Abstract

Hibernomas are rare, benign tumors of adipose tissue histologically associated with rudimentary remnants of brown fat. Physiologically, brown fat produces heat, which occurs by a unique uncoupling protein on the inner mitochondrial membrane of brown fat cells. This protein allows protons to freely reenter mitochondria uncoupled to ATP synthase.1

While brown fat is abundant in hibernating mammals and newborn humans, it is scarce in adults. Scattered brown fat deposits are most commonly found in subcutaneous regions within the back, axilla, thorax, and mediastinum. The majority of reported hibernomas are located in the thigh and trunk.2 Hibernoma has been reported in the neck, scalp, parotid, submental space, and larynx.

Introduction

Hibernomas are rare, benign tumors of adipose tissue that can occur in the head and neck. Learn the unique propensity for growth over time, complete surgical resection is indicated to prevent recurrence. 

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Discussion

• Hibernomas may occur at any age, with a peak incidence in the 4th decade. There is no gender predilection. Clinically, they present as firm, freely movable, nontender masses. Symptoms occur by compression of nearby structures.3

• MRI is the study of choice. T1-weighted images can suggest the diagnosis, showing a heterogeneous enhancing mass with characteristic areas of hypointensity and internal septations. Signal intensity is typically intermediate between skeletal muscle and subcutaneous fat. Hibernomas are usually isointense to subcutaneous fat on T2-weighted images. These tumors fail to suppress on fat-suppression sequences given their high lipid content, despite their rich vascularity.2

• On CT scan, hibernomas appear well-circumscribed and enhancing with attenuation between that of fat and muscle. Ultrasound delineates a homogeneously hyperechoic mass. Doppler and angiography show hypervascularity. FDG-PET shows active uptake with SUV from 11 to 26. To-99m lymphoscintigraphy also shows uptake given high mitochondrial density in hibernomas.6

• Hibernomas have a well-defined capsule with a lobular fatty cut surface. Microscopic eosinophilic multivacuolated fat cells with granular cytoplasm and small, central nuclei are mixed with blood vessels and typical univacuolated white fat cells. Most are S-100 positive and CD34 negative. Electron microscopy reveals abundant mitochondria.7

• Four morphologic variants of hibernoma exist, including typical, myxoid, spindle-cell, and lipoma-like.8 The myxoid variant occurs predominantly in men and is nearly exclusively found in the head and neck.5

Cases

Case 1: A 75-year-old man presented with an incidental neck mass found on imaging. Two successive needle biopsies were inconclusive. The tumor increased in size over 6 months and he complained of dysphagia. Physical exam revealed a smooth, round mass within the left pharyngoepiglottic fold. Transoral laser microsurgical resection was performed, removing the 3.3 cm fatty tumor in totality. Pathology revealed a lipomatous neoplasm with prominent vascularity and myxoid change consistent with hibernoma. The patient healed with normal speech and swallow. He is free of recurrence at one year.

Case 2: A 70-year-old man presented with a recurrent supraglottic lipomatous tumor status post 2 previous transoral excisions. He complained of dysphagia and occasional airway obstruction. Physical exam revealed a smooth, round mass projecting from the right piriform. Transoral microsurgical resection was performed. The 2.5 cm encapsulated tumor was peeled from the internal perichondrium of laryngeal cartilage. Pathologically, the tumor contained focally myxoid adipose tissue consistent with hibernoma. The patient healed well with normal speech and swallow. He is free of recurrence at 4 years.

References


4. Libshitz HI. CT: 2.5 cm contrast-enhancing mass in right piriform (Case 2)

5. Libshitz HI. T1 MRI: 3 cm contrast-enhancing mass in left piriform with internal hypointense and internal septations (Case 1)

6. Libshitz HI. T2 MRI: same mass appears isointense to subcutaneous fat (Case 1)

7. Libshitz HI. Intraoperative view of left hypopharynx with submucosal mass through Hinni laryngoscope (Case 1)

8. Libshitz HI. Case 1 – H&E stain of lipomatous neoplasm with focal areas of myxoid change and increased vascularity consistent with myxoid hibernoma. (B) Higher magnification of specimen A.

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