

## Original Research Article

# Parasites found in surgical pathology: the institutional experience

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### ABSTRACT

**Background:** Parasitic infestation has a worldwide prevalence and it affects almost all age groups and both the sexes. The incidence of these infections is slowly rising in today's era. Parasites are mainly found in stool samples but due to increase in a immunocompromised state now a days, tissue parasitaemia has increased globally necessitating more such type of studies. Parasite found in surgical pathology either incidentally or in clinically suspicious cases not only improves morbidity but also saves clinician's time and patient's money.

**Methods:** A retrospective-cross sectional study is done based on histomorphological and cytomorphological evaluation of 25 cases diagnosed at The Department of pathology, New Civil Hospital Surat from January 2015 to January 2017.

**Results:** Most common parasite seen was Echinococcus presenting as hydatid cyst in liver followed by filariasis. Most common age group affected was 0-20 years of age. Most common intestinal parasite found in our study was Entamoeba histolytica. Patients presented with variety of symptoms.

**Conclusions:** Distribution of parasite in tissue section in relation to frequency, age, sex, various system involvements and its correlation with clinical symptoms are analyzed in our study.

**Keywords:** Amoeba, Appendix, Cysticercosis, Hydatid cyst, Parasite, Surgical pathology

### INTRODUCTION

Parasitic infections are a major public health problem worldwide with one quarter of world's population is suffering from it.<sup>1</sup> The developing countries are more prone to intestinal and extra-intestinal parasitic diseases.<sup>2</sup> The frequency and incidence of parasites also varies with age, sex and geography.<sup>3</sup> These infections are responsible for high levels of morbidity and mortality due to increased prevalence of immunocompromised states, nutritional deficiencies, chronic diarrhea and impaired physical development in children.<sup>4,5</sup> Specific tissue reaction i.e. eosinophilic infiltration, xanthogranulomatous reaction and foreign body granuloma provide clue to look actively for them in tissue section other than incidental diagnosis. Sometimes, there is even no tissue reaction as in a case of dead/calcified parasite. The incidence of these infections is slowly

raising hence active search for them in tissue sections and FNA smears in correlation with clinical history is yielding.<sup>6</sup>

### METHODS

Surgical pathology laboratory, Department of pathology, New Civil Hospital Surat being a tertiary care center in south Gujarat region, we receive large no. of samples from all the clinical departments. We conducted retrospective secondary data analysis of the cases we received during 3 years duration. (January 2015 to January 2017) Out of thousands of tissue samples. We have reported 25 parasites in surgical pathology during these years. We conducted detailed study of these cases and arrived to specific derivations that we have plotted in result section. After receiving of samples at histopathology section tissue processing is done which is

followed by proper staining and mounting of the slides. In routine stains we did HE/PAP/Giemsa stains and also went for some ancillary techniques like special stains and culture in special cases to reach to the diagnosis. After reviewing all the reported cases as different parasites, we performed multistep analysis of details of the patients like age, sex, locality, socio-economic status, nutritional status, past history, drug history, immune status and so on from the records available and results we found out from these were really yielding and helping in the fields of diagnostics, patient management and social welfare.

**Inclusion criteria**

- Parasitic infections diagnosed histopathologically in tissue sections
- Parasitic infections diagnosed cytomorphologically in fine needle aspiration smears.

**Exclusion criteria**

- Parasitic infestation diagnosed in brush and exfoliative cytology smears.
- Smears from fluid cytology.
- Autopsy cases.

**RESULTS**

Analysis of 3 years data from histopathology section and Cytopathology section was done.

As shown in Table 1 out of total 11432 samples in histopathology, 23 cases and 10005 samples in cytopathology 2 cases of parasites were reported. Prevalence of parasites in Histopathology and Fine needle aspiration cytology was less than 0.5%. Prevalence was variable in different years. Maximum no of parasitic infestation were seen in 2016(42.8%) which decreased in 2017(19%).

**Table 1: Parasitic prevalence in tissue section.**

	No. of specimen	Parasite
Histopathology	11432	23
Cytopathology	10005	02

Table 2 dictates most common age group affected by parasitic infestation which was 0-20 years however; we can notice in table that the distribution touched almost all the age groups including toddlers and geriatric population. There was no particular sex predisposition in affected individuals.

