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# Scapulothoracic Bursitis Appearing as Fluorodeoxyglucose-Avid Subscapular Mass: A Case Report

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**Abstract:** Overuse or structural bony abnormalities of the scapulothoracic “articulation” make it susceptible to chronic friction, which can lead to bursitis and soft tissue changes. Clinically, scapulothoracic bursitis is associated with pain, crepitus, and scapular snapping. On physical examination, a firm, large subscapular mass may be present, sometimes with rapid growth. Asymptomatic cases without scapular snapping can be clinically indistinguishable from soft tissue tumors of the chest wall. Characteristic imaging findings of scapulothoracic bursitis include a well-circumscribed cystic mass, internal debris, and intralesional hemorrhage. Recognition of these characteristic findings is essential to avoid misinterpretation and unnecessary treatments. Here, we describe a case of an incidentally discovered, asymptomatic, fluorodeoxyglucose (FDG)-avid subscapular mass with typical imaging features of scapulothoracic bursitis. Additional imaging and histopathologic examination of sampled tissue confirmed the diagnosis. To our knowledge, this incidental finding is the first documented case of FDG-avid scapulothoracic bursitis.

**Keywords:** *scapulothoracic bursitis, subscapular mass, FDG-avid cystic mass, snapping scapula syndrome*

## Case Presentation

A 65-year-old woman with a history of excised melanoma of the left upper extremity presented 8 years after surgery for staging of a new lesion on the chin. An excisional biopsy of the new lesion confirmed the diagnosis of melanoma without significant evidence of invasion (Breslow Depth, 0.34 mm). Physical examination of the patient’s left upper extremity revealed that the site of the previous excision was healing. It also revealed a scar from a traumatic, left radial neck fracture that occurred 7 years prior. The patient had no other history of thoracic trauma or surgery and did not experience shoulder pain, crepitus, or a snapping sensation.

## Key Points

- Scapulothoracic bursitis may be asymptomatic and can mimic soft tissue tumors.
- Characteristic imaging findings, such as a well-circumscribed cystic mass, internal debris, and intralesional hemorrhage in the subscapular location, are key for the accurate diagnosis.
- Subscapular soft tissue and cystic lesions can demonstrate intense FDG avidity on PET/CT scanning.
- Ultrasound may depict cystic and/or solid components of a soft tissue mass and offers excellent and safe real-time guidance for percutaneous sampling.

### Abbreviations

CT: Computed Tomography  
 FDG-PET/CT: Fluorodeoxyglucose-Positron  
 Emission Tomography/Computed Tomography  
 MRI: Magnetic Resonance Imaging  
 SUVmax: maximum standardized uptake value

Magnetic resonance imaging (MRI) with gadolinium performed prior to the excision of the new melanoma revealed a subscapular cystic mass with peripheral enhancement, thin enhancing septa, and internal layering blood products (Figure 1). FDG-PET/CT, which was performed to stage the melanoma, revealed a corresponding thick-walled cystic mass at the left scapulothoracic articulation, with complex internal debris and intense FDG avidity (SUVmax, 3.7) (Figure 2). MRI and computed tomography (CT) revealed structural bony changes affecting the medial region of the left scapula and the posterior aspect of the opposing third rib. These changes included cortical irregularity, a small chronic focal step-off and anteriorly projecting bony apposition of the superomedial angle of the scapula, likely from the remote trauma (Figures 1 and 2).

Given the patient's history of melanoma and the implications of a new neoplastic lesion metastasizing, the subscapular mass was biopsied via ultrasound-guided fine needle aspiration and core needle sampling. Biopsy results included polymorphonuclear leukocytes and blood with no evidence of malignant growth. Ultrasonography with a linear array 18-4 MHz probe of the posterior aspect of the left shoulder demonstrated a thick-walled cystic subscapular soft tissue mass with scattered internal septa and debris without blood flow (Figure 3).

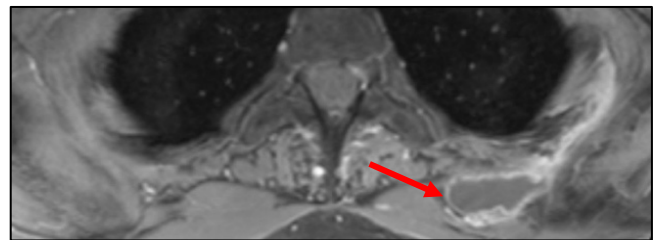
Overall, the imaging and histopathologic findings were consistent with benign disease, specifically scapulothoracic bursitis secondary to bony irregularities at the scapulothoracic articulation. These findings may have initially resulted from the prior trauma and been compounded by ongoing chronic bony remodeling at the articulation. A wide local excision of the melanoma was performed without complication. No treatment was pursued for scapulothoracic bursal disease.

