FILARIASIS: A REPORT OF THREE CASES

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Filariasis is endemic worldwide in the tropical areas. It is uncommon in Saudi Arabia, but has been reported from the areas adjoining the Red Sea, particularly from the South-Western region.[1] Conventional diagnostic procedures include the demonstration of microfilaria in the blood smears or in the skin snips. Both of these procedures have high false-negative rates.[2] In surgical material, the diagnosis is relatively easy when viable filarial worm is present.[3] Necrotic and calcified worms may require special stains for identification. Similarly, microfilaria may be missed if you are not aware of the possibility, particularly in cases where tissue eosinophilia is absent. The purpose of this paper was to illustrate these examples and to review the appropriate literature, in order to make physicians aware of this uncommon entity. This is a retrospective study of three cases of filariasis seen during a period of 20 years (1981-2001) in the Riyadh Armed Forces Hospital (RKH).

Case Reports

Case 1

A 68-year-old Saudi female presented with left inguinal hernia, as well as a separate 2.5 cm mass in the left groin. On histology, the specimen labeled as hernial sac showed fibroadipose tissue with a lining of reactive mesothelial cells on the surface. Sections taken from the separate inguinal mass (Figure 1) showed a segment of adult filarial worm along with many free-living microfilaria in the surrounding connective tissue. The adult worm was a gravid female as indicated by a pair of ovaries containing fertilized eggs. A diagnosis of filariasis, compatible with onchocerciasis was made.

Case 2

A 78-year-old Saudi female presented with hard subcutaneous masses, one in the right groin and another in the anterior abdominal wall, measuring 2 cm and 3 cm in diameter, respectively. Both masses required decalcification and showed similar histology. There were coils of dead and calcified gravid female filarial worm with necrotic microfilaria in their body cavities (Figure 2). A diagnosis of filariasis, compatible with onchocerciasis was made.

Case 3

A 32-year-old Saudi male presented with a painful right inguinal mass of 20 days' duration. A 3 cm inguinal lymph node was excised with a provisional clinical diagnosis of tuberculous lymphadenitis. On histology, the lymph node architecture was mostly replaced by extensive proliferation of plasma cells, with a few microabscesses containing neutrophilic exudate. The latter included a few tiny and questionable segments of microfilaria. The diagnosis, however, was missed because of the unexpected absence of tissue eosinophilia. On deeper sections, larger and recognizable segments of microfilaria were seen both within the albuminous exudate (Figure 3), as well as in the solid areas (Figure 4).

Discussion

Filariasis is a parasitic infestation characterized by the presence of microfilaria, an embryonic stage between the eggs and the larvae.[4] These represent free-living uncoiled embryos, which have still not developed the gut, a feature seen in the larvae. Microfilaria may or may not retain the egg shell and are labelled as sheathed or unsheathed, respectively.[4] This feature along with nuclear arrangement, particularly in the tail end, help to distinguish between the different species of filarial worm. Adult filarial worms also show morphological differences in their cuticle and subcuticle,[5] which further helps in the species differentiation.

In a cross-section, an adult filarial worm shows a small intestine along with a much larger single testis in males and two ovaries in females[3] (Figure 1). Adult filarial worms live in lymphatics, lymph nodes, subcutaneous soft tissues and body cavities. The microfilaria are released in the blood or in the dermis from where they are picked up by a blood-sucking mosquito or fly. The microfilaria develop into infective larvae within the intermediate host, which then deposit these larvae on the human skin at the time of another blood meal.[4]

The incidence of filariasis in the surgical material received at the Riyadh Armed Forces Hospital is low (3 cases in 20 years). This is because the service is limited to

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FIGURE 1. Filariasis. Subcutaneous nodule with a cross-section of a gravid female. The coelomic cavity is filled with two ovaries containing many fertilized eggs. Small-sized intestine is seen under the cuticle. The adjacent connective tissue show many microfilaria. (H&E, 400x).

FIGURE 2. Filariasis. Decalcified section of a subcutaneous nodule showing a segment of gravid female containing many microfilaria. (Masson's trichrome, 200x).

FIGURE 3. Filarial lymphadenitis. A long segment of microfilaria is seen within the albuminous exudate. (H&E, 400x).

