

Subcutaneous Nematode Mimicking Soft Tissue Neoplasm: A Case Report with Review of Literature

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Abstract

Parasitic infections can involve various organs of the human body; one the most common sites is the gastrointestinal tract. Their identification as isolated organ involvement in the soft tissues is unusual and under diagnosed event. Herein, we report a case of a 15 year old Indian male patient who presented with soft tissue swelling in his right arm. MRI imaging revealed an oval-shaped mass lesion measuring 2 cm in diameter with intense post-contrast enhancement and non-enhancing center. Soft tissue neoplasm was suspected and direct surgical wide excision of the mass was performed. Unexpectedly, histopathologic examination revealed Nematode worms with exuberant tissue response causing this mass lesion.

Parasitic infections should be considered in the differential diagnosis of soft tissue lesions, especially in endemic populations or when there is a history of travel or immigration from an endemic region. If such lesions are misdiagnosed as a neoplastic process, this may lead to unnecessary overtreatment for a disease meant be cured by simple surgical excision and antiparasitic medications.

Keywords: Parasite; Nematode infection; Soft tissue neoplasm

Introduction

Parasitic infestation of the soft tissues with mass formation is unusual and under diagnosed event [1,2]. Clinical history is essential to suspect parasitic diseases. The primary factor that contributes to the risk is exposure history; such as travel or immigration from endemic regions [3]. Socioeconomic and demographic factors, including crowding, nutrition, age, and immune-status are also factors that influence incidence and severity of parasitic infections [4].

We report a case of subcutaneous Nematode infection in the arm that was initially misdiagnosed clinically and radiologically as a soft tissue tumor. These soft tissue infections can pose a diagnostic challenge; they sometimes may not be included in the initial differential diagnosis as they can simulate other conditions such as inflammatory disorders or neoplastic processes, until the worm is confirmed from the mass lesion.

Case presentation

A 15-year-old Indian male presented to the emergency department at Hamad General Hospital with right arm swelling for 3 weeks duration. The swelling was painful and itchy. However, there was no fever, loss of appetite or weight loss. Physical examination revealed a firm tender lump over the lateral aspect of the right arm. The lump was superficial, solid and the overlying skin was intact. No redness or warmth was noted. Further examination showed no other lesion at other sites.

Based on the initial clinical assessment, deep vein thrombosis was suspected. Ultrasound examination of the right arm showed marked subcutaneous fat edema in the lateral posterior compartment of the lower half of the right arm, however, the deep veins were patent with no evidence of thrombosis. Complete blood count was performed which revealed marked eosinophilia. Accordingly, further investigations were performed. IgE level was markedly elevated. Stool analysis for ova and parasites came negative. MRI imaging was performed which revealed an oval-shaped mass lesion at the distal third of the upper arm measuring 2x1.3x1.2 cm with intense post-contrast enhancement and non-enhancing center. The radiological differential diagnosis included nodular fasciitis, peripheral nerve sheath tumor and myxofibrosarcoma.

Based on the radiological and clinical suspicion of soft tissue tumor, direct surgical wide excision of the mass was performed. Histopathologic examination revealed a well-circumscribed lesion in the subcutaneous tissue composed of exuberant inflammatory cell infiltrate comprising lymphocytes, histiocytes and abundant eosinophils with necrotic material. Within the center, parasitic organisms consistent with Nematode Helminthes were identified (Figure 1A). These Nematodes characterized morphologically by the presence of thick outer multilayered cuticle, thick muscular bands, alimentary tract and internal reproductive organs (Figures 1B and 1C). Based on the morphological features, the differential diagnosis for this Nematode worm includes *Dirofilaria* spp. and *Dracunculus* spp.

