Intra-articular Fibroma of the Tendon Sheath Involving the Dorsal Triquetral-Hamate Joint

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Learning objectives

• Description of a rare case of intra-articular synovial fibroma of the wrist, a subtype of fibroma of the tendon sheath
• Discussion of histopathology of fibrous tumors of the tendon sheath
• Description of radiographic findings of fibrous tumors of the tendon sheath involving the hand
• Discussion of differential diagnosis of fibrous tumor of the tendon sheath involving the hand
Abstract

A 53 year old male presented to Beaumont Farmington Hills in July 2016 for magnetic resonance imaging (MRI) of an enlarging dorsal left wrist mass.

MRI demonstrated a heterogeneous soft tissue mass located on the dorsal left wrist involving the tendon sheaths of the dorsal third through fifth extensor compartments with extension into the triquetral-hamate joint. Signal was isointense to skeletal muscle on T1 and T2 weighted images with mild heterogeneous enhancement.

The mass was subsequently excised due to slow progressive enlargement over a period of eighteen months. Operative findings confirmed intra-articular involvement.

Gross examination demonstrated a multilobulated, white, rubbery mass. Histology demonstrated a multilobulated collagenous matrix with fibrous spindle cells, having slender nuclei and abundant cytoplasm, consistent with an intra-articular fibroma of the tendon sheath. There was no physical exam evidence to suggest recurrence as of his 6 month follow up appointment in March 2017.
This is a case report of an extremely rare intra-articular synovial fibroma of the dorsal left wrist. Including literature review and discussion of pathologic diagnosis, radiologic findings and treatment. Fibroma of the tendon sheath, is a slow growing benign tumor, most commonly presenting as a painless mass involving the upper extremity.

Although a fairly common tumor in the hand, up to 2-3% of all hand tumors, intra-articular involvement is extremely rare. The primary differential is giant cell tumor of the tendon sheath, often only distinguishable by histopathology. Although rare, given the nonspecific radiologic and gross pathologic findings, fibroma of the tendon sheath should be included in the differential for soft tissue hand tumors.
Case Presentation

- 53 year-old male presented in July 2016 for initial imaging via magnetic resonance imaging (MRI) of a suspected enlarging dorsal left wrist mass
Imaging

• MRI with intravenous gadolinium contrast demonstrated a 3.8 x 2.1 x 5.2 cm heterogeneous soft tissue mass located on the dorsal left wrist.

• There was involvement of the tendon sheaths of the dorsal third through fifth extensor compartments as well as intra-articular extension into the carpal joints.

• Intrinsic signal within the lesion was isointense to skeletal muscle on T1 and T2 weighted images with mild heterogeneous enhancement.

• These nonspecific findings were favored to represent a large giant cell tumor of the tendon sheath, the most common soft tissue tumor of the hand.
Axial, sagittal and coronal T1 images demonstrate a mildly heterogeneous dorsal wrist mass that is predominantly isointense to adjacent musculature surrounding multiple extensor tendons with extension into the intra-carpal articulations.
Axial and coronal T2 images demonstrate a mildly heterogeneous dorsal wrist mass that is isointense to adjacent musculature, surrounding multiple extensor tendons.
Axial, sagittal and coronal fat saturated post contrast T1 images demonstrate a heterogeneous mild enhancement of the mass that is slightly greater than adjacent muscle.
Follow up

• Physical exam by orthopedics following the MRI again demonstrated a dorsal wrist mass, which per the patient had been slowly getting larger over the last 18 months.

• On provocative examination he was able to actively extend of all fingers in the left hand, although he was only able to move the left ring and small fingers when they were moved in unison.

• The left hand/wrist was negative for carpal compression, tinel's and phalen’s test.
Gross Pathology

- Due to progressive enlargement the mass was surgically removed in September of 2016.
- Intraoperatively the mass was seen extruding from between the hamate and triquetrum, with encasement of multiple extensor tendons.
- At removal the mass was measured at 8 x 7 x 3 cm. This was significantly larger than what was identified on MRI from 3 months prior
- Gross examination demonstrated a multilobulated, white rubbery mass.
Pathology

- Pathology results demonstrated multilobulated collagenous matrix with fibrous spindle cells having slender nuclei and abundant cytoplasm.
- There was no necrosis, cellular atypia or mitotic activity noted.
- Although unusual, the mass was most consistent with a lesion of the synovium containing only fibrous tissue, known as a fibroma of the tendon sheath.
Histopathology

• A – 40x section shows interface of the multilobular process with normal tendon tissue in the right hand corner

• B – 100x section shows alternation of densely collagenous areas with more myxoid areas. Extravasated red blood cells are (black arrow)

• C – 100x section shows densely collagenous matrix with slit like vascular spaces (black arrow)
Post Surgical follow Up

• At his follow up appointment with orthopedics in March of 2017 there was no physical exam evidence to suggest recurrence.
Literature Review

- Few published articles on fibroma of the tendon sheath (FTS), also known as synovial fibroma, involving the hand were found on literature review.
- To our knowledge only three cases of intra-articular FTS involving the upper extremity have previously been published. None having been published in radiology journals.\(^1\)-\(^3\)
- FTS was first described in 1949 by Copeland and Geschickter.\(^4\)
- Chung and Enzinger authored a paper describing 138 cases of FTS in 1979.\(^5\)
- Millon published a case series in 1994 demonstrating seven cases of fibroma of the tendon sheath out of 208 soft tissue hand tumors surgically resected over a 15 year period.\(^6\)
- A case of FTS arising from the radio-ulnar joint was described by Misawa in 1999.\(^2\)
- An additional case of a volar right wrist mass involving the scapholunate and radiocarpal joints in a 53 year old female with a six month history of a slow growing painless mass was published by Athwal in 2006.\(^1\)
- In 2012 Heckert published a case of fibroma of the tendon sheath in a 63 year old male with a three month history of a painless mass involving the right palm.\(^7\)
Discussion

