huge proportions before discovery.

2. The smaller lesions cannot be distinguished roentgenographically from other benign anterior mediastinal masses.

3. The large tumors tend to slump toward the diaphragms, leaving the anterior superior mediastinal space lucent, an unusual finding in the majority of large mediastinal tumors. Often the large mass simulates cardiomegaly, but a normal position of the esophagus on the lateral roentgenogram is evidence against significant cardiac enlargement.

4. Well penetrated chest roentgenograms will usually demonstrate the outlines of the underlying heart and diaphragms, since these structures are always of greater roentgenographic density than the fatty tumor. This finding is virtually pathognomonic and will obviate the need for angiocardiology or pneumomediastinum.

5. The thin periphery of the tumor may be considerably more lucent than the bulky center—a suggestive finding.

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