Case Report

ANNALS OF MEDICINE & SURGERY

OPEN

Lipoma arborescens in the dorsum of the hand: a case report and a comprehensive review

Sundar Suwal, MD[a], Shailendra Katwal, MD[d,*], Dinesh Chataut, MD[a], Suman Lamichhane, MD[b], Amrit Bhusal, MBBS[e], Sandeep Bhandari, MS[c]

Introduction and importance: Lipoma arborescens is a rare synovial disorder, typically affecting the knee joint, with limited reports of atypical presentations. The study emphasizes the need for a multidisciplinary diagnostic approach and discusses the genetic and signalling factors associated with its pathogenesis.

Case presentation: A 50-year-old male presented with a painless swelling in the dorsum of the right hand, a rare extra-articular manifestation of Lipoma arborescens. Comprehensive clinical, imaging, and histopathological evaluations confirmed the diagnosis, revealing unique features on MRI and frond-like fatty tissue infiltration on excisional biopsy.

Clinical discussion: The case underscores the distinct clinical characteristics, diagnostic challenges, and differential considerations associated with atypical Lipoma arborescens presentations. Extra-articular manifestation of Lipoma arborescens involving the dorsum (extensor aspect) of the hand is rare. Imaging techniques, including MRI and ultrasound, play a crucial role in accurate diagnosis, differentiating it from other joint pathologies. The MRI findings include intra-articular fat deposits and villous proliferation of the synovial membrane. At the same time, the histopathological analysis includes frond-like infiltration of sub-synovial tissue with mature adipocytes which helps in confirming the diagnosis.

Conclusion: Successful surgical excision of the extra-articular lesion highlights the importance of a comprehensive diagnostic strategy for managing this uncommon condition. The study contributes valuable insights into understanding, diagnosing, and treating atypical presentations of lipoma arborescens.

Keywords: case report, hand swelling, lipoma arborescens, rare presentation, synovial proliferation

Introduction

Lipoma arborescens is a rare condition affecting the synovium, characterized by villous-lipomatous synovial proliferation and the replacement of sub-synovial tissue with mature adipose tissue[1]. Initially described by Albert Hoffa in 1904, it is typically diagnosed in individuals aged 4th to 6th decades and is found in various joints, including the knee joint's suprapatellar pouch[2]. The cause of this rare condition is unknown, but theories suggest a role for genetic factors and signalling pathways associated with adipocyte differentiation. The secondary type is thought to develop from chronic joint irritations like rheumatoid arthritis, trauma, psoriasis, and diabetes mellitus[3]. The involvement of the wrist joint extensors is rare, and accurate diagnosis requires a multidisciplinary approach including a detailed history, clinical examination, advanced imaging techniques, and histopathological examination[4,5]. Chronic recurrent swelling, resistant to conservative measures, with arthritic changes visible on X-rays, is commonly diagnosed using magnetic resonance imaging due to its high sensitivity[6].

Treatment involves straightforward debridement with synovectomy, as lipoma arborescens is confined within the synovium without invading adjacent structures[4].

The objective of this case report is to highlight the rarity of Lipoma arborescens in the dorsum of the hand and its management with a brief review of the literature.

HIGHLIGHTS

- This study presents a rare case of lipoma arborescens affecting the wrist's extensor tendon sheaths.
- The atypical presentation highlights unique features on imaging, confirming the diagnosis through excisional biopsy.
- The study contribute valuable insights into understanding, diagnosing, and treating atypical presentations of lipoma arborescens.

[a]Department of Radiology, Maharajgunj Medical Campus, [b]Department of Radiology, Nepal A.P.F. Hospital, Balambu, [c]Department of Orthopedics, HAMS hospital, Kathmandu, [d]Department of Radiology, Dadeldhura Subregional Hospital, Dadeldhura and [e]Department of Medicine, B.P Koirala Institute of Health Science, Sunsari, Nepal

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Department of Radiology, Dadeldhura Subregional Hospital, Dadeldhura 10300, Tufandada. Tel.: +977 9849 149 630. E-mail: shailendrakatwal@gmail.com (S. Katwal).

Annals of Medicine & Surgery (2024) 86:2305–2308

Received 3 January 2024; Accepted 21 February 2024

Published online 4 March 2024

http://dx.doi.org/10.1097/MS9.0000000000001884

Case report

A 50-year-old male presented with a painless swelling in the lateral aspect of the dorsum of the right hand (at the level of the wrist joint) for the past 4 years. The swelling, steadily increasing in size, had no associated history of trauma, and no similar swellings were found elsewhere on the body. No inflammatory changes were noted in the overlying skin, with only slight discomfort reported in the movement of the right wrist. Upon physical examination, a relatively well-defined, soft mass measuring ~6 × 5 cm was identified in the dorsum of the right hand, superficial to the wrist joint, and lacks obvious tenderness. The patient's occupation is that of a farmer. The patient did not experience pain during active or passive range of motion, and normal arterial pulsations were observed. The rest of the physical examination revealed no abnormalities. Biochemical investigations, including normal levels of uric acid and a negative rheumatoid factor, showed no abnormalities. Acute phase reactants such as erythrocyte sedimentation rate and C-reactive protein were within normal limits.