**Figure 1.** MRI of the Cervical Spine in a 65-Year-Old Woman with Melanoma and Scapulothoracic Bursitis

**A** T2-weighted fat-saturated post-contrast image, axial view



**B** T1-weighted fat-saturated post-contrast image, axial view



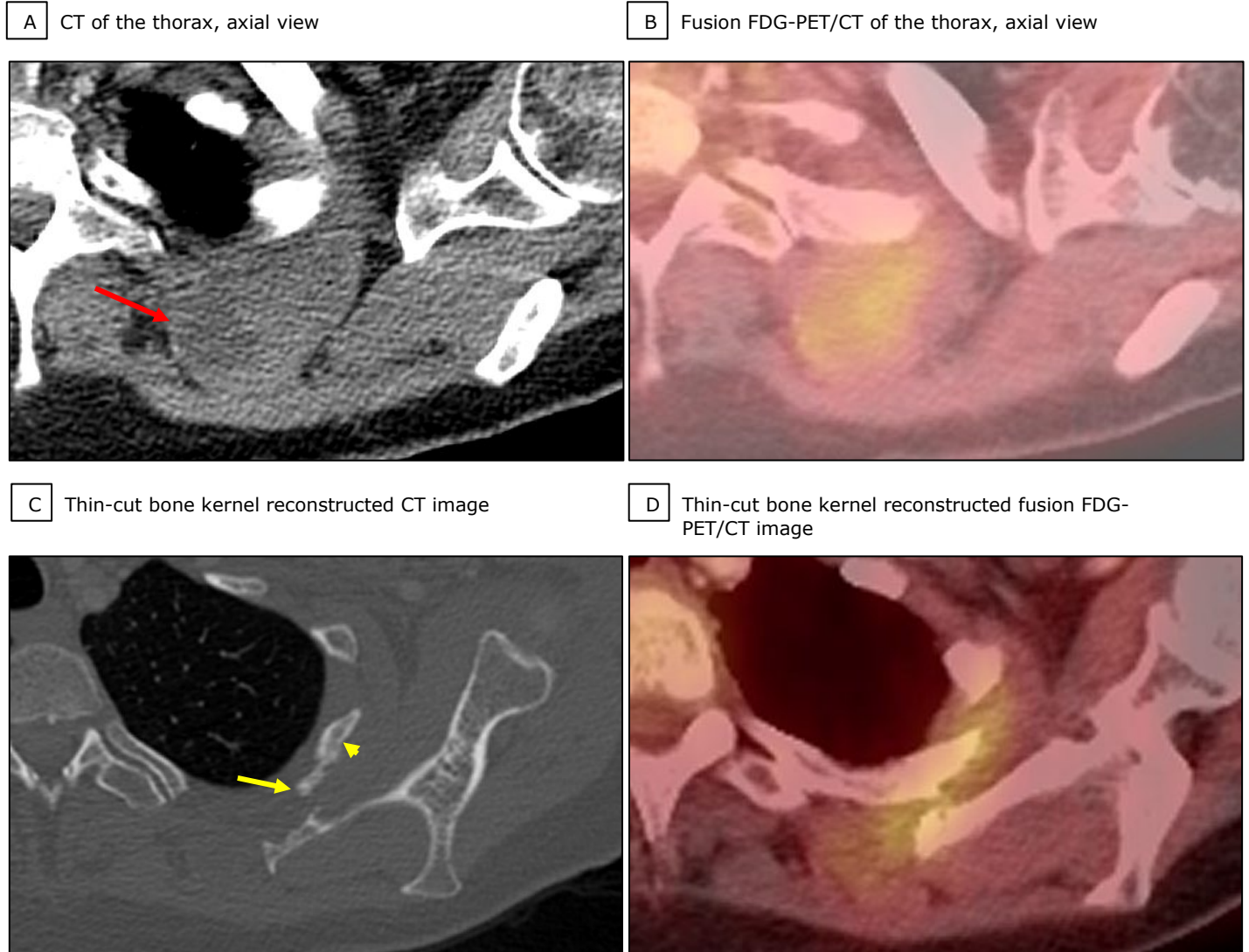
MRI of the cervical spine demonstrates an incidental subscapular lesion. These images show a subscapular mass (A and B, arrows) that is hyperintense on T2-weighted images and demonstrates internal septa and layering debris, presumably blood products. Peripheral and septal enhancement and more focal patchy enhancement correspond to synovitis. Findings are characteristic of scapulothoracic bursitis.