**Table 2: Age groups affected by parasite.**

Age group	No.	%
0-20 years	11	46.2
21-40 years	05	21.2
41-60 years	05	17.4
61-80 years	04	15.2
Total	25	100%

As per Table 3, patients presented with varying symptoms i.e. liver cyst, flank pain, chronic diarrhea, nausea, vomiting, weight loss, anemia, pruritus, soft tissue swelling etc. Clinical diagnosis of hydatid cyst was there in majority of the cases of hydatid cyst but some other parasites like amoeba and ascariasis presented with non-specific symptoms like nausea, vomiting, flank pain.

**Table 3: Clinical presentation.**

Symptoms	No of cases
Clinical diagnosis of Hydatid Cyst	09
Right flank pain, nausea, vomiting	05
Skin and soft tissue swelling	04
Chest pain and cough	02
Intramuscular swelling	01

**Table 4: System wise distribution of various parasites.**

Parasite	No. (%)	Liver and biliary tract	GIT	Skin and soft tissue	LN and Spleen	Respiratory	Pancreas	Muscular system	GUT
Echinococcus	12(48%)	08	00	00	01	02	01	00	00
Filaria	05(20%)	00	00	03	02	00	00	00	00
Amoeba	03(12%)	00	03	00	00	00	00	00	00
Enterobius Vermicularis	02(8%)	00	02	00	00	00	00	00	00
Cysticercosis	01(4%)	00	00	00	00	00	00	01	00
Cutaneous Leishmania	01(4%)	00	00	01	00	00	00	00	00
Ascariasis Lumbricoides	01(4%)	00	00	00	00	00	00	00	01
Total	25(100%)	08(32%)	5(20%)	4(16.6%)	3(12.5%)	2(8.3%)	1(4.1%)	01(4.1%)	1(4.1%)

Table 4 highlights frequency based distribution of parasites amongst various systems. Most common parasite was Echinococcus followed by Filariasis and most commonly involved system was Liver and biliary tract. Hydatid cyst was most commonly encountered in Liver. Unusual presentations of hydatid cyst i.e. hydatid cyst in lung, pancreases and spleen were also noted. All cases of *E. vermicularis* were found in appendicectomy specimens operated for acute appendicitis without prior clinical or radiological suspicion of parasite. Entamoeba histolytica were reported in ileum and appendix in tissue section where stool examinations of same patient were negative. One case of Cystecercosis affecting gluteal muscle was reported where patient presented with gluteal mass. One case of Cutaneous Leishmaniasis with history and clinical evidence of visceral Leishmaniasis in the past was reported in HIV positive patient.

## DISCUSSION

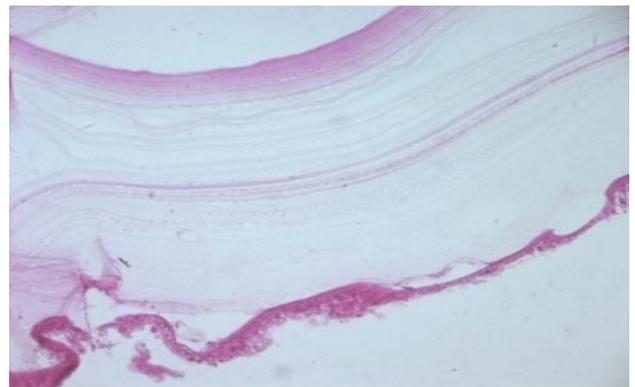
Many studies have been conducted stating prevalence of parasites in stool samples in various regions of India. However very few similar researches have been conducted which state presence of different parasites in tissue section. We conducted 3 years retrospective data analysis for prevalence of parasite in histopathology and cytopathology which was less than 0.5 percent. Most common parasite in our study was hydatid cyst followed by Filariasis. Most common parasite in study of A Manoharan et al was Filariasis, cystecercosis and hydatid cyst where in study of Gochhat, Pranab Dey et al, was cysticercosis followed by hydatid cyst.<sup>6,7</sup> This difference is due to geographical variation in distribution of parasite, life habits and climate changes. Our city is located in South Gujarat belt of India which is a coastal area having humid climate, moderate to heavy rain and few areas of slum having poor sanitation, overcrowding and low level of living. Besides more no. of migrant population, increase HIV patients in our area and other immunocompromised states have led to occurrence of uncommon parasites. Though mosquito control programs are ongoing effectively, complete control is yet to be achieved especially in periphery leading to still higher no. of filarial cases. Clinical presentation in cases of hydatid cyst matches with histopathological findings in majority cases in our study. Study of A. Manoharan has also proved the same.<sup>6</sup>

