SHORT REPORT

Fish tank granuloma—a frequently misdiagnosed infection of the upper limb

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Abstract

Five patients attended the accident and emergency (A&E) department with fish tank granuloma caused by an infection with *Mycobacterium marinum*. All patients had forearm symptoms which were initially misdiagnosed. They were later recognised by the presence of superficial cutaneous lesions in a sporotrichotic distribution. Definitive diagnosis was confirmed by the histological appearances of a biopsy and or culture of the organism. All patients responded to oral minocycline and had uncomplicated recoveries once the diagnosis was established. A&E doctors need to be aware of the possible diagnosis of fish tank granuloma especially when treating forearm infections which have been resistant to antibiotics.

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Hand and forearm cellulitis, with or without associated lymphangitis, commonly presents to accident and emergency (A&E) departments. Many cases may require admission to hospital for treatment with intravenous antibiotics. The source of an infection can usually be located and the causative organisms are often sensitive to penicillin or erythromycin. We report five cases of fish tank granuloma which presented to an A&E department and where the initial diagnosis was incorrect. Suspected diagnoses included cellulitis, trauma, and warts. Commonly the lesions failed to respond to antibiotics. The diagnosis was suspected on further questioning of the patient. It was confirmed by histological examination and responded to treatment with oral minocycline.

Case 1

A 59 year old man was referred to the A&E department by his general practitioner with a lesion on his right index finger. He had injured it on the heating element of a fish tank one month previously. He had lesions tracking up his arm along the line of the cephalic vein. A diagnosis of cellulitis was made. He was treated with oral antibiotics and an iodine dressing. A senior A&E doctor saw him four days later in the review clinic and diagnosed fish tank granuloma. A biopsy

revealed granulomata consistent with fish tank granuloma and he was treated with minocycline 100 mg twice daily. The granulomata were resolving when he was reviewed in the dermatology out patients clinic eight weeks later.

Case 2

A 55 year old man presented with an ulcerating lesion on the dorsum of his right hand with redness tracking up his arm. He had been treated with antibiotics by his general practitioner but the lesion had not resolved. A diagnosis of cellulitis was made and he was admitted to the A&E observation ward for intravenous antibiotics. He was reviewed the next morning by a senior A&E doctor who diagnosed fish tank granuloma. On direct questioning he admitted having put his hand in a fish tank two weeks previously. A biopsy failed to show granulomata; however, culture of the lesions revealed mycobacteria. He was treated with minocycline and the lesions had responded well when he was seen three months later.

Case 3

A 71 year old woman presented to the A&E department with a three week history of a lesion on her right index finger. There had been no improvement following a course of antibiotics. She had an inflamed lesion on the index finger with redness on the dorsum of her hand. She was diagnosed as having cellulitis and treated with erythromycin, as she was allergic to penicillin. At review four days later she was felt to have improved and was discharged. She subsequently developed a soft tissue swelling on the dorsum of the right hand in association with nodules and an apparent paronychia of the index finger. She was referred to an orthopaedic surgeon who treated her with erythromycin. Three months later she had failed to improve and was seen by a dermatologist. The lesions were recognised as fish tank granulomata and a biopsy showed granulomatous changes consistent with the diagnosis. Further questioning revealed that she frequently cleaned out her husband's tropical fish tank. She was treated with minocycline and the lesions resolved.

Case 4

A 42 year old man presented to the A&E department with a fractured scaphoid. The

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Figure 1 Classical appearance of fish tank granuloma.

A&E doctor commented on “odd wart like swellings on the hands and arms.” He was treated with a plaster cast. At follow up he expressed concern about cutaneous lesions extending from the dorsum of his right middle finger to the upper arm. He was referred to a dermatologist for an opinion. The dermatologist diagnosed fish tank granuloma. Further questioning revealed that he kept tropical fish. He had cleaned out the tank around the time of onset of the lesions. A biopsy showed changes consistent with fish tank granuloma. The lesions were treated with minocycline and had disappeared at follow up three months later.

Case 5

A 59 year old man presented with a four day history of swelling and redness over the dorsum of his right hand (fig 1). He was treated with penicillin and advised to return for review. Four days later there had been a reduction in his symptoms and he was discharged. He returned after two weeks with an unrelated problem. Four distinct lesions were noted over the dorsum of his hand by the examining doctor. Fish tank granuloma was suspected. He admitted to having cleaned out his tropical fish tank without gloves during the previous month. A skin biopsy confirmed the classical granulomatous histology consistent with fish tank granuloma. He was prescribed minocycline and was followed up in the dermatology outpatients department.

Discussion

Fish tank granuloma is an uncommon infection of the upper limbs seen most often among keepers of tropical fish aquariums and fish tanks, although it has also been described in swimming pool lifeguards.¹ It typically occurs in middle aged people,² although it has also been described in patients with immunocompromised states.^{3,4} There are usually no systemic symptoms and the patient remains afebrile. It is most commonly acquired following exposure of an abrasion or cut on a hand to the causative organism *Mycobacterium marinum*. Appearances often follow a typical linear nodular or “sporotrichotic” appearance with red skin nodules that may be discrete, with normal skin between them.⁵ Similar lesions may be found with cat scratch fever, primary tuberculosis, and leishmaniasis. Lesions may also appear elsewhere including the thorax, legs, and face.⁶ Lymphatic and local spread is commonly seen.

It is not uncommon for the diagnosis to be delayed. Diagnosis can be suspected by a detailed history and recognition of a typical clinical pattern. It can be confirmed by biopsy and histological examination of a nodule, which shows typical granulomatous changes. Acid fast bacilli may be seen on histology. Culture of tissue from a lesion may also grow the mycobacteria on Lowenstein's medium.⁷

Complications can include involvement of the tenosynovium and deep structures such as the carpal tunnel, septic arthritis, and osteomyelitis.⁸⁻¹⁰ Simple incision and drainage may aggravate the symptoms, although extensive debridement may be required where deeper structures are involved.¹¹

Chemotherapy alone is often adequate but usually requires a few months of continuous antibiotics. Effective treatments include oral minocycline, ethambutol and rifampicin, co-trimoxazole, or on occasions formal debridement.^{12,13} One study showed ethambutol and rifampicin to be more effective than minocycline, although not significantly so.¹⁴ Poor prognostic factors include pain, a discharging sinus, and previous local injection with steroids.¹⁵

In conclusion, unusual infections of the dominant hand in middle aged people who present to the A&E department may well be due to *Mycobacterium marinum*, particularly where there is a history of contact with tropical fish. Failure to suspect and diagnose the infection may result in significant soft tissue and bony complications. Treatment with appropriate antibiotics will usually be adequate but more formal debridement may be required where the diagnosis has been delayed.

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