



ROLE OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF FOOT LESIONS: A CASE SERIES

Pathology

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ABSTRACT

Fine needle aspiration cytology (FNAC) is an important diagnostic tool in the diagnosis of soft tissue nodules. FNAC being a fast technique is used as a primary investigation to diagnosed wide spectrum of foot lesions. Foot is prone to trauma, reparative and infectious process, which forms mass lesions mimicking neoplasia. Tumors and tumor like lesion of the foot are not common. However, occur with sufficient frequency to present a regular diagnostic challenge. Symptoms are often non-specific, most commonly that of pain and swelling. It may be caused by infection, injury or abnormal growth of tissue. Our study highlighted the importance of FNAC with the chance of reduction in biopsy or excision.

KEYWORDS

Cytology, Gout, Foot, Tuberculosis

INTRODUCTION

The foot is a complex structure that endures significant stress and is susceptible to trauma, infection, and a range of abnormal growths. Lesions can mimic neoplasia, complicating diagnosis. FNAC has emerged as a preferred initial investigation due to its speed and efficacy in obtaining tissue samples for cytological evaluation.

This article discusses the importance of FNAC in the diagnosis of foot lesions, highlighting its benefits, limitations, and the spectrum of conditions it can identify.⁹

MATERIAL AND METHODS

In present study 14 cases of foot swelling in all age group was discussed. FNAC was performed and smears were stained with Haematoxylin and Eosin (H&E) and PAP stain. A comparison between cytology and histological diagnosis was done wherever possible.

Case No.1

A 24-year-old farmer came with complaint of swelling over right foot in first web space since 2 years. On examination a swelling over left foot in first web space of size 2x1 cm firm mobile and tender. Initially the patient noticed a painless nodule over right foot that became painful in last 10 days. History of trauma or laceration was not given. No draining sinuses or palpable inguinal lymphadenopathy was seen. FNAC was done. Cytomorphological evaluation suggestive of actinomycosis. (Fig.1)

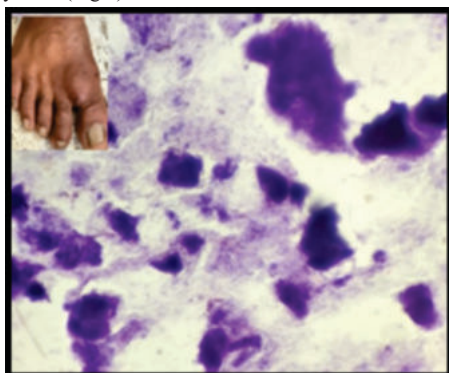


Fig.1 Actinomycosis. Smear show clumps of filamentous bacterial colonies showing Splendor-Hoepli phenomenon against suppurative background. (PAP Stain, 40X)

Case No. 20 years-old male patient came with complaints of swelling over right foot lateral side since 15 months. On further investigation patient gave history of extrapulmonary TB (cervical) and was on AKT since 15 months. The patient had fever, cough, fatigue and weight loss. FNAC was performed from foot swelling and diagnosed as Tubercular Osteomyelitis. (Fig.2)

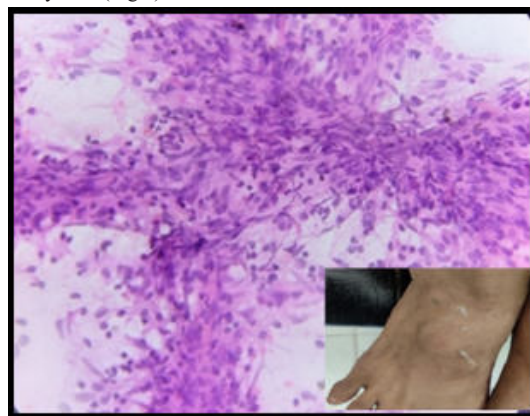


Fig.2 Tubercular Osteomyelitis. Epithelioid cell granuloma, lymphocytes and plasma cells against caseous necrotic background. (H&E Stain, 40X)

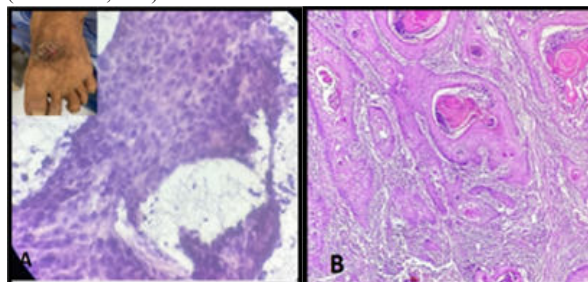


Fig.3A&B Squamous cell carcinoma A) Smear show clusters of atypical squamous epithelial cell (H&E Stain, 40X) B) Section studied show islands of dysplastic epithelial cells invading the stroma along with keratin pearls at places (H&E Stain, 40X)

Case No.3

50yr male patient came with complaints of growth over dorsum of foot

since 2 month. On further investigation patient gave history of trauma 20 year back and had non-healing ulcerated wound . Patient also gave history of loss of appetite and weight loss since 2 months. On examination fungating growth of size 2x2 cm, soft to firm in consistency, non-mobile and non-tender noted.