Most common location involved is liver however we encountered 2 cases of hydatid cyst in lungs, 1 case each in spleen and pancreas. Parasite tends to affect multiple systems during their course of life. Clinical symptoms are mostly nonspecific in these lesions and correlates with symptomology of affected system only. Many times symptoms are non-diagnostic and these parasites are encountered incidentally. Echinococcosis or hydatid cyst (Figure 1-3) is a zoonotic helminth caused by tapeworm of the genus Echinococcus. Dogs and some wild carnivores like foxes are definitive hosts. Most commonly children while playing with pets get affected

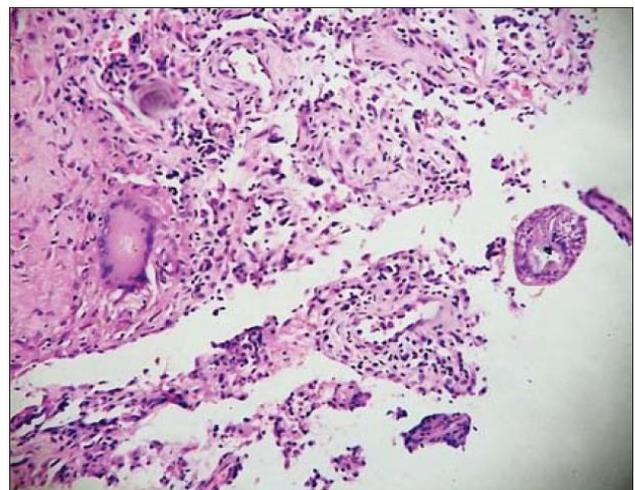
by their larvae in feces or through direct contact. In man it mainly affects the liver and the lung. The tissue response results from multiple host parasite relationships such as mononuclear cell infiltration, fibrosis, necrosis and areas of calcification.<sup>8</sup>



