



A CASE SERIES OF TISSUE PARASITEMIA IN HISTOPATHOLOGY: TERTIARY CARE HOSPITAL OF WESTERN INDIA

Pathology

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ABSTRACT

Background: Parasitic infestations are common across all age groups and contribute significantly to morbidity in society. Developing countries are more prone to both intestinal and extra-intestinal parasitic diseases. Many parasitic infestations, such as lymphatic filariasis, malaria, ascariasis, cysticercosis, and echinococcosis, fall under the category of neglected tropical diseases (NTDs), likely due to a lack of attention from the public health community. **Aim:** To study the impact of parasitic diseases on human health, including their prevalence, morbidity, and mortality. **Methods:** A retrospective descriptive study was conducted using data collected over eight years, from January 2017 to March 2025, from the histopathology section. All cases diagnosed as parasitic infestations were included. **Results:** A total of 11 cases of parasitic infestation were diagnosed. The most commonly affected age group was 21–30 years (27.27%). The most frequent clinical presentation was abdominal pain, and the most common intestinal parasite identified in this study was *Enterobius vermicularis*. **Conclusion:** Careful histopathological examination to identify tissue parasitic infestations can aid in the better management of patients and help reduce associated morbidity and mortality.

KEYWORDS

Parasitic infestations, Histopathological examination, *Enterobius vermicularis*.

INTRODUCTION

Parasitic infestations are very common in every age group and are responsible for significant morbidity in society [1, 2]. Developing countries are more prone to intestinal and extra-intestinal parasitic diseases [12]. The frequency and incidence of parasites also vary with age, sex, and geography [13]. These infections are responsible for high levels of morbidity and mortality due to the increased prevalence of immunocompromised states, nutritional deficiencies, chronic diarrhea, and impaired physical development in children [14, 15]. Many parasitic infestations like lymphatic filariasis, malaria, ascariasis, cysticercosis, and echinococcosis, among others, fall under the neglected tropical diseases (NTDs) probably due to a lack of attention from the public health community [16]. They affect around one billion people, which is one-sixth of the world's population, largely in rural areas of low socio-economic countries. This results in the loss of ability to attend school or work, retardation of growth, and impairment of cognitive skills and development in young children [16]. Cysticercosis, a leading cause of muscle parasitic infestation, is the larval stage of *Taenia solium*. It can affect any age group and commonly involves organs such as the brain and eye, or it can also present as a subcutaneous nodule in tissue or muscle [5, 7]. The tissue damage caused by the parasite can be either due to physical pressure or toxic secretory products, which may lead to hypersensitivity reactions. The tissue response produced by these parasites on histopathology provides a clue in the search for parasites and confirms the diagnosis. Eosinophilic infiltration, abscess formation, and granulomatous reaction are the most common tissue responses encountered due to parasites. In the case of dead or calcified parasites, no tissue response is identified [17, 18]. Relevant clinical information and histomorphological features in the tissue section would help to identify a particular organism.

METHODOLOGY:

A retrospective descriptive study was conducted using data collected from the Histopathology Section, Department of Pathology, GMERS Medical College & Hospital, Gotri - a tertiary care center in Vadodara, Gujarat - from January 2017 to March 2025. A total of 11 cases were included in the study, with patients' ages ranging from 1 to 70 years. All cases of parasitic infestation diagnosed on tissue sections in histopathology were included. Cases positive for parasitic infestations detected through bone marrow aspiration, fine needle aspiration, fluid cytology, exfoliative cytology smears, and peripheral blood smears were excluded. Tissues received in the histopathology section were grossed, processed, and paraffin-embedded tissue blocks were prepared. The sections were then cut and stained using Hematoxylin and Eosin (H&E) stain.

RESULTS

In the present study, 11 cases of parasitic infestation diagnosed on tissue sections via histopathology were included. The affected age group ranged from 1 to 70 years, with the highest number of cases reported in the 21–30-year age group. The study showed that parasitic infections were more common in males (54.54%) compared to females (45.45%).

The most common symptom was abdominal pain (36.36%), followed by vomiting and acute abdominal pain (9.09%), submandibular swelling (9.09%), arm swelling (9.09%), subcutaneous swelling (9.09%), and inguinal swelling (9.09%). (Table-1)

The most common site of parasitic infestation was the gastrointestinal tract (GIT) (27.27%), followed by muscles (18.18%), liver (9.09%), skin and soft tissues (9.09%), pelvis (9.09%), and salivary glands (9.09%).

Enterobius vermicularis was the most commonly identified parasite (36.36%), followed by *Echinococcus* (27.27%), Cutaneous Larva Migrants (18.18%), and Cysticercosis and suspected microfilaria (9.09% each). (Table-1)

Three cases of *Echinococcus* were diagnosed from the liver, pelvis, and salivary gland. Four cases of *Enterobius vermicularis* were diagnosed from the GIT. Two cases of Cutaneous Larva Migrants were diagnosed from the muscles and skin/soft tissue. One case of Cysticercosis was diagnosed from the muscle.

