

## USING DIFFUSION WEIGHTED MR IMAGING IN A LIPOMATOUS CHEST WALL LESION

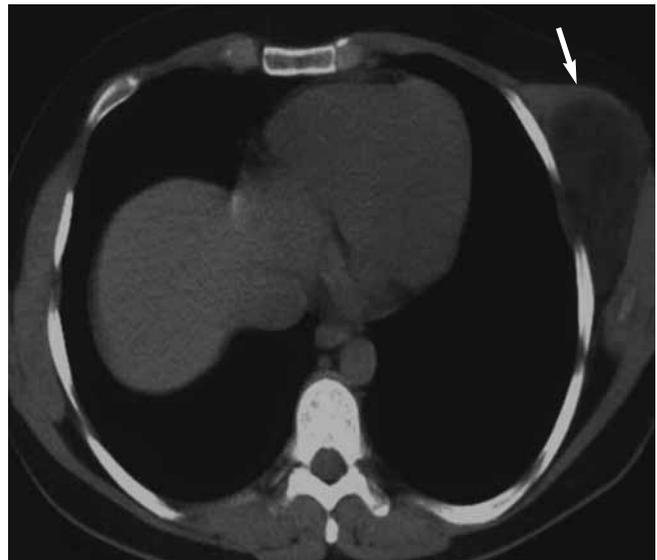
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**Hibernoma is a rare benign soft tissue tumor derived from brown fat. The tumor is also known as "fetal lipoma, lipoma of embryogenic fat and lipoma of immature adipose tissue. Hibernomas are slow-growing, painless soft tissue tumors which do not recur after surgical resection. Preferred locations are brown fat containing sites as thigh, interscapular region, shoulder, axilla, and mediastinum. The tumor occurs most commonly in adults, with a mean age of 38 years (age range, 2-75 years). We present a rare case of hibernoma with radiological and pathological findings.**

**Key-word: Hibernoma.**

### Case report

A 23-year-old man was referred to our department because of painless, slow-growing soft tissue mass located in the left chest wall. The lesion was rubbery and slightly mobile on physical examination. The patient's medical history was unremarkable. He reported that the lesion had existed for 3 years. Nonenhanced CT revealed a 4 × 7 × 8 cm well-defined, slightly homogeneous, ovoid mass located between the left lateral ribs and the serratus anterior muscle. The average density of the lesion was measured -60 HU similar that of the subcutaneous fat tissue. No bone destruction or invasion was seen (Fig. 1). Contrast-enhanced MRI was performed with phase-array body coil and surface coils in 1.5 Tesla scanner (Siemens Avanto, Erlangen, Germany). On T1-weighted MR images, lesion is isointense to the subcutaneous fat. Fat suppressed T2-weighted image shows no suppression in the lesion (not-shown). Contrast-enhanced MRI showed marked hypervascularity predominantly periphery of the lesion (Fig. 2). No invasion and soft tissue enhancement next to the lesion was also shown. DWI was performed with 3 directional axial single-shot spin-echo planar (4,000/81; echo-planar imaging factor, 77; sensitizing gradients in x, y, and z directions) imagings. The images were acquired with 0, 500 and 1000 mm<sup>2</sup>/s b values. ADC (apparent diffusion coefficient) maps were calculated afterwards. Lipid content and hypervascularity of the lesion were highly suspicious



*Fig. 1. – Unenhanced CT shows a 4 × 7 × 8 cm sized, well-defined fatty lesion at the lateral thoracic region (arrow). No invasion to the adjacent soft tissues and bone is seen.*

for liposarcoma. But subsequent diffusion weighted imaging (DWI) showed heterogeneous high signal intensity and apparent diffusion coefficient (ADC) values measured as normal (Fig. 3A,B). ADC absolute value was  $1.34 \times 10^{-3}$  mm<sup>2</sup>/sn. So we reported the lesion as a benign fat-containing tumor.

Surgical excision was performed. The mass was completely excised and examined histopathologically. On macroscopic examination the tumor was yellow-brown and encapsulated. It was measured 4 × 7 ×

8 cm. On microscopic examination, the tumor was composed of large numbers of brown fat cells with small centrally placed nuclei, prominent nucleoli and numerous small cytoplasmic vacuoles (Fig. 4). Mitotic figures and cytologic atypia were not seen.

