

### Zoonoses Presenting as Head and Neck Swellings

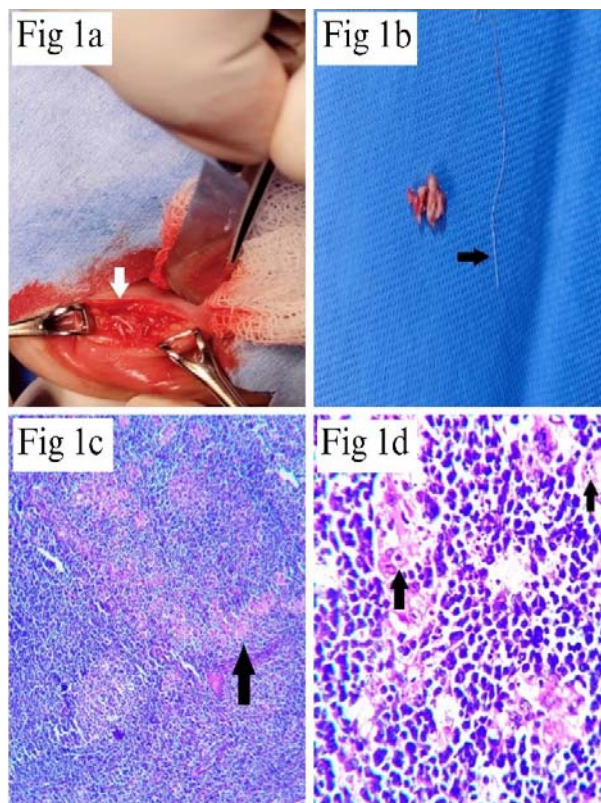
With a rising exposure to increased populations of stray dogs and cats in human proximity, there has been an increase in incidence of zoonotic illnesses. Young children have a higher risk of contracting zoonotic infections as they often put their hands and other items in the mouths of pet or stray animals and may not always wash their hands well or often. Here, we illustrate two children who presented with facial swelling wherein an underlying zoonotic disease was established.

A two-year-old-boy presented with a gradually increasing painless swelling of the left cheek of 10 month-duration. The swelling was initially grape-sized and gradually increased to the size of a cherry. There was no associated fever, decreased opening of the mouth, pain or bleeding inside the mouth, or halitosis. The overlying skin had some redness over the initial 1 week, for which a course of oral antibiotics was prescribed by a local practitioner. However, the swelling continued to increase in size. Local examination revealed smooth, non-tender, cystic swelling about 3 x 2 cm in size. The swelling was palpable through buccal mucosa. Systemic examination did not reveal any organomegaly, lymphadenopathy or any other swelling. Differential diagnosis considered were infected cysts, abscesses, lipomas, granulomas, mucocele, epidermoid cyst and benign or malignant tumors. Complete blood picture was suggestive of eosinophilia (hemoglobin 11.2 g/dL, total leukocyte count 10,200/ $\mu$ L, absolute eosinophil count 800/ $\mu$ L, platelet count 204 x 10<sup>3</sup>/ $\mu$ L). Ultrasonography showed well-defined cystic lesion with internal serpiginous parallel hyperechoic lines suggestive of moving worms (filarial dance) surrounded by hypoechoic area of coiled up worms. A repeat history revealed exposure of the child to stray dogs.

Surgical excision of the swelling in buccal pad of fat revealed moving long slender round worms within the swelling (**Fig. 1a, b**). Histopathological examination showed fibrofatty tissue with granulation, fibroblastic proliferation, mixed inflammatory cell infiltration with predominant eosinophils. Cut section of the worm revealed thick multi-layered cuticle with longitudinal ridges and prominent musculature and lateral cords. Parasites like hookworm, whipworm, tapeworm, elephantiasis, lymphatic filariasis and toxocarids were excluded by morphological features of the worm. The site of lesion and the typical morphology of the worms seen on cut-section

corroborated the diagnosis of *Dirofilaria*. Associated eosinophilic predominance in blood and affected tissue due to allergic reactions required no further treatment after excision.