**Figure 1: Hydatid cyst(gross).**

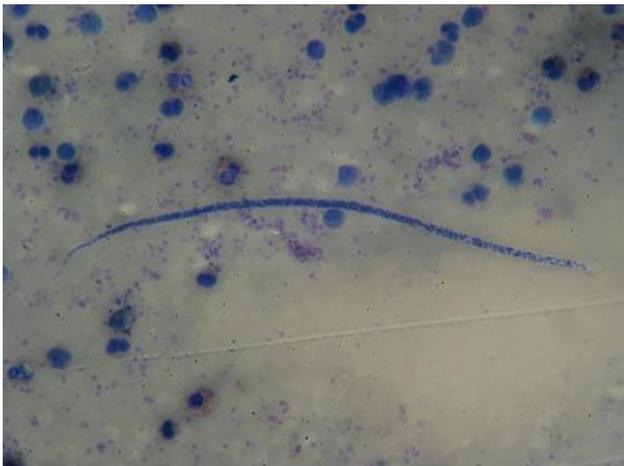


**Figure 2: Microscopy of hydatid cyst-laminated membrane.**



**Figure 3: Microscopy of hydatid cyst-protoscolices.**

Filariasis affecting genitourinary region is common as seen in study of A Manoharan.<sup>6</sup> But in our study we have found 3 cases presenting as soft tissue swelling and 2 cases in lymphnode. Filariasis often occurs in endemic areas, especially in tropical countries around the world. The agriculture sector is mainly found in lowland and swampy areas surrounded by forests, agricultural areas, beaches, plantations and rehabilitant areas. Two species of worms most often associated with this disease are wucheria bancrofti and Brugia malayi. The larval form of parasite transmits the disease by the bite of tiger mosquito. Detection of filarial parasite in blood smear and Buffy coat is relatively easy but detection of parasite in tissue section i.e. lymph node, lung, soft tissue swelling etc. require cautious eye where microfilaria or larval form or both can be seen (Figure 4).<sup>9</sup> Finding of *E. Vermicular* is being most common parasite found in appendix specimen (Figure 4) operated for acute appendicitis matches with the study of Aydin et al and Da Silva et al.<sup>10,11</sup> Parasitic diseases caused by helminths, or worms, account for billions of human infections worldwide. Notably, many helminthic diseases present with specific and nonspecific signs and symptoms like abdominal pain, chronic diarrhea, anemia, cough, allergy, dermatologic signs and symptoms including skin nodules, cysts, migratory skin lesions, and pruritus etc.<sup>4,5</sup>

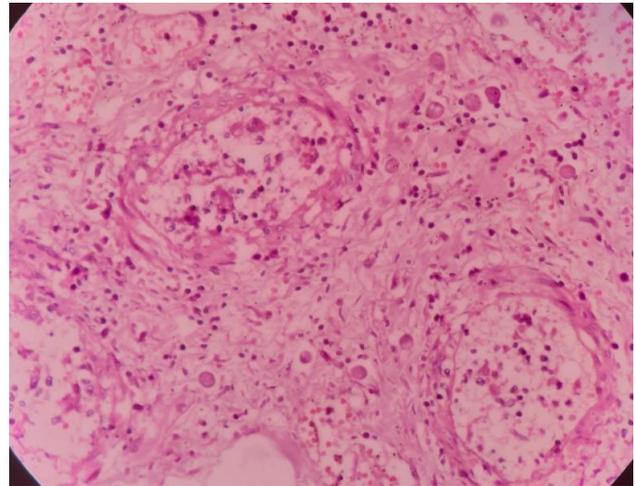


**Figure 4: Microfilaria in FNAC of gluteal mass.**

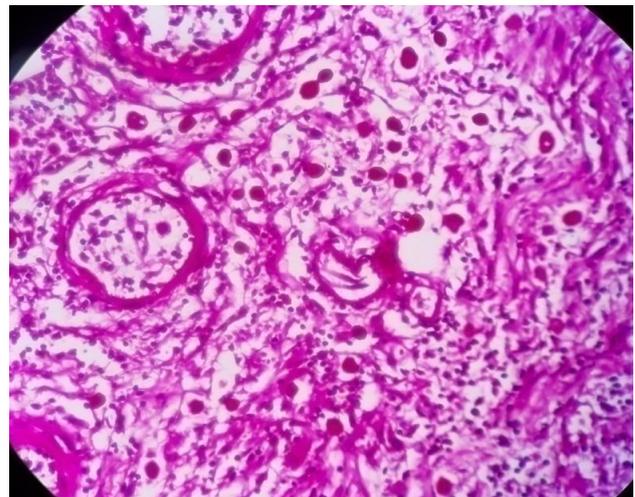
In few cases of appendicitis, appendectomy and unnecessary surgery can be avoided if pre-operative diagnosis of luminal parasite can be made because clinical management of these infections is different from that for classical appendicitis.<sup>10,11</sup> Appendectomies with Taenia showed acute inflammation, while acute inflammation was absent in the ones with Enterobius Vermicularis (Figure 7).<sup>10</sup>

In many studies parasites detected in stool sample showed maximum cases of Entamoeba histolytica and G. Lambia. Their mean age of presentation here is 20-30years.<sup>12-14</sup> Study of Patel M conducted on stool samples in same institute few years back state common age group affected was <10 years.<sup>15</sup> Common age group affected in present study is also

0-20 years which indicates that younger population are affected more in our region. Poor sanitation, overcrowding and nutritional deficiencies explain this result. Amoebiasis is caused by the protozoan parasite Entamoeba histolytica. The ulcer is flask-shaped with the broad base composed of fibrin and cellular debris. A sharp line divides the necrotic and viable mucosa (this feature is due to the lytic action of the trophozoites). Trophozoites are found on the surface of the ulcers, in the exudates and in the crater (Figure 5, 6).<sup>6,7</sup>