### Discussion

Hibernomas are extremely rare benign, slow-growing soft-tissue tumors composed of brown fat. The term "hibernoma" was proposed by Gery in 1914 because of its histological similarity to the brown fat in hibernating animals (1).

Brown fat is first recognizable in human fetuses at the 21st week of gestation and it persists beyond fetal life, such as the neck, axilla, back, thigh and mediastinum (2). So tumor location corresponds to the fetal

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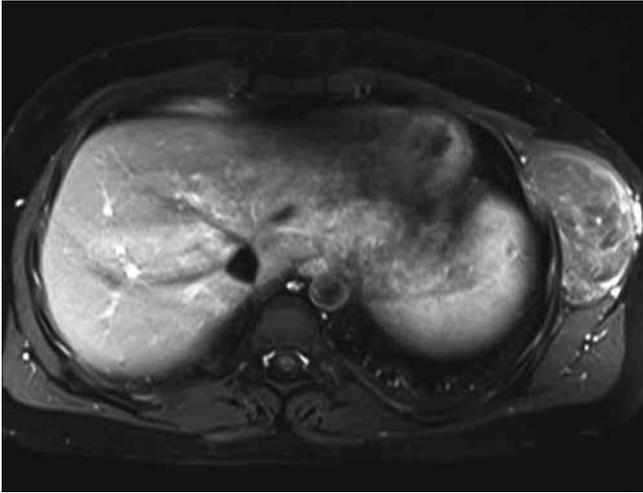


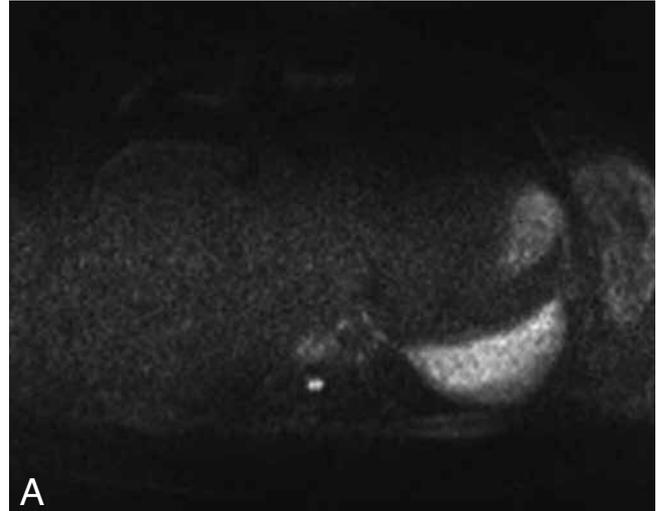
Fig. 2. — Axial T1-weighted MRI with contrast medium shows hypervascular nature of the lesion, markedly at the periphery.

distribution. The most common site where tumor occurs is thigh (3). It is believed that the brown adipose tissue has a role in thermoregulation.

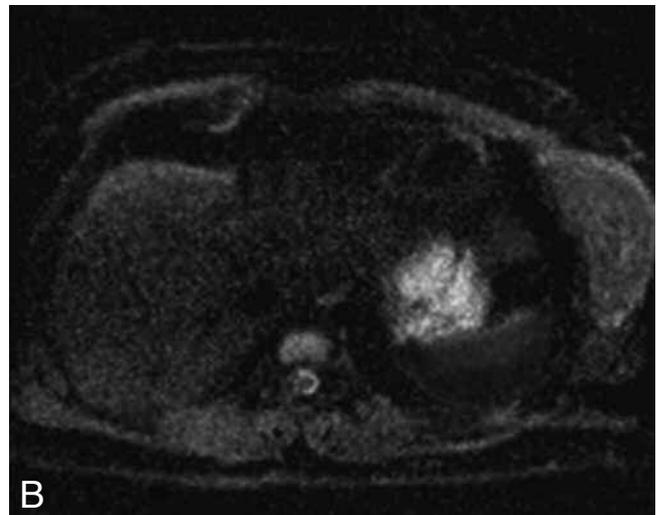
Clinically, tumor manifests as a slow-growing painless mass. On physical examination, it looks like a lipoma. When present, symptoms are related to the compression of adjacent tissues by tumor. Hibernomas occur between the ages of 2-75 years with a mean age of 38 years and have a slight male prevalence (3).