FNAC was done and smears was prepared. Cytomorphological study was suggestive of Squamous Cell Carcinoma as smears showed clusters of atypical squamous epithelial cell with high N:C ratio having pleomorphic vesicular nuclei and moderate amount of eosinophilic cytoplasm (Fig.3A&B)

Case No. 4 & 5

Case No. 4- A 60-year-old male came to cytology OPD with history of slow growing, painful mass over first tarsometatarsal joint of right foot. On examination swelling was 2x1 cm in size, firm in consistency, mobile and tender. Local USG was suggestive of Neoplastic etiology, neurogenic in origin.

Case No.5- 38-year female came with complaints of painless swelling over left foot since 15 year. It became painful from 1 month. No past history of trauma. On examination swelling was 1x1 cm firm in consistency, mobile and tender.

FNAC was done. Smears show similar cytomorphological features in both cases showing neoplastic spindles cells arranged in groups and clusters. Individual cells have elongated slender comma shaped wavy nuclei with tapering end and moderate amount of eosinophilic cytoplasm. Based on cytomorphological and clinical features Benign Peripheral Nerve Sheath Tumor (Schwannoma/Neurofibroma) diagnosis was given.(Fig.4A&B)

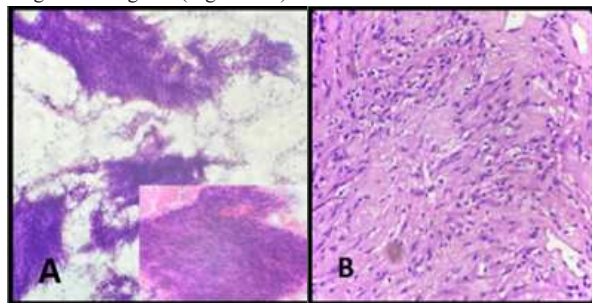


Fig.4 A&B. Schwannoma A) Smear show neoplastic spindles cells arranged in groups and clusters. Individual cells have elongated slender comma shaped wavy nuclei with tapering end (H&E Stain, 40X) B) Section studied show hypercellular (Antoni A) & hypocellular areas (Antoni B). (H&E Stain, 40X)

Case No.6 & 7

Case No.6 - 55-year-old male came with complaints of swelling over fourth digit of right foot since 2 month. On palpation the nodule was 4x3 cm in size, hard to feel, non-tender and fixed. On local USG suggestive of Neoplastic etiology with regional metastasis

Case No. 7- 40-year male with CKD came to cytology OPD with history swelling over left ankle since 6 month. He did not have any other clinical symptoms. On examination swelling measured 4x4 cm, hard in consistency, fixed. and tender. Sr uric acid level was high (9.3mg/dl).

FNAC was done, chalky white material was aspirated. Smear show needle shaped crystals were seen against eosinophilic amorphous granular material. Diagnosis Gouty Tophi was given on the basis of cytomorphological features. Following this report, patient was investigated for serum uric acid levels which was found to be markedly raised. (16.3gm%)

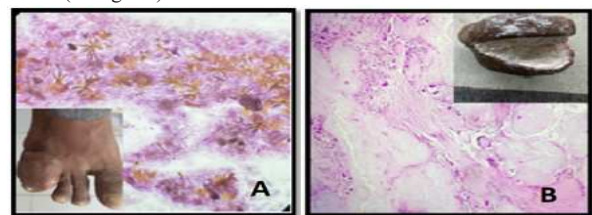


Fig.5 A&B. Gouty Tophus A) Smear shows needle shaped crystal

against eosinophilic amorphous granular material. (H&E Stain, 40X) B) Section studied show acellular amorphous eosinophilic material & inflammatory cell infiltrate. (H&E Stain, 40X)

Case No.8

67-year-old female come with complain of swelling over right foot lateral aspect since 5 month, on further investigation she gave history of trauma at same site 6 months back. On examination swelling was measuring 1.5x1.5 cm, soft to firm in consistency, mobile and non-tender. USG local was suggested hematoma. FNAC was done haemorrhage aspirate obtained. Cytomorphological studied suggestive of Benign Vascular Lesion (Hematoma).

Case No. 9,10,11 and 12

Case No. 9 – 50-year-old male presented with a painless soft tissue swelling over left foot since 5 year. On examination swelling was 1 cm in largest diameter, fixed to deeper structure but overlying skin was normal. The mass had been growing slowly for past 5 years

Case No. 10 – 37-year female presented with swelling over dorsal aspect of left foot on examination swelling was 1x1 cm in size, soft to firm in consistency, mobile and tender.

Case No.11 – 34-year-old female presented with painless swelling over left 2nd toe. Swelling was growing slowly for past five to six months. On examination it was 1x1 cm in size, firm in consistency and partially mobile. Radiologic examination showed well defined soft tissue lesion. The underlying bone was normal

Case No.12- A 39-year male came to cytology OPD with complaints of swelling over right foot third toe since 1 year. On examination swelling was 1x1 cm in size, soft to firm in consistency, mobile and tender. No past history of trauma or injury at same site. Local USG suggested neoplastic etiology probably tendon sheath fibroma or Giant Cell Tumor of Tendon Sheath (GCTT) or peripheral nerve sheath tumor.

