Incidental Findings of Different Tissue Parasites - A Tertiary Care Centre Study in Konkan Region

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Abstract

Background: One fourth of the world's population could be carrying parasitic infections affecting all age groups and both gender. In era of molecular diagnostics, histopathology is still gold standard in diagnostic pathology. It helps to determine associated pathological responses, further consequences of parasitic infections and mapping of treatment plans.

Aim: To determine the role of histopathology in diagnosis of parasitic infections, their importance in human health and diseases and the associated tissue changes occurred during different parasitic infections.

Materials and methods: Retrospective and prospective 5 years study from April 2019 to April 2024 with data collected from archives of Histopathology department. It involves analysis of all parasitic infections diagnosed on Histopathology and correlated with clinical presentation.

Results: Out of these 20 cases 6 (30%) cases were of appendiceal Enterobius vermicularis common in younger age group, 3 (15%) Hydatid cyst, 2 (10%) Scabies, 2 (10%) Amoebic colitis and 1 (5%) case each of Dirofilariasis, Onchocerciasis, Ascariasis, Cysticercosis, Guinea worm infection, Cutaneous Leishmaniasis and Strongyloides stercoralis.

Conclusion: Histopathology plays important role in detecting parasites and to assess area of tissue damage. In present scenario as most of cases are incidental findings, thus it is helpful to physician for treating patients.

Keywords: Histopathology, parasites, incidental findings.

Introduction

In the era of molecular diagnostics, histopathology is still a gold standard in diagnostic pathology[1]. In parasitic infections histopathological examination not only helps in identification of morphology of parasites but also helps to determine associated tissue responses and consequences of infections and to map the treatment[1]. It gives us knowledge about interactions between pathogens and host[2]. The parasitic infections are prevalent worldwide affecting one fourth of the world's population including India. It affects both male and female of all age groups[3,4]. Environmental, social and economic factors affects prevalence of different parasitic illnesses[5]. Parasites are group of eukaryotic organisms. They are living organisms and are classified as endoparasite and ectoparasite. Endoparasites live inside the host and causes severe damage to host. Ex.-roundworms, tapeworms. Ectoparasite live on the surface of host and causes less damage to the host. Eg- mite, tick [6]. Entamoeba histolytica is the most common cosmopolitan gastrointestinal parasite [4]. The parasitic diseases has complex pathogenesis. Primarily parasites cause damage to the tissue by secreting toxins that may leads to hypersensitivity reactions and also cause physical or mechanical trauma as they travel through tissue[3,6]. Increase in the number of immunocompromised conditions, chronic diarrhea, malnutrition and altered development in children has increased morbidity and mortality in infected patient [3]. Present study tells us the importance of histopathology in human parasitic manifestations by promptly detecting various parasites in various tissues and their tissue responses [1,6].

Aims and Objectives

To determine the role of histopathology in diagnosis of parasitic infections, their importance in human health

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and diseases and the associated tissue changes occurred during different parasitic infections.

Methods

This is a retrospective study done in tertiary hospital in Konkan region over the period of 5 years from April 2019 to April 2024. Total 20 cases were studied. All diagnosed cases of parasitic infestation were included whereas hemoparasites like malaria and microfilaria were excluded from the study. The details of histopathologically diagnosed parasitic infestations were retrieved from archives. Histopathological diagnosis was done on formalin fixed and Hematoxylin and Eosin stained slides. Data was mainly based on age, sex, site, complaints of patient, clinical diagnosis and microscopic findings.

Results

Out of these 20 cases 6 (30%) cases were of appendiceal Enterobius vermicularis which is common in younger age group, 3 (15%) Hydatid cyst, 2 (10%) Scabies, 2 (10%) Amoebic colitis and 1 (5%) case each of Dirofilariasis, Onchocerciasis, Ascariasis, Cysticercosis, Guinea worm infection, Cutaneous Leishmaniasis and Strongyloides stercoralis. 8 cases were from age group <30 yrs, 7 cases from 30 to 60yrs and 5 cases were of >60yrs. There is equal distribution of cases in both gender. Among these only 3 cases (Scabies, Strongyloides stercoralis and calcified Guinea worm) were clinically diagnosed. Rest 17 cases were incidental findings on histopathological examination.