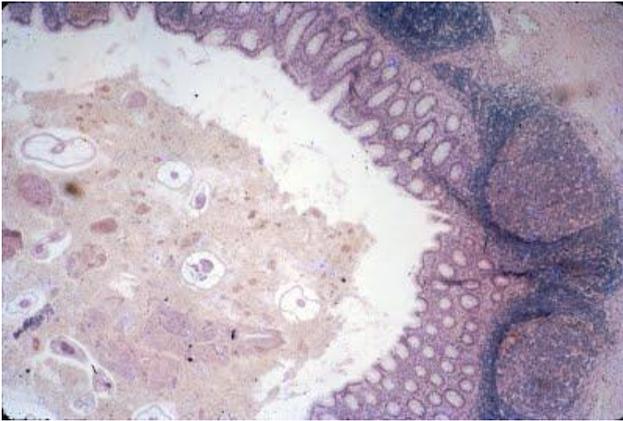


**Figure 5: Intestinal amoebiasis.**

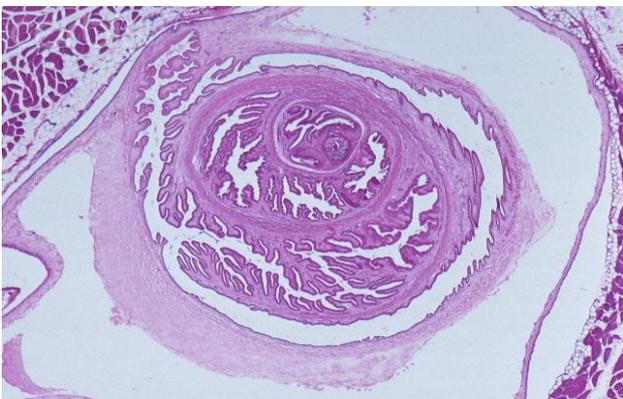


**Figure 6: PAS stain highlighting amoeba.**

One case of intramuscular cysticercosis was diagnosed from arm swelling in our study. Human cysticercosis is a parasitic infestation caused by *Cysticercus cellulosae*, the larvae of the pork tape worm, *Taenia solium*. It occurs due to food contamination. The common sites of occurrence of cysticercus are skeletal muscle, subcutaneous tissues, brain and eye but can occur in lung, brain, heart, muscle and salivary gland (Figure 5). It produces tissue responses such as inflammatory infiltrate and xanthogranulomatous reaction. (Figure 8) Further, early intervention by anthelmintic drugs eliminates the risk of neurocysticercosis.<sup>6</sup>



**Figure 7: E. Vermicularis in appendix.**



**Figure 8: Intramuscular cysticercosis.**

In our study, one migrant patient from Bihar presented to skin departments with complaint of multiple non-healing plaques on leg. Skin wedge biopsy was received, and we doubted about cutaneous leishmaniasis. We advised clinician to inquire in detail about past clinical history of patient and later case turned out to be a known case of visceral leishmaniasis. Though splenic aspirate and biopsy remain gold standard for diagnosis of visceral Leishmaniasis, it is associated with highest risk of hemorrhage and splenic rupture. PCR testing of skin lesion specimens currently provides the most sensitive method for diagnosis of cutaneous Leishmaniasis (CL), a disease highly endemic in Latin America, and South East Asia. Sensitivity can be variable and dependent upon the infectious agent load and its dispersion in the lesion.<sup>16</sup>

Thus, the diagnosis of parasites is not restricted to examining stool samples but the responsibility remains on the shoulder of surgical pathologist, too. Basic tissue stains like H and E and other special stains like PAS allow us to identify the parasite as well as host response.<sup>17,18</sup>

## CONCLUSION

Increasing change in Life habits, overuse of antibiotics and immunocompromised states are major concerns in

today's time, calling for cautious eye to look for parasitemia in tissue sections. As there is no vaccine treatment for such lesions, active search followed by systemic medications can lead to significant decrease in morbidity and mortality, hospital burden and monetary burden on the patients, too.

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