### Discussion

Scapulothoracic bursitis is an uncommon entity with several important clinical and imaging features, including subscapular discomfort and pain with crepitus and an audible clicking sound during scapulothoracic motion, known as snapping scapula syndrome.<sup>1,2</sup> Patients can present with a firm palpable mass that can demonstrate rapid growth, likely secondary to intralesional hemorrhage.<sup>1,3</sup> In the absence of these characteristic symptoms and signs of bursitis, this lesion may be confused with a soft tissue neoplasm.<sup>1</sup>

Imaging features of scapulothoracic bursitis typically demonstrate a well-circumscribed cystic mass in the subscapular fossa, which is located between the serratus anterior and subscapularis

**Figure 2.** FDG-PET/CT for Pre-operative Workup of Subscapular Mass with FDG Avidity of a 65-Year-Old Woman with Known Melanoma



(A) Axial CT and (B) axial fusion PET/CT images of the thorax demonstrate a subscapular lenticular cystic mass (A, red arrow) with internal hyperdensity/debris and intense FDG uptake. (C) The thin-cut bone kernel reconstructed images show focal irregularity of the undersurface of the scapula with small focal anterior bony apposition (C, yellow arrow) and chronic irregularity and healed fracture deformity of the opposing posterior aspect of the third rib (C, yellow arrowhead), also with associated intense FDG-uptake (D).

muscle.<sup>4</sup> Internal debris and intralesional hemorrhage are almost universally present in reported cases,<sup>2</sup> as they were with our patient. MRI with gadolinium contrast may show septal and peripheral enhancement.<sup>2,3</sup> This finding has also been described by Osias et al,<sup>2</sup> who found a focus of irregular peripheral enhancement consistent with synovitis in a patient with lupus. Huang et al<sup>4</sup> have also described a pathologic specimen of scapulothoracic bursitis covered with synovial lining with capillary proliferation, which may

explain the septal enhancement and internal hemorrhage. It is important to note that enhancement is typical in cases of scapulothoracic bursitis and that irregularity of hypervascular peripheral tissue as well as internal irregular septal enhancement can be the result of reactive and benign conditions.<sup>2</sup>

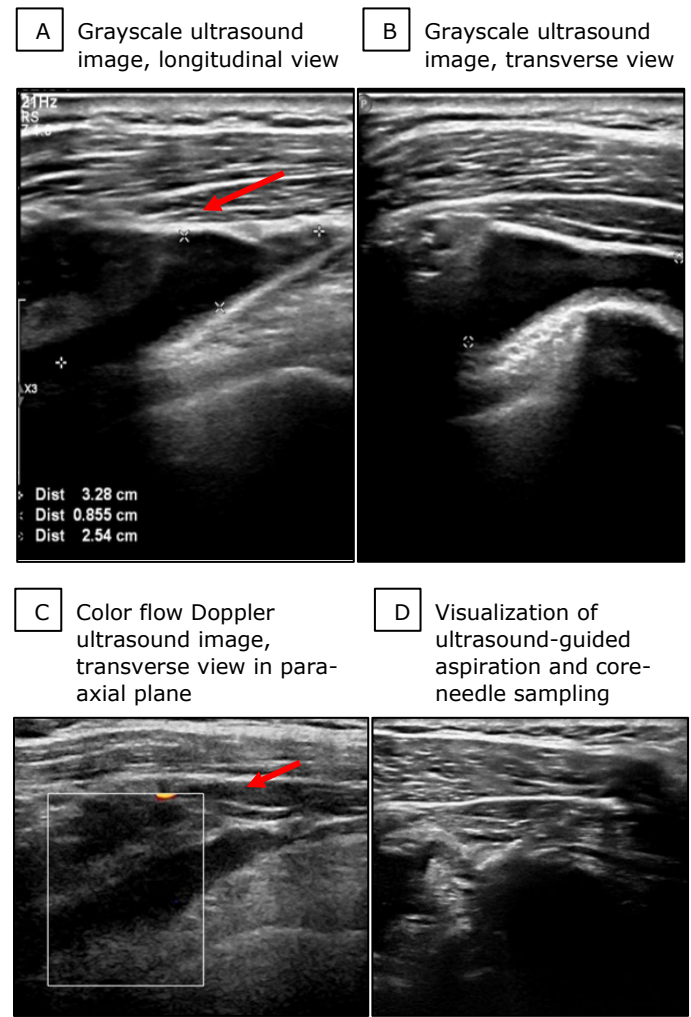
In addition to the expansion of the bursa, imaging can demonstrate associated focal bony abnormalities, most classically a scapular osteochondroma.<sup>2</sup> Scapulothoracic bursitis has