The Cysticercosis case presented as a right arm swelling. Histopathological findings revealed a parasite with irregularly shaped membranous folds and ciliated scolices, accompanied by marked chronic inflammatory infiltrates. (Fig. 4 & 5) (Table-1)

The four *Enterobius vermicularis* cases presented as acute appendicitis and were diagnosed in the appendix. Of these, two cases were male and one was female. All patients were under 25 years of age, ranging from 9 to 23 years. In one case, the appendix lumen was obliterated; in the remaining three, the lumen was patent. Histopathological findings showed the characteristic alae of *Enterobius vermicularis* with two cuticular crests, partially eroded appendicular mucosa, and infiltration by inflammatory cells. (Fig. 1, 2 & 3) (Table-1)

The three *Echinococcus* cases were diagnosed from the liver, pelvis, and salivary gland. One patient presented with right-sided neck

swelling for five years. Histopathological findings revealed multiple cysts lined by an acellular laminated layer, with the germinal layer showing Echinococcus protoscolices embedded in thick material. The cysts were surrounded by diffuse inflammatory infiltrates and multinucleated giant cells. (Fig. 6, 7 & 8) (Table-1)

Of the two Cutaneous Larva Migrans cases, one presented as left lower abdominal swelling, initially provisionally diagnosed as a lipoma. The second case presented with swelling over the right arm. Histopathological examination showed inflammatory infiltrates and foreign body-type giant cell formation. The left lower abdominal swelling revealed parasitic eggs and a larval form, while the arm swelling showed a larval form with inflammation. (Fig.9 & 10) (Table-1)

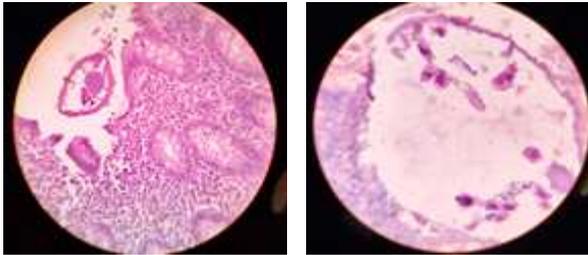


Fig.:1

Fig.:2

Figure 1: Cuticle and alae of Enterobius vermicularis in appendicular lumen (10 X, H&E stain)

Figure 2: Enterobius vermicularis eggs in appendicular lumen(40 X, H&E stain)

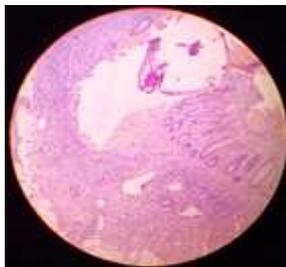


Figure 3: Enterobius vermicularis in appendicular lumen(10 X, H&E stain)

TABLE – 1

Table 1: Patients Demographics, Clinical Presentation, and Histopathological Findings

Histopathology Diagnosis	Age/ Sex	Site	Clinical Diagnosis
Enterobius Vermicularis	46/ Male	Appendix	Abdominal Pain
Enterobius Vermicularis	9/Male	Appendix	? Acute small bowel obstruction
Enterobius Vermicularis	23/Fe male	Appendix	Acute Appendicitis
Enterobius Vermicularis	17/ Male	Appendix	Abdominal Pain
Hydatid Cyst	16/ Female	Pelvis	Intraperitoneal Hydatid Cyst
Hydatid Cyst	30/Fe male	Liver	? Liver abscess
Hydatid Cyst (Echinococcus Infection)	65/Fe male	Right submandibular gland	Swelling a right side of neck
Cutaneous Larva Migrans	30/ Male	Right arm swelling	Swelling over right arm
Cutaneous Larva Migrans	58/ Male	Left Anterior abdominal	Left lower abdominal lipoma
Cysticercosis	33/ Female	Right arm swelling	Swelling over right arm
Microfilaria	52/ Male	Right inguinal lymph node	Right inguinal lymph adenopathy

DISCUSSION:

Parasites are very common in developing countries and are responsible for significant morbidity, particularly if left undiagnosed. Their detection in histopathology through microscopic examination of tissue is cost-effective, reliable, and definitive [3]. Parasites can be identified in various pathological samples, including peripheral blood smears, histopathology specimens, and cytology smears. Therefore, all samples in histopathology and cytopathology should be carefully screened for the presence of parasites, as they are often diagnosed incidentally alongside malignancies or infections. In histopathology, parasitic infections typically exhibit marked inflammatory infiltrates predominantly composed of eosinophils and/or macrophages, epithelioid cells, lymphoid cells, granulomatous inflammation, or giant cell formation. Deeper tissue sections may reveal the complete morphology of the parasite. The main disease-causing parasites in humans include Protozoa, Helminths, and Ectoparasites [4]. Protozoa are unicellular organisms and include Entamoeba, Giardia, Leishmania, Plasmodium, etc. Helminths are multicellular organisms, such as trematodes and cestodes (e.g.Echinococcus granulosus, Ascaris lumbricoides).