FIGURE 4. Filarial lymphadenitis. A long segment of microfilaria is seen within the cellular exudate. Note the absence of eosinophils. (H&E, 100x).

the Army personnel and their families, who comparatively enjoy a higher economic standard. The surgical material received at the Ministry of Health Central Laboratory shows a relatively higher incidence because the facility caters for the general public. During a period of 16 years (1964-80), one of the authors(AH) reported on 28 cases of filariasis in Saudi patients. This unpublished data was based on the cumulative index of the tissue diagnoses made during the same period. This included 27 males with an average age 30 years and only one 20-year-old female. The most common sites (n=11) were the male external genitalia, including spermatic cord (5), scrotum (4) and epididymis (2). This was followed by skin and subcutaneous tissue (n=8), lymph nodes (n-=5), peritoneum/retroperitoneum (n:2) and site unknown (n=2). The low incidence of the condition in females is probably related to the social custom of covering the whole body and thus denying vectors their blood meal and thus their ability to infect.

Alive and mobile adult worms and microfilaria do not excite any tissue reaction.[6] Any restriction to their movement excites a variable but generally mild, reaction. Dead and fixed adults and microfilaria excite severe reaction,[7] which may include eosinophilia, eosinophilic abscess, neutrophilic abscess, necrosis and epithelioid cell granuloma.[6] This is usually followed by fibrosis with or without calcification. These tissue reactions in the lymph nodes or around the lymphatics produce lymphedema.[8]

Viable adults in soft tissue are easily recognized by their characteristic morphology.[3] Dead and calcified worms on routine H&E stain may be confused with other calcified lesions, such as pilomatrixoma or dystrophic calcification. Masson's trichrome stain produces a more contrasting appearance,[3] which makes the recognition of adults and microfilaria easy (Figure 2). Despite the morphological differences between the human filarial worms and the zoonotic *Dirofilaria*,[9] it is often difficult to make a specific diagnosis on H&E sections. The presence of gravid female or microfilaria, however, excludes the possibility of zoonotic filarial worms.[10] Zoonosis, however, is a milder and self-limiting infestation characterized by the presence of a single male[11] or nongravid female adult,[9,10] which obviously does not produce the microfilaria.

Filarial lymphadenopathy usually involves the inguinal lymph node, but other locations as well as generalized lymphadenopathy have also been reported.[12] Filarial lymphadenitis is commonly caused by *Wuchereria* and *Brugia* species, which normally reside in the lymphatics and the lymph nodes.[6,8] Occassionally, the microfilaria of other filarial worms normally residing in the soft tissues such as *Onchocerca* species[13] or the body cavities such as *Mansonella streptocerca*[14] can also produce lymphadenitis. In very rare instances, the larvae of the non-filarial worms, such as strongyloides stercoralis can also produce lymphadenitis.[15] In paraffin sections, these larvae resemble microfilaria, except for their slightly larger size and the presence of intestine, a feature often difficult to recognize in H&E stained sections. Filarial lymphadenitis, like other parasitic infestations, is characterized by tissue eosinophilia. In the absence of tissue eosinophilia, however, the filarial nature of the lymphadenitis can easily be missed. Segments of microfilaria are often too small to catch the eye but larger segments can be found (Figure 3,4) if one looks carefully.

In paraffin sections, the microfilaria are often seen in small segments, which does not allow a specific diagnosis. Fine-needle aspiration (FNA) biopsy, on the other hand, commonly includes whole microfilaria,[12] the detailed morphology of which can be studied in the air-dried and Diff-Quick stained smears.[16-18] In addition to the microfilaria, adult males, gravid females and fertilized eggs can also be recognized.[16,18,19] FNA biopsy is, therefore, considered to be a better procedure for the diagnosis of filariasis.[7,19] Monoclonal antibodies against the circulating filarial antigen[2] and molecular biology techniques like ISH, FISH and PCR[20] are now available for a specific diagnosis, without going through the difficult task of morphological differentiation. However, these tests are either experimental or are not available universally, and hence we still have to rely on morphology for the diagnosis.

In conclusion, we would like to remind the reader that indigenous filariasis is present in Saudi Arabia and should be kept in mind when examining subcutaneous nodules or enlarged lymph nodes.

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