The second case was a six-year-old-boy who presented with a submental swelling for one year and a history of recurrent fever, one or two episodes every month, each lasting for about one week. The child had received multiple antibiotic courses, but the swelling continued to increase in size although without any associated pain, redness or weight loss. There was no difficulty in breathing or deglutition. There was history of regular playing in soil with pet cats. Examination revealed firm 3 x 3 cm, non-tender cystic swelling in the submental area, without any lymphadenopathy or organomegaly. Ultrasonography showed submental adenitis with cystic changes and loss of echogenic hilum, suggestive of inflammatory/granulomatous disease. Complete blood counts were unremarkable (hemoglobin 12.9 g/dL, total leukocyte count 9.15 x 10<sup>3</sup>/ $\mu$ L and platelet count 329 x 10<sup>3</sup>/ $\mu$ L). An infectious etiology, possibly bacterial or protozoal, was suspected and the child was started on a course of antibiotics for a week but the swelling remained unchanged. Excision biopsy showed two lymph nodes, deep to platysma. Histopathological examination showed hyperplastic lymphoid follicles, focal collection of small epithelioid cells mimicking micro-granulomas, lymphocytoid cells extending to pericapsular soft tissue, proliferated histiocytes, and toxoplasma cyst (**Fig. 1c, 1d**). There were no inclusions seen within histiocytes or well-formed granulomas. Periodic acid-Schiff, Gomori methenamine silver and acid-fast bacilli stains were negative. Tuberculosis-CBNAAT and culture from the aspirate from the swelling done were also negative. Definite tachyzoites of *Toxoplasma gondii* were not seen. Serology for toxoplasmosis revealed elevated IgG (228 IU/mL) and IgM (35 IU/mL) and a diagnosis of toxoplasmosis was established. Presence of chorioretinitis was ruled out by ophthalmological examination. In the absence of relevant symptoms and due to financial constraints, imaging of the brain and chest were not performed. The child was treated with spiramycin and folinic acid for 1 month-duration following which fever subsided, appetite improved and the child felt a sense of well-being. Parents were counselled regarding the risk factors and methods of prevention of toxoplasmosis.



**Fig. 1a** Buccal swelling: White arrow showing dirofilarial worms. **1b.** Excised cyst: Black arrow showing long slender dirofilarial worm. **1c.** Lymph node biopsy (H & E Stain, Magnification 100X): Black arrow showing Epithelioid microgranuloma within germinal centre. **1d.** Microgranuloma within germinal centre (H & E Stain, Magnification 400X): Black arrow showing probable toxoplasma cyst.

Zoonotic illnesses can have myriad presentations including flu-like illnesses, gastrointestinal symptoms, ocular involvement and skin lesions including scratches, bite marks, ulcers or subcutaneous swellings. Zoonotic diseases which present with subcutaneous swellings include cutaneous larva migrans, blastomycosis and sparganosis [1].

Dirofilariasis also called “dog heartworm” is one such zoonosis which may present with subcutaneous swelling. It is caused by filarial worms which develops inside dog’s heart as infective larva. Microfilaria from reservoirs- dogs, cats, foxes etc are transmitted to humans by the bite of *Anopheles*, *Aedes*, and *Culex* mosquitos [2]. Humans are accidental dead-end hosts with no person-to-person transmission. It manifests as human subcutaneous dirofilariasis (HSD), ocular or pulmonary dirofilariasis. In India, *D. repens* is common which manifest as HSD involving face, eyes, upper chest and at areas of mosquito bites [3]. High mosquito density, warm climate, human

outdoor activities, close contact with dogs and abundance of microfilaremia among stray dogs are risk factors. Surgical excision is both diagnostic and therapeutic. Anti-helminthics are not given as human *Dirofilaria* is reproductively inactive, usually involves a single site with no microfilaremia.

*Toxoplasma gondii* is an intracellular protozoon, infecting almost one-third of world’s population [4]. It can infect and replicate virtually within any nucleated vertebrate cell. Life cycle is divided into asexual phase in nucleated cells and sexual phase within gastrointestinal tract of cats, the definitive host. Excreted oocysts from cat’s small intestine can last in the environment for 18 months. In the immunocompetent, primary infection is usually asymptomatic and only 10% develop isolated cervical/occipital lymphadenopathy lasting for four-to-six weeks. Unlike immunocompromised hosts and congenital infections, immunocompetent rarely develop myocarditis, polymyositis, pneumonitis, hepatitis, chorioretinitis and encephalitis. Diagnosis is made by PCR, hybridization, isolation, histology and serological methods like Sabin-Feldman dye test, immune fluorescent assay and ELISA IgG, IgM antibodies and IgG avidity tests and characteristic histopathology of lymph nodes [4]. In our case, history, histology and serology aided in diagnosis. For immunocompromised individuals or with persistent symptoms, it is advised to undergo treatment with pyrimethamine-sulfadiazine and folinic acid for a duration of 1 to 4 months. Alternatively, spiramycin and trimethoprim-sulfamethoxazole may be considered [5].

Children presenting with unexplained fever and subcutaneous swelling should be evaluated for zoonotic diseases. Blood eosinophilia, serological tests and high-resolution ultrasonograms are useful diagnostic aids. The necessity of controlling stray dogs and cats, and mosquito population, is underscored as preventive strategies.

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