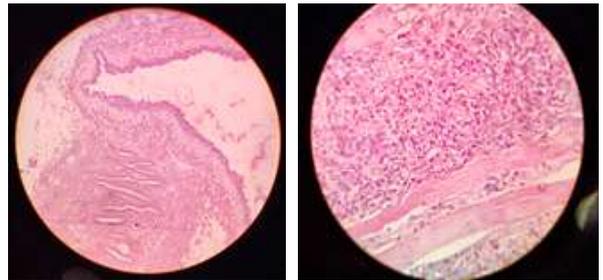


Fig.4

Fig.5

Figure 4: Intramuscular Cysticercosis (10X, H&E stain) & **Fig. 5:** Cysticercosis shows intense mixed inflammatory infiltrate mainly lymphocytes and eosinophils (40 X, H&E stain)

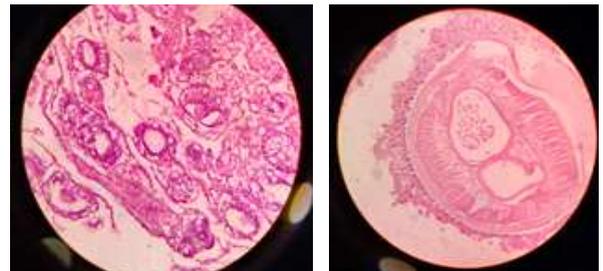


Fig.6

Fig.7

Figure 6: Hydatid cyst laminated membrane (10 X, H&E stain) **Figure 7:** Hydatid cyst protoscolices (10x, H&E stain)

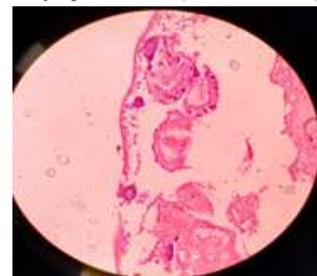


Figure 8: Hydatid cyst protoscolices (40x , H&E stain)



Fig.9

Fig.10

Figure 9, 10: Cutaneous larva migrans shows intense mixed inflammatory infiltrate mainly lymphocytes and eosinophils (10 X, & 40X, H&E stain)

examinations remain the most reliable methods for diagnosing cysticercosis. Fine-needle aspiration cytology (FNAC), when combined with ultrasonography (USG-guided FNAC), increases diagnostic sensitivity, and histopathological examination confirms the diagnosis^[1,5]. This aligns with findings from studies by Adhikari et al., Handa et al., and Kodiatte et al.^[1,5,6]. In our study, we identified a case of cysticercosis presenting as right arm swelling. Similarly, Ghimire et al. and Handa et al. also reported the upper limb as a common site for cysticercosis^[1,7]. However, Kodiatte et al. found the head and neck region to be the most common site. Another parasite, *Enterobius vermicularis* (pinworm or threadworm), is transmitted through the fecal-oral route. The adult worm attaches to the intestinal mucosa via its anterior end. It commonly presents as pruritus ani, and the cellophane tape test is used for diagnosis. Occasionally, it can also be found in extraintestinal sites^[8,9]. In our study, we found four cases of *Enterobius vermicularis* presenting as acute appendicitis, diagnosed from the appendix.

Hamdona et al. and Akbulut et al. reported *Enterobius vermicularis* in approximately 15% and 28.4% of appendicitis cases, respectively^[8,9]. *Echinococcus granulosus* can affect almost any part of the body, though the liver is the most frequently involved organ, followed by the lungs^[10,11]. In our study, three cases of *Echinococcus* infection were diagnosed in the liver, pelvis, and salivary gland. One of these cases presented as a right-sided neck swelling of 5 years' duration and was diagnosed as a hydatid cyst, which is extremely rare at that location. The smear showed hooklets, scolices, and fragments of laminated membranes. Bothak et al. also reported a case of a hydatid cyst in the thigh via FNAC^[10], while Kim et al. reported one case from the liver^[11].

LIMITATIONS:

Findings may not be generalizable to other centers or populations, data may be limited by existing records, small sample sizes may affect statistical power and accuracy and diagnostic methods or techniques may have limitations or variability.

CONCLUSION:

Parasitic infestation is a very serious problem in a society. Our study highlights the importance of parasitic infections in tertiary care settings, emphasizing the need for early diagnosis and treatment and also to improve diagnostic methods and treatment strategies, ultimately reducing the burden of parasitic diseases on public health.

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