Table 1: Clinical presentation of parasitic infestations diagnosed on histopathology in the present study.

Sr. No.	Histopathological Diagnosis	Age	Sex	Site	Clinical Diagnosis
1.	E.vermicularis	49 yrs	F	Appendix	Perforation peritonitis
2.	E.vermicularis	16 yrs	F	Appendix	Chronic Appendicitis
3.	E.vermicularis	7 yrs	F	Appendix	Chronic Appendicitis
4.	E.vermicularis	14 yrs	F	Appendix	Chronic Appendicitis
5.	E.vermicularis	25 yrs	M	Appendix	Acute Appendicitis
6.	E.vermicularis	20 yrs	F	Appendix	Acute Appendicitis
7.	Subcutaneous Dirofilariais	37 yrs	F	Forearm	Swelling over forearm
8.	Onchocerciasis	27 yrs	M	Base of testies	Nodule over scrotum
9.	Amoebic colitis	76 yrs	F	Periappendicular region	Abdominal pain
10.	Amoebic colitis	61 yrs	M	Rectosigmoid colon	CA. sigmoid colon
11.	Cutaneous leishmaniasis	52 yrs	M	Skin over chin	Lepra reaction
12.	Hydatid cyst	60 yrs	M	Liver	Cholangiocarcinoma
13.	Hydatid cyst	50 yrs	M	Lung	RTA PM case
14.	Hydatid cyst	43 yrs	M	Liver	Abdominal pain
15.	Ascariasis	45 yrs	M	Small intestine	Abdominal pain
16.	Cysticercosis	22 yrs	M	Lumbar region	Swelling over left lumbar region
17.	Strongyloides stercoralis	61 yrs	F	Ascending colon	Worm infestation
18.	Scabies	25 yrs	M	Skin over forearm	Scabies
19.	Scabies	54 yrs	F	Skin over breast	IDC breast
20.	Calcified Guinea worm	75 yrs	F	Left iliac crest	Guinea worm infestation

Case reports

- **Dirofilariasis**

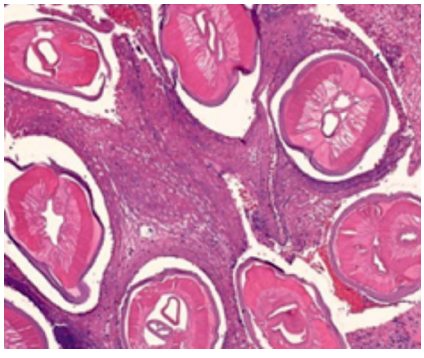


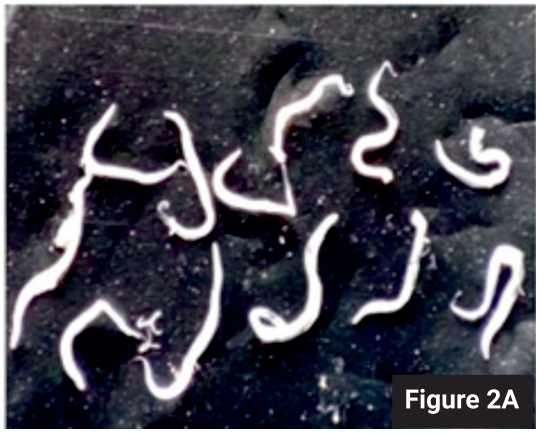
Fig.1 Cross sections of Dirofilaria worms. HE (400X)

Thirty Seven years (37 yrs) old female, presented with multiple swellings over left arm, elbow, forearm with pain since 1 month. Microscopy shows cross sections of worms with outer multilayered cuticle and well developed inner muscular layer surrounded by fibrosis with heavy eosinophilic infiltrate. A pseudocoel cavity and male genital tubule containing spermatocytes were seen (Fig.1).

It was an incidental finding. These are rare Infection caused by Dirofilaria repens. Patients usually present with inflammatory subcutaneous masses may or may not be associated with pain and increased eosinophil count. Human is accidental host in lifecycle of parasite. Adult Dirofilaria are located in subcutaneous tissues

of natural hosts like dogs, cats, etc. Sometimes, it may be associated with a deep- seated infection like pulmonary, where early and correct diagnosis plays very significant role in preventing major complications[7].