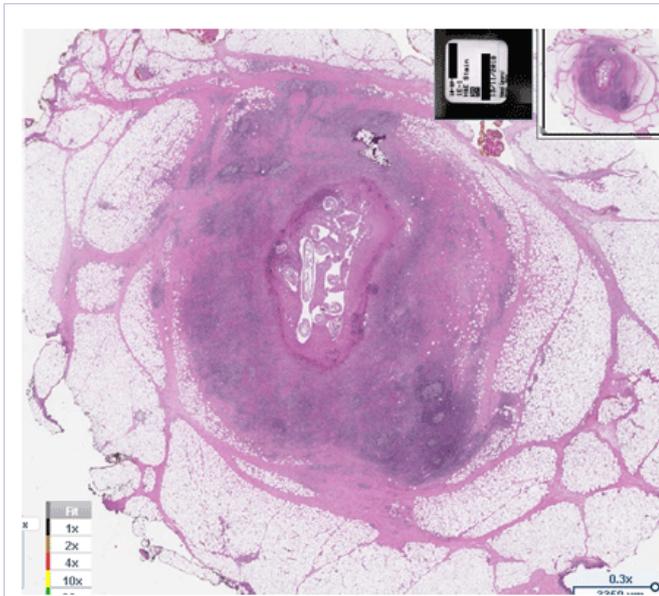


Figure 1A

Figure 1A: Haematoxylin and eosin stain (H&E). Photomicrograph depicting a well-circumscribed mass in the subcutaneous adipose tissue, composed of Nematode Helminthes in the center, surrounded by exuberant inflammatory cell infiltrates

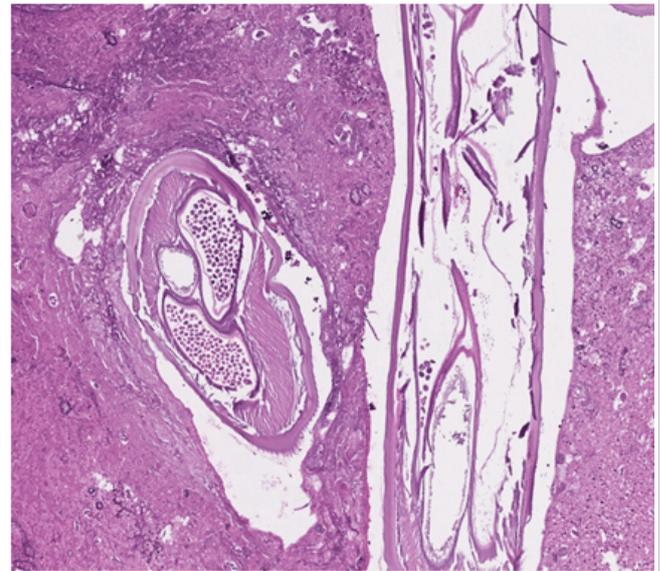


Figure 1B

Figure 1B: H&E stain. On high power, the Nematode is characterized by having thick outer multilayered cuticle, internal reproductive organs and alimentary tract

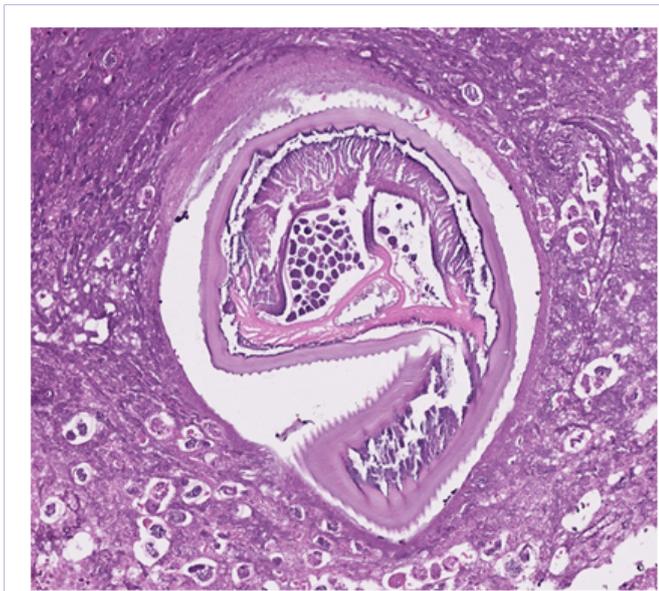


Figure 1C

Figure 1C: H&E stain. On high power, the Nematode is characterized by having thick outer multilayered cuticle, internal reproductive organs and alimentary tract