In all four cases, FNAC was done and smears were prepared. Cytomorphological findings in all four cases were remarkably similar and suggestive of Giant Cell Tumor of Tendon Sheath (GCTT). The smears were highly cellular, and a majority of cells were scattered singly, randomly interspersed between them were multinucleated osteoclast like giant cells containing 10-50 nuclei. The predominant cell type was mononuclear and round to oval, containing a moderate amount of eosinophilic cytoplasm and centrally or eccentrically placed nuclei with evenly dispersed, finely granular chromatin. Many hemosiderin laden macrophages were also present.

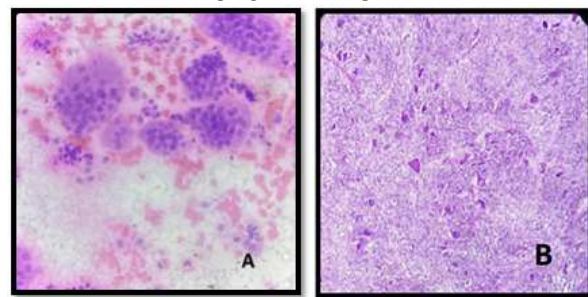


Fig.6 A&B GCTT A) Highly cellular smear show majority of cells were multinucleated osteoclast like giant cells containing 10-50 nuclei along with round to oval mononuclear (H&E Stain, 40X) B) Section studied show multinucleated osteoclast like giant cells and mononuclear cells (H&E Stain, 40X)

Case No.14- A 70-year male patient presented with 2x2 cm gradually increasing swelling over right foot near malleolus. Patient did not give any significant history of trauma. On palpation it was hard, non-mobile and non-tender. On FNAC chalky white material was aspirated. Smears showed amorphous granular calcified material. Finding suggestive of Calcinosi Cutis.

DISCUSSION

Fine needle aspiration cytology (FNAC) is a safe, cost-effective method in the diagnosis of soft tissue nodules. Distal extremities are frequently exposed to trauma, a number of reactive, reparative, and infectious processes may form mass lesions. These are diagnosed as such with a thorough history and physical examination. However, a

number of benign or malignant foot neoplasms may be indistinguishable from non-neoplastic conditions using clinical examination alone because symptoms can be entirely nonspecific. In some literature, preoperative clinical accuracy distinguishing benign or malignant neoplasms is less than 60%. It must be remembered that more than 100 distinct histopathologic tumor types can arise from the skin, soft tissue, and bone over foot and ankle. The efficacy and practicability of FNAC have been demonstrated. Palpable lesions arising from foot are easily accessible to FNAC.^{9,10}

Actinomycosis is an indolent, slowly progressive, suppurative infection caused by gram-positive branching bacteria of the genus *Actinomyces*. The disease actinomycosis most commonly occurs in 3 body regions: cervicofacial (55% of patients), abdominopelvic (20%), and pulmonothoracic (15%). Extremity disease can occur by secondary involvement through direct extension or hematogenous spread. Actinomycosis is a difficult disease to diagnose. A correct diagnosis requires a combination of microbiological, molecular, and pathologic studies. The correct diagnosis of actinomycosis versus actinomycetoma is important because they are sensitive to different antibiotic treatments.^{5,7,8}

Tuberculosis is a major health issue in developing countries. Osteoarticular tuberculosis comprises 1% to 3% of extra pulmonary tuberculosis, among which spine and hip are the most commonly involved. Tuberculosis of the foot by itself is rare. Tuberculosis involves the calcaneum, talus, first metatarsal, navicular, first and second cuneiform bone in decreasing frequency followed by other bones of the foot¹

Schwannoma is a soft tissue tumor that rarely presents in the foot. Schwannoma, also known as neurilemoma, is a benign encapsulated soft tissue tumor classified under the group of peripheral nerve sheath tumors (PNSTs). Schwannomas affect man and woman equally with peak age at diagnosis of 30–40 years, and are usually localized in skin or subcutaneous tissue.^{3,4}

Diagnosis of gouty tophus is difficult in those cases with atypical presentation and in absence of hyperuricemia. FNAC is an easy, minimally invasive and cost-effective procedure for diagnosing Gouty Tophus and is replacing biopsy.⁶

We diagnosed four cases of GCTTS on foot by FNAC. Diagnosis of GCTTS by FNAC is important for accurate preoperative diagnosis and more extensive surgical procedure can be prevented.²

CONCLUSION

Present study focuses on the diagnostic efficacy of FNAC in evaluating foot swellings, presenting a case series that illustrates the role of FNAC in clinical practice. FNAC is a key procedure that allows clinicians to quickly obtain cellular samples from swellings in the foot, enabling the differential diagnosis of various conditions including infections and tumors. The results indicated that FNAC is effective, with positive diagnostic outcomes in identifying various pathologies, and highlights its advantages in being minimally invasive and easily accessible.

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