• **Enterobius vermicularis**



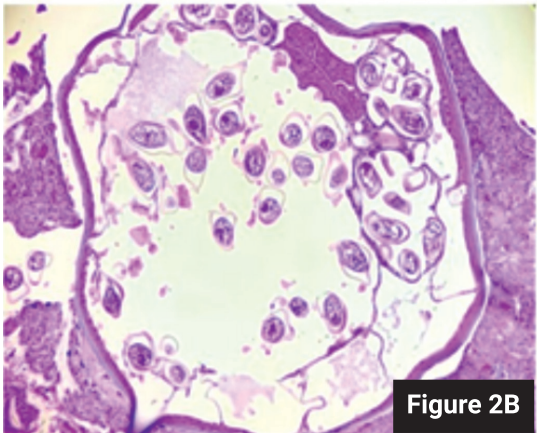


Figure 2: A. Gross pictures of threadworms, B. Cross sections of E.vermicularis. HE (400X)

Forty nine years (49 yrs) female admitted with complaint of pain in abdomen. Grossly appendix appeared normal and lumen contained several worms (Fig 2A). Microscopically lumen shows Enterobius vermicularis with chronic inflammatory infiltration of lymphocytes and eosinophils in the wall (Fig 2B). Prevalent in India and several European countries as Peru, and Thailand. Children are affected commonly. It is the most common gastrointestinal parasite and is endemic in temperate climate[4]. Abdominal pain is secondary to appendiceal lumen obstruction with increase in intraluminal pressure[6]. It further causes mucosal damage leading to bacterial invasion, inflammation, sepsis and at last necrosis and perforation[6].

• **Cysticercosis**

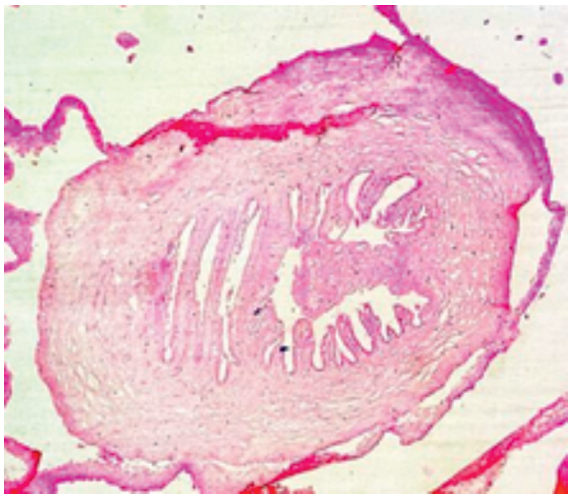


Figure 3: Larval form of Taenia solium. HE (40X)

Twenty two years (22 yrs) old male presented with swelling in left lumbar region. A single piece of muscle with tiny cystic lesion was identified. Microscopy revealed cystic cavity within the muscle containing larval form of Taenia solium. Surrounding tissue showed suppurative granulomatous inflammation (fig 3). Worldwide 50 - 100 million people are infected. India, China, Central and South America, Africa and Eastern Europe are the endemic areas. Human cysticercosis is caused by larvae of the pork tape worm, Taenia solium (Cysticercus cellulosae) [7]. Commonly food contamination leads to parasite infection [3,7]. The common sites of occurrence are skeletal muscle, subcutaneous tissues, brain and eyes. Tissue-host interaction produces tissue responses like xanthogranulomatous reaction [6].

• **Ascariasis**

Ascaris Lumbricoides were accidentally recovered from small intestine resected for gangrene in 45 yrs male. It is the largest human helminth[7]. Microscopical examination of intestine showed mucosal ulceration, submucosal oedema, eosinophilic infiltration, fibrosis, and patchy gangrenous necrotic changes. Worldwide 1.2 billion people are infected and is highly endemic in tropical and subtropical areas[8].Transmission of parasite occurs through the ingestion of embryonated eggs by feco-oral route[8]. Hallmark of helminth infections is eosinophilia both in blood and tissue, especially with tissue-invasive stages[6]. Poverty, inadequate sewage disposal, poor sanitation, and poor personal hygiene are responsible factors for infection[8].