Discussion

Parasitic infestation of the soft tissues with mass formation is an unusual event [1,2]. A thorough clinical history is essential to suspect parasitic diseases. Immigration from endemic regions increases the risk of these types of infections [3]. Patients with chronic illnesses or with impaired immunity are also at increased

risk for these kinds of infections, who can even develop more virulent forms of the disease [4]. It should be emphasized that climate change has also contributed to the emergence and re-emergence of parasitic diseases. The impending climate change has contributed to alteration of the spread and distribution of Vector-Borne Parasitic diseases, ingested protozoa and soil-transmitted Helminthiasis [5].

These soft tissue lesions can pose a diagnostic challenge for health professionals especially if encountered in non-endemic populations. It is becoming increasingly evident that due to globalization, migration and international travel, infectious diseases can still be encountered in non-endemic populations. These diseases may not be initially included in the differential diagnosis by the clinicians as they can simulate other conditions; such as inflammatory disorders or neoplastic processes. They may only be considered after more common causes of the presentations are ruled out [3,6].

There are some cases reported in the literature of parasitic infection that mimicked clinically a soft tissue tumor. Hwang et al reported a case of young female patient presented with a subcutaneous swelling in the thigh. The mass in that case was clinically misdiagnosed as a soft tissue tumor and total surgical excision was performed. Histopathologic examination revealed parasitic organisms morphologically consistent with *Spirometra mansoni* [7]. Basarir et al also reported five cases of primary muscular hydatidosis that mimicked clinically soft tissue tumor [8].

Our patient presented with a localized swelling at the right arm. Clinically, deep vein thrombosis was initially suspected.

This possibility was excluded by ultrasound examination that revealed patent deep veins. Blood tests revealed marked peripheral eosinophilia. Peripheral eosinophilia can be caused by various conditions mainly including allergic reactions, parasitic infestations and neoplastic disorders. The patient was then investigated accordingly. IgE levels were elevated and stool analysis for ova and parasites came negative. The features were suspicious on MRI imaging and could not rule out more sinister neoplastic diseases such as peripheral nerve sheath tumor or myxofibrosarcoma. Due to the clinical and radiological suspicion, the case has been discussed in the multidisciplinary team (MDT) meeting, where individualized treatment options are tailored to every patient according to the case and the general medical condition. There was an agreement to perform direct surgical wide excision as an initial step in order to identify the nature of the lesion before proceeding for further treatment. Special laboratory investigations and serological testing were not performed, because the patient decided to undergo surgery to clarify the etiology of the mass lesion as parasitic infection was not suspected. The histopathologic identification of Nematode helminthes was very unexpected and unusual finding in the resected specimen.

Nematode worms are among the most ubiquitous organisms on earth. They are round with a body cavity. Its body wall is composed of a cuticle acting to protect the animal from the external environment and a single layer of longitudinal muscle cells allowing it to move back and forth. The digestive system is generally divided into stomodaeum, mesenteron and proctodeum. Male reproductive system is mainly formed of testes and ducts as vas deference, seminal vesicles and ejaculatory ducts. The female reproductive system is double so there are two ovaries, two oviducts and two uteri. The uteri are much larger than either oviducts or ovaries. They are filled with large, shelled "eggs" in various stages of oogenesis and development [9].

On the basis of our experience with this case, we concluded that subcutaneous Nematode infections can mimic soft tissue tumor in terms of clinical manifestations and radiological findings. It is very important to consider it in the differential diagnosis in endemic populations or when there is a history of travel or immigration from endemic regions. If recognized and correctly diagnosed, these infections can be cured by simple surgical excision and anti-parasitic medications.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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