also been described in association with postsurgical changes to the scapula or ribs.<sup>2,3</sup> In the presence of a subscapular lesion, the adjacent bony structures should be carefully assessed. Bony lesions, irregularities, or findings of old trauma may be subtle on MRI and are optimally evaluated using radiography or CT imaging.<sup>2</sup>

Inflamed scapulothoracic bursae are one of a small subset of soft tissue masses that can occur in this location along the posterior thoracic wall, many of which are benign and have characteristic imaging features. The primary considerations in the differential diagnosis of a subscapular soft tissue mass include elastofibroma dorsi, desmoid lesion (fibromatosis), hematoma, or lymphatic malformation.<sup>2,4</sup> Elastofibroma dorsi is most common in older women and often presents as a subscapular soft tissue mass with characteristic alternating soft tissue and fat attenuation.<sup>1,4</sup> These masses may be bilateral in up to 60% of cases and can demonstrate FDG uptake.<sup>2</sup> A desmoid lesion appears on T2-weighted MRI images as a hyperintense intermuscular mass with hypoenhancing collagen bands and may also have low levels of FDG uptake.<sup>5</sup> Hematoma and lymphatic malformations can appear as cystic lesions and may have internal debris or enhancement, which can vary depending on the lesion's chronicity and presence of superinfection.<sup>2</sup> Malignant lesions that can occupy the posterior thoracic wall predominantly include soft tissue sarcomas, such as malignant fibrous histiocytoma or liposarcoma.<sup>1,4</sup> Imaging findings include solid masses with avid FDG uptake that may extend beyond the subscapular space and/or demonstrate displacement of adjacent structures.<sup>6</sup> Focused ultrasound with soft tissue sampling can be performed to confirm the diagnosis; however, CT-guided sampling can be used if a safe acoustic window is not available.<sup>2</sup>

To our knowledge, this case is the first documentation of FDG avidity within inflamed scapulothoracic bursa. While FDG uptake in malignant tumors is usually more focal and intense<sup>2,5</sup> than the diffuse uptake seen in this case, additional workup was pursued given the patient's history of melanoma. MRI and ultrasound findings, confirmed by the results of histopathologic examination, demonstrated a benign cystic mass in the subscapular region.

**Figure 3.** Targeted Ultrasound and Image-Guided Biopsy of the Posterior Soft Tissues and the Subscapular Mass in a 65-Year-Old Woman with Melanoma



(A) Longitudinal grayscale and (B) transverse grayscale and (C) color Doppler transverse in para-axial plane ultrasound images demonstrate a well-circumscribed cystic mass (A, arrow) with internal debris and few thin septa, deep to the trapezius along the thoracic rib cage. There is no peripheral or septal color flow. (D) Ultrasound-guided aspiration and core-needle sampling were performed.

## Conclusion

In summary, scapulothoracic bursitis is an uncommon entity with classic clinical and imaging characteristics. Intralesional hemorrhage, septation, and enhancement are common occurrences in the bursae of this region and may complicate radiological interpretation. PET/CT may demonstrate diffuse FDG uptake due to local

inflammation. However, MRI and ultrasound imaging features are typical and help distinguish this benign entity from malignant lesions. Awareness of the characteristic imaging appearance of scapulothoracic bursitis, and of the pattern of FDG uptake in benign lesions, is thus important for accurate diagnosis and the prevention of unnecessary treatment or additional workup. For cases with indeterminate MR and PET/CT imaging results, ultrasound often provides clear lesion visualization and is an excellent option for image-guided tissue sampling.

### Author Contributions

Conceptualization, J.J.M. and K.M.; Acquisition, analysis, and interpretation of data, J.J.M. and K.M.; Writing – original draft preparation, A.H. and J.J.M.; Review and editing, K.M.; Supervision, K.M. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

### Disclosures

None to report.

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