• **Strongyloides stercoralis**

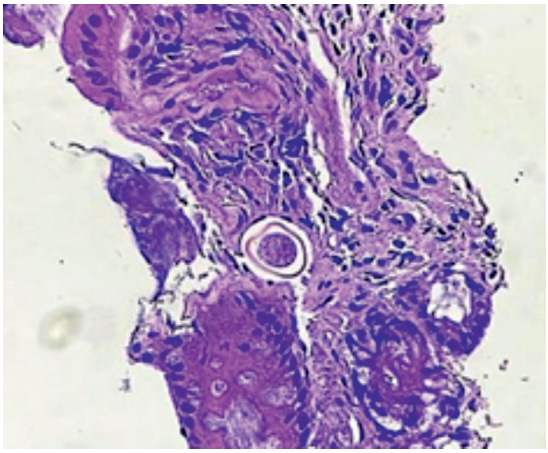


Figure 4: Eggs of Strongyloides stercoralis. HE (40X)

Sixty one years (61 yrs) old female presented with abdominal pain, pruritis and weight loss. Colon showed eggs containing worms with epithelial erosion, ulceration and moderate lymphoplasmacytic and eosinophilic infiltration of lamina propria (figure 4). Worldwide approximately 75 million people are infected with Strongyloidosis[9]. Most commonly seen in humid regions with poor hygienic conditions.

• **Cutaneous leishmaniasis**

Fifty two years (52 yrs) old male had nodular erythematous lesion over chin since 2 months. He gave history of travelling to Bihar and was treated for leprosy. Microscopy revealed thinned out epidermis. Dermis showed nodular lymphoplasmacytic, macrophages and polymorphs infiltrate eparated by fibrous

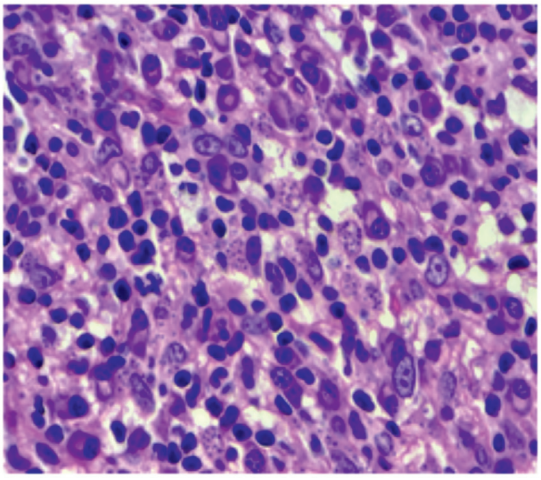


Figure 5: Intracellular amastigotes of leishmania. HE (400X)

Septae. Scattered macrophages showed intracellular amastigotes of leishmania (inlet) (fig 5). Leishmaniasis is a chronic zoonotic protozoan infection with sandflies as a most common vector[10]. Ninety percent cases are observed in Middle East and South America; and few are seen in India, North Africa and Central Asia.

• **Scabies**

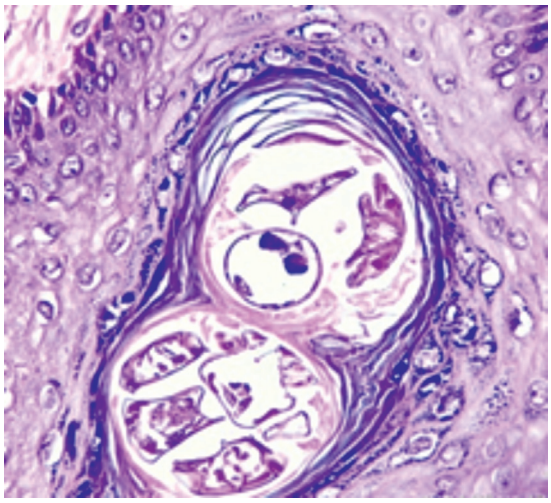


Figure 6: Egg shells of mite. HE(40X)

Two cases of scabies were observed. First case was of 54 yrs female presented with breast lump which was microscopically diagnosed as infiltrating breast carcinoma. Incidentally, cracks in nipple areola showed scattered eggs shells of mite in keratin layer (Fig.6). Second case was 25 yrs male with skin itching was clinically diagnosed as scabies and microscopically showed cross sections of mite. It is caused by tiny mites (Sarcoptes scabiei var. hominis) and is commonest dermatological condition. According to World Health Organization scabies is neglected tropical disease as more than 200 million people are still affected by scabies worldwide. Global prevalence of scabies ranged from 0.2% to 71.4% [11]. It is contagious and spreads through skin to skin contact causing intense itching and rash. It can lead to skin sores and serious complications like septicemia, heart disease and kidney problems.