- Fibroma of the tendon sheath (FTS) is a benign soft tissue tumor.
- It occurs in the extremities in 98% of cases, of which the fingers (49%), hands (21%) and wrists (12%) are most commonly involved.\(^5\)
  - In a case series published by Millon et al in 1994 FTS were found to represent 2-3% of all hand tumors.\(^6\)
  - Statistics addressing intra-articular involvement were not found in available literature.
- While initially thought to relate to a history of trauma given the predilection for the palmar surface of the dominant hand, FTS are now known to represent true neoplasms.\(^8\)
- Males are more commonly affected.\(^1\)
- The neoplasm most commonly presents in the third to fifth decades,\(^1\) in a similar fashion to the more common giant cell tumor of the tendon sheath.\(^7\)
- The typical presentation is an asymptomatic palpable mass
  - Although in one study the mass was painful at presentation in 31% of patients.\(^5\)
Histology Discussion

• Fibromas of the tendon sheath are composed of scattered benign fibroblasts seen as spindle or stellate-shaped cells within a dense background of collagen.\(^6,7\)

• By definition no giant cells, xanthoma cells, inflammatory cells or areas of necrosis are seen. \(^6,7\)

• There may be demonstration of slit-like spaces.
  – These are hypothesized by some to represent vascular spaces due to staining with Von Willebrand factor, although others describe a distinct lack of red blood cells within the spaces\(^6,9\)

• Occasionally they can demonstrate areas of cellularity resembling nodular fasciitis.\(^7\)

• Rarely nuclear atypia and pleomorphism can be seen, termed pleomorphic fibroma of the tendon sheath.\(^7\)

• Immunohistochemistry is rarely needed to confirm the diagnosis, in which cases the cells have been found to express vimentin and muscle markers.\(^7,9\)
  – In one study these most commonly represented myofibroblasts.\(^7,9\)
Typical Imaging Features

- Imaging features are nonspecific, significantly overlapping with those of giant cell tumor of the tendon sheath, often being similar in size and location, with a common site of origin adjacent to a tendon or tendon sheath.\(^4\)
- The lesions are most commonly seen involving the flexor surface.
- Radiographic findings range from a normal appearance to that of a soft tissue mass with mild scalloping of adjacent bone.\(^4\)
- Computed tomography (CT) findings describe the mass as being isoattenuated to adjacent musculature with encasement of the associated tendons/tendon sheaths.\(^7\)
- Ultrasound was described in only two cases, with findings of a solid heterogeneous and hypoechoic mass with slight internal vascularity.\(^7,10\)
• MRI typically demonstrates a lobulated mass, having been described as mild to moderately heterogeneous, with signal intensity similar or slightly greater than that of skeletal muscle on T1 weighted images and low to intermediate on T2 weighted images. 4

• Enhancement characteristics are nonspecific ranging from no enhancement to marked diffuse enhancement. 4

• Variability on MRI is thought to be secondary to differing degrees of cellularity. 1,11
Differential Diagnosis

• Differential diagnosis based solely on imaging is nonspecific including giant cell tumor of the tendon sheath, nodular fasciitis, and fibrous histiocytoma.¹
  – Additional less likely differential diagnosis have been suggested including fibromatosis, collagenous fibroma and desmoid tumor.²,¹⁰

• Giant cell tumor of the tendon sheath and fibrous histiocytoma can often only be differentiated with microscopic examination.
  – Giant cell tumor of the tendon sheath are characterized on histology by xanthomatous histiocytes, hemosiderin pigment deposition and giant cells.¹¹
  – Fibrous histiocytoma is differentiated on immunohistochemical staining by presence of CD34.¹¹

• Nodular fasciitis can often be differentiated based on patient history.
  – While they are similar histologically, nodular fasciitis typically has a different clinical presentation, being fast growing and uncommonly seen in the hands.¹
Treatment

- Marginal surgical excision is the treatment of choice given the intimate involvement of these tumors with the tendons and tendon sheaths, and the inability to prospectively distinguish FTS from other common tumors. 1-11
- FTS are often difficult to excise as they are often found to be adherent to the tendon sheaths at surgery.
- Rate of recurrence appears to be related to how aggressively the lesion was dissected.
  - The case series of 138 patients published by Chung demonstrated a recurrence rate of up to 24%, all within four months following surgery. 5
  - The studies published by Million demonstrated no tumor recurrence at follow up with a minimum interval of 3 years 9 months, and Al-Qattan reported no recurrence at follow up at two to five years. Both studies attributed lack of recurrence to aggressive dissection. 6,11
Conclusion

• This case report discusses a rare case of intra-articular fibroma of the tendon sheath involving the dorsal left wrist with extension into the triquetral-hamate articulation.
• Fibroma of the tendon sheath, is a slow growing benign tumor, most commonly presenting in the hand as a painless mass.
• The primary differential is giant cell tumor of the tendon sheath, often distinguishable only by histopathology.
• Although rare, given the nonspecific radiologic and gross pathologic findings, fibroma of the tendon sheath should be included in the differential for soft tissue hand tumors.
References


References


Contact Information

Questions or comments?

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