Radiographic imaging was advised, revealing soft tissue swelling in the lateral aspect of the right wrist joint at the level of the distal aspect of the ulna, without evident bony changes. MRI exhibited multiple cystic lesions along the extensor tendon sheaths in the distal forearm and wrist, featuring frond-like projections with a fat signal, as well as synovial proliferation (Fig. 1A and B). Excisional biopsy of the lesion revealed frond-like yellow fatty tissue involving the synovium. Microscopic examination of the specimen confirmed the diagnosis of lipoma arborescens, showing large groups of mature adipocyte cells infiltrating the sub-synovial areas with minimal surrounding inflammatory changes consisting of lymphocytes (Fig. 2). No adverse effects from the procedure were observed.

The patient received reassurance and underwent regular follow-up for 2 years, with no apparent clinical signs of recurrence observed. Economic constraints led the patient to decline an MRI imaging study during the follow-up assessment.

Discussion

Lipoma arborescens is a rare condition, with an incidence ranging from 0.14 to 0.25%. The term "arborescens," derived from Latin, signifies a "tree-like" appearance, describing the unique villous and frond-like characteristics of this uncommon disorder[7]. Although the exact pathogenesis of lipoma arborescens remains unclear, genetic factors and signalling pathways associated with adipocytes, such as PPARγ and C/EBPα, are implicated in its development[3].

Typically, lipoma arborescens is unilateral and mono-articular, with a preference for the knee joint, presenting a distinctive clinical picture marked by joint-related symptoms. Patients commonly exhibit persistent joint swelling (effusion), which progressively enlarges due to the accumulation of mature adipocytes within the synovial membrane, causing painless effusion and limited range of motion. This limitation leads to functional impairment and challenges in daily activities[2]. Joint discomfort may result from the pressure exerted by accumulated fatty tissue. In our case, there was extra-articular involvement affecting the extensor aspect of the wrist joint, presenting as a steadily increasing, painless swelling on the lateral aspect of the wrist joint, without restricting joint movement.

The affected joint may also exhibit warmth due to the inflammatory component of the condition[2]. Accurate diagnosis involves a comprehensive assessment using imaging modalities

Figure 1. (A) Coronal T1 weighted MRI image showing multiple communicating intermediate signal pockets encasing the extensor tendons. (B) Coronal Fat saturated T2 weighted MRI image showing fat signal suppression with surrounding fluid collection in lesion encasing the extensor tendons.

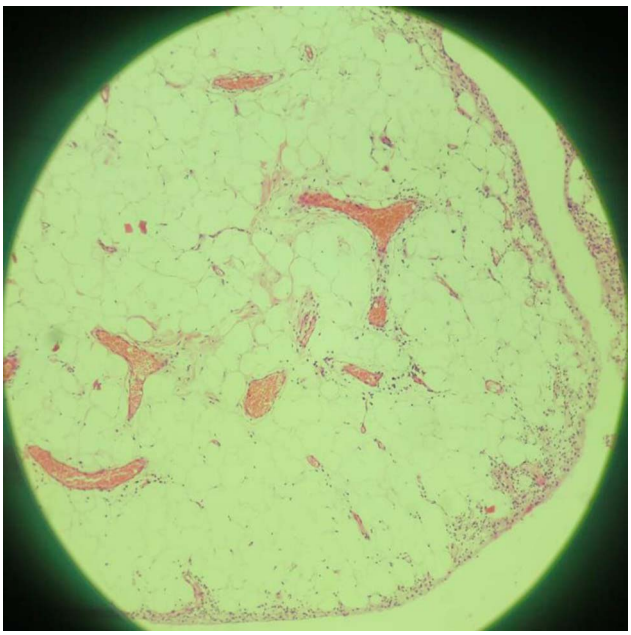

Figure 2. Histopathological image of the specimen showing frond-like projections containing multiple mature adipocytes with synovial epithelial lining.

and histopathological analysis[7]. MRI and ultrsonography (US) can aid in identifying fatty proliferation within the synovial cavity, with MRI revealing intra-articular fat deposits and villous proliferation of the synovial membrane. These findings exhibit high signal intensity on T1 and T2 weighted images and low intensity on fat-suppressed and short tau inversion recovery sequences[5]. US can complement MRI and guide joint aspirations or biopsies for histopathological confirmation[8]. However, a definitive diagnosis relies on histopathological examination through synovial tissue biopsy or surgical intervention, confirming the presence of mature adipocytes infiltrating the sub-synovial tissues, differentiating lipoma arborescens from other joint pathologies[9].