• **Hydatid cyst**

First case of Hydatid cyst of lung was an accidental finding in an autopsy of 50 yrs male. Second case was a 60yrs male presented with pain abdomen and clinically diagnosed as cholangiocarcinoma and lobectomy of left lobe of liver was done. Microscopy revealed cyst wall with outer acellular membrane, germinal membrane & Protoscolices. Protoscolices were ovoid & contain hooklets & sucker. Dog tapeworm Echinococcus granulosus is a zoonotic helminth causes

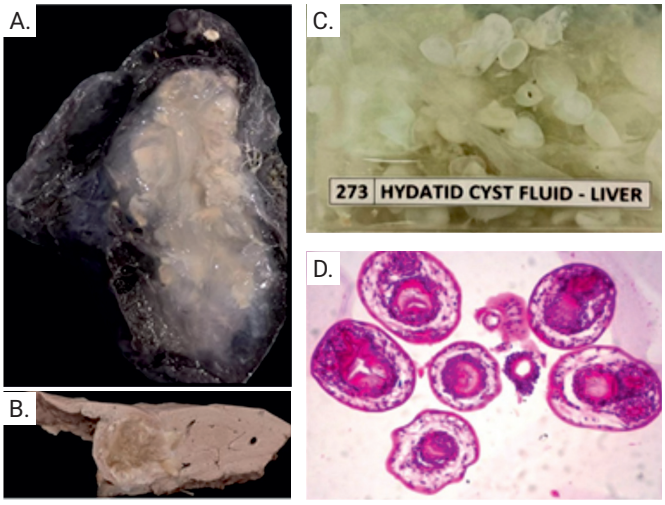


Figure 7: Gross - A. Lung B. Lobe of liver C. Hydatid cyst fluid. Microscopy - D. Scoliosis HE (400X)

Echinococcosis (Hydatid cyst)[3]. Annual incidence is 1–200 per 100000 worldwide. Humans are incidental intermediate hosts and are "dead-end" for parasite[6]. The commonest route of transmission is feco-oral route[3]. After ingesting Echinococcal eggs, they penetrate the intestinal mucosa, migrate to portal circulation and then transfer to the liver, lung and other organs, where it forms fluid-filled cyst[3]. In humans it mainly occurs in liver and lungs but also affects eye, bones, genitourinary tract, brain, spleen and heart[6].

- **Onchocerciasis**

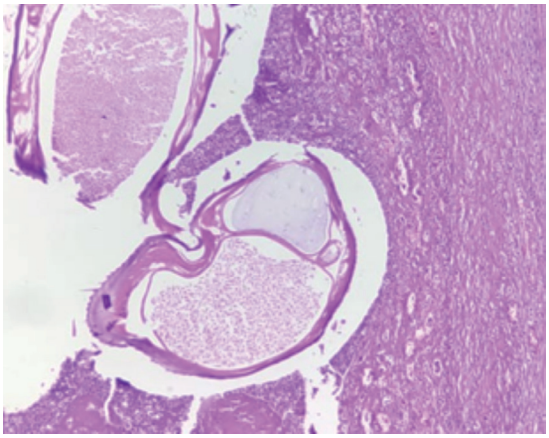


Figure 8: Transverse section of microfilariae.HE(40X)

Twenty Seven years (27 yrs) male presented with hard nodule at base of left testis m.2x2.5 cm. On cut section central granular material was noted. Microscopy showed fibrocollagenous tissue and transversely cut adult female worms surrounded by dense eosinophilic and lymphoplasmacytic infiltrate. The parasite has thick cuticles, thick muscle layer and double barrel uterus filled with numerous microfilariae (Fig.8). Onchocerciasis is caused by filarial nematode (Onchocerea volvulus) through bite of a blackfly. The adult worms are seen in nodules in subcutaneous connective tissue of infected persons. Humans are only definitive host. Day-biting female black flies are Intermediate host. It is the 2nd major cause of blindness in the world.

- **Amoebic colitis**

