Diagnostic Imaging

Hibernoma in the clavicular fossa: A case report and literature review

Hongzeng Wu, Xiaotong Ma, Ze Li, Helin Feng

A hibernoma is a benign soft tissue tumor consisting of brown adipose tissue. The tumors are mostly located in the thigh, back, and shoulder region. They are rarely found in the suprACLavicular fossa. A 39-year-old woman was hospitalized for a nonsymptomatic, slow-growing left clavicular fossa mass that was first noticed 15 years ago. Physical examination revealed a palpable soft, nontender mass, approximately 6 × 4 × 4 cm in size. The local skin temperature did not notably increase.

Laboratory studies, including routine blood evaluation, hematocrit, liver and renal functions, electrolytes, coagulation function, routine urine test, and cardiac and pulmonary functions were normal. Computed tomography (CT) of the chest...
revealed a heterogeneous low-density shadow with sharp margins extending to the left axilla. The CT attenuation value was −4 to 9 HU. Magnetic resonance imaging showed an inhomogeneous round mass with a hypointense signal on T1-weighted imaging, a hyperintense signal on T2-weighted imaging, and a slightly hyperintense signal on fat-suppression T2-weighted imaging [2]. The mass distinctly compressed adjacent structures and the subclavian vessels. To clarify the blood supply of the mass, the patient consented to undergo computed tomography angiography, which revealed a rich blood flow signal around the mass (Figs. 1 and 2). Resection was performed to relieve pressure symptoms and to clarify the pathology. Intraoperative visualization revealed the strong adherence of the tumor to the brachial plexus nerves and compression against the subclavian vasculature. Careful resection was performed with a sufficient surgical margin after cutting off the clavicle. The fracture ends were repaired using a locking plate and a screw (Fig. 3).

On gross morphologic examination, the surgical specimen comprised a well-circumscribed reddish brown mass in a thin transparent membrane and some normal soft tissue. The whole mass measured 12.5 × 6.5 × 4.0 cm. The cut surface was yellow, fatty, and lobulated, and showed focal pale fibrous tissues. Postoperative pathologic examination showed the adipose cells had abundant, multivacuolated eosinophilic cytoplasm, and moderately defined cytoplasmic borders (Fig. 4). These histologic features were consistent with those of a hibernoma.

**Discussion**

A hibernoma is occurs most commonly in adults at 40-70 years of age, with a mean age of 38.0 years (range, 2-75 years) [3]. Pediatric hibernoma is rarely seen. According to a clinical pathologic study of 170 patients with hibernomas carried out by Furlong et al in 2001, the morbidity was slightly higher in men than in women, and the tumors were located mostly in the thigh (29.4%), shoulder (11.8%), back (10.0%), neck (9.4%), chest
(6.5%), arm (6.5%), and abdominal cavity or retroperitoneum (5.9%) [4]. In the last 40 years, there have only been 12 cases of hibernomas in the supraclavicular fossa. A review of approximately 80 cases of hibernomas in 1985 showed that only 5 cases were reported in the cervical region before 1976.

Hibernomas progress slowly without obvious tenderness or pain [5]. The pressure symptoms occur due to compression on neighboring structures with tumor enlargement. The first symptomatic case reported was in a 12-year-old girl who presented with chest discomfort, night sweats, shortness of breath, fatigue, and pruritus. She was asymptomatic after excision, and there was no recurrence of symptoms or supraclavicular swelling [6]. There have been only 12 cases of hibernomas in the supraclavicular fossa, and their clinical features are shown in Table 1. Of the 12 patients with hibernomas, 10 cases were in men and 2 in women. The hibernomas in the supraclavicular fossa

Fig. 3 – Postoperative x-ray of neck showing the second rib deformity caused by the lump’s perennial compression.

Fig. 4 – (A) Macroscopic view of the specimen. (B) The cut surface of mass: note yellow, fatty, lobulated appearance with focal white tan fibrous tissues. (C) Histologic image: HE × 400: adipose cells with abundant, multivacuolated eosinophilic cytoplasm. HE, hematoxylin and eosin.

| Author(s)/year (ref.) | Age of diagnosis (years) | Sex | Duration | Size (cm) | Physical examination | Imaging | Operative specimen |
|-----------------------|--------------------------|-----|----------|-----------|----------------------|--------|-------------------|
| Lawson W and Biller HF/1976 [7] | 20 | Male | — | — | — | — | — |
| Kristensen S/1985 [8] | 54 | Male | 3 mo | 6 × 5 × 4 | — | — | — |
| Hashimoto CH and Cobb CJ/1987 [9] | 23 | Male | 2 y | 4 × 10 × 12 | — | — | — |
| Abemayor E et al/1987 [10] | 38 | Female | — | — | — | — | 10 × 10 × 3 |
| Abemayor E et al/1987 [10] | 21 | Male | 6 mo | 10 × 10 × 6 | — | — | — |
| Florio G et al/2000 [11] | 23 | Male | — | — | — | — | — |
| Carinci F et al/2001 [12] | 41 | Male | 5 mo | — | — | — | 3 × 3 × 2 |
| Ahmed SA and Schuller I/2008 [6] | 12 | Female | 2 mo | 2 × 2 | — | — | — |
| Peycrut T et al/2009 [13] | 43 | Male | 2 y | 7.6 | — | — | — |
| Khattala K et al/2013 [14] | 2 | Male | 6 mo | 4.6 × 6.9 × 9.1 | — | — | — |
| Nardi CE et al/2013 [15] | 1 | Male | — | 6 × 4 | — | — | — |
| Nardi CE et al/2013 [15] | 36 | Male | 40 d | 5 | — | — | — |
occurred most commonly in young adults, with a median age of 23 years (age range, 1-54 years).

In most cases of fracture, the imaging examinations can result in a confident diagnosis. However, CT and magnetic resonance imaging findings of a hibernoma are similar to other adipocyte tumors, such as adult rhabdomyoma, granular cell tumor, lipoma, and liposarcoma. A remarkable difference between these tumor types is that hibernomas are well vascularized, as observed on computed tomography angiography in the present case. The most effective method for actual diagnosis is pathology. Considering that most clavicular fossa lumps are inflammatory masses or enlarged lymph nodes, a puncture biopsy such as fine needle aspiration is always recommended before treatment. However, severe bleeding that can even lead to hemorrhagic shock can occur during this invasive manipulation if it is a hibernoma. Therefore, it is important to determine the blood supply, when imaging presents an adipocyte tumor. There has never been a report of recurrence worldwide after complete surgical excision.

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