Macroscopically, hibernomas are well-defined and encapsulated masses. Typically, fatty content causes to tan- red brown appearance at cut surface. Tumor size ranged from 1 to 24 cm with an average dimension of 9.3 cm (3). Microscopically, four morphological variants have been reported (typical, myxoid, lipomalike, and spindle cell). The most common type is typical form as in our case. The tumors are characterized by cells of various degrees of differentiation. Multivacuolar adipocytes and brown fat cells with granular eosinophilic cytoplasm are interspersed with univacuolar adipocytes. Hypervascularity combined with abundant mitochondria give hibernomas their color (4).

Radiology may be helpful in differential diagnosis of fat-containing soft tissue lesions. Sonography shows homogeneous hyperechoic solid mass. CT shows well-defined solid mass iso-hypoattenuated to the subcutaneous fat. The tumor demonstrates high signal intensity on T1- and T2-weighted MR images but slightly less than that of the sub-



A



B

Fig. 3. — A. Lesion shows high signal intensity on DWI, B. Normal ADC values on ADC map images.

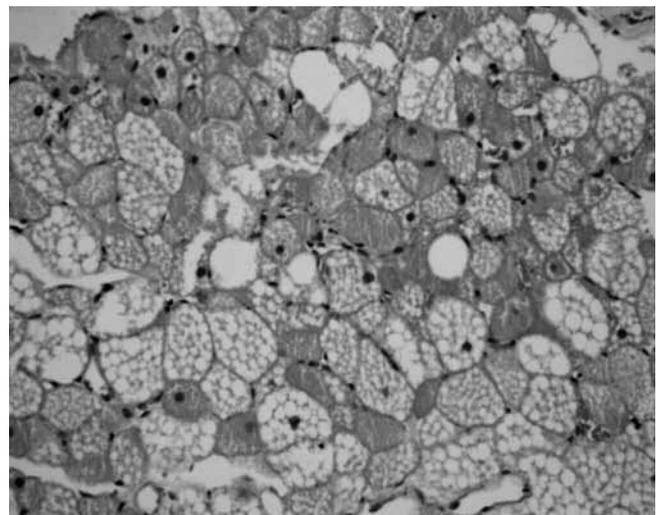


Fig. 4. — High magnification micrograph of hibernoma, H&E stain. The image shows large polygonal/oval cells with centrally located small nucleus and multivacuolated, eosinophilic, granular cytoplasm.

cutaneous fat. Incomplete fat suppression may be seen on fat suppressed sequences due to nature and amount of lipids (5). An additional new MRI sequence, diffusion-weighted imaging (DWI), is being used with conventional sequences. This method was initially used in the diagnosis of central nervous system ischemia, but then when it was found that it could help to differentiate benign and malignant tissues, it began to be used extensively (6). On contrast enhanced CT and MRI, marked heterogeneous enhancement pattern is noted.

Differential diagnoses include liposarcoma, rhabdomyosarcoma, granular cell tumor. Rhabdomyomas and granular cell tumors are readily distinguished pathologically by the complete absence of lipid vacuoles in the cytoplasm (7). Well-differentiated liposarcoma, which has decreased vascularity (4) and usually presents as a predominantly fatty mass having irregularly thickened, linear, and/or nodular septa. The nonadipose areas show a nonspecific decreased signal intensity on T1-

weighted images and variably increased signal intensity on T2-weighted or fluid-sensitive images and hyperdense on CT. Myxoid liposarcomas are distinguishable because of their hypervascularity and common existence of the prominent "plexiform" capillary pattern and characteristic molecular translocation t (12;16) (4).

Complete surgical resection is curable for hibernoma and local recurrence does not occur (4). No report of metastases or malignant transformation has been reported.

### Conclusion

DWI may be useful for lesion characterization if it is benign or malignant in fat-containing soft tissue lesions which are not differentiated from liposarcoma by conventional MRI.

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