Differential diagnoses involve synovial chondromatosis, synovitis with fatty metaplasia, and rheumatoid arthritis (RA). Thorough clinical history, physical examination, and laboratory investigations, including joint fluid aspirate, RA factor, and anti-CCP antibodies, help accurately differentiate these conditions[10]. In our case, laboratory parameters were within normal limits, ruling out RA.

Chronic synovitis with fatty metaplasia, resulting from inflammation-induced changes in synovial tissue, differs from lipoma arborescens, which is characterized by the accumulation of mature adipocytes within the synovium. This distinction can be precisely identified using MRI and US[10]. The primary goal of lipoma arborescens treatment is symptomatic relief and prevention of joint damage. Surgical synovectomy, particularly arthroscopic synovectomy, is the preferred therapeutic option due to its minimally invasive nature and potential for faster recovery compared to open surgery[4]. In our patient's case, an open surgical excision was performed for the extra-articular lesion, and there were no postoperative complications during regular follow-up over 2 years. The recurrence rate of lipoma arborescens is exceedingly rare[5]. Additionally, our review did not uncover any literature documenting the malignant transformation of this condition.

Conclusion

This case of lipoma arborescens of tendon sheath in the hand highlights the rarity of its presentation. Successful surgical excision demonstrates an effective treatment approach, emphasizing the importance of a comprehensive diagnostic strategy for accurately identifying and managing this uncommon extra-articular condition. Physicians should maintain suspicion of lipoma arborescens when assessing painless wrist joint swelling, despite its infrequent occurrence in this location.

Ethical approval

This case report did not require review by the ethical committee.

Consent

Written informed consent was obtained from the patient for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor-in-chief of this journal on request.

Source of funding

None.

Author contribution

S.S.: conceptualization, as mentor and reviewer for this case report and for data interpretation. S.K.: contributed in performing literature review and editing. D.C.: contributed in writing the paper and reviewer for this case. S.L.: contributed in writing the paper and reviewer for this case. A.B.: contributed in writing the paper. S.B.: contributed in writing the paper. All authors have read and approved the manuscript.

Conflicts of interest disclosure

All the authors declare that they have no competing interest.

Research registration unique identifying number (UIN)

Not applicable.

Guarantor

Sundar Suwal.

Data availability statement

Data sharing is not applicable to this article.

Provinence and peer review

Not commissioned, externally peer-reviewed.

References

[1] Bora N, Parihar P, Raj N, *et al*. Lipoma arborescens where MRI is a boon. Cureus May 2023;15:e39212.
[2] De Vleeschhouwer M, Van Den Steen E, Vanderstraeten G, *et al*. Lipoma arborescens: Review of an uncommon cause for swelling of the knee. Case Rep Orthop 2016;2016:9538075.
[3] Kalia V, Daher O, Garvin G, *et al*. Synchronous bilateral lipoma arborescens of bicipitoradial bursa a rare entity. Skeletal Radiol 2018;47:1425–9.
[4] Stepan JG, Gelberman RH, Osei DA. Extra-articular lipoma arborescens of the dorsal aspect of the wrist with invasion of the extensor tendons: a case report. JBJS Case Connect 2013;3:e30.
[5] Tsifountoudis I, Kapoutsis D, Tzavellas AN, *et al*. Lipoma arborescens of the knee: report of three cases and review of the literature. Case Rep Med 2017;2017:3569512.
[6] Coll JP, Ragsdale BD, Chow B, *et al*. Best cases from the AFIP: lipoma arborescens of the knees in a patient with rheumatoid arthritis. Radiographics 2011;31:333–7.
[7] Vilanova JC, Barcelo J, Villalon M, *et al*. MR imaging of lipoma arborescens and the associated lesions. Skelet Radiol 2003;32:504–9.
[8] Lyrtzis C, Stamati A, Pantazis E, *et al*. Lipoma arborescens of the knee: a case report and comprehensive review. Med Rep 2023;1:100021.
[9] Drevelegas A, Pilavaki M, Chourmouzi D. Lipomatous tumors of soft tissue: MR appearance with histological correlation. Eur J Radiol 2004;50:257–67.
[10] Davies AP, Blewitt N. Lipoma arborescens of the knee. Knee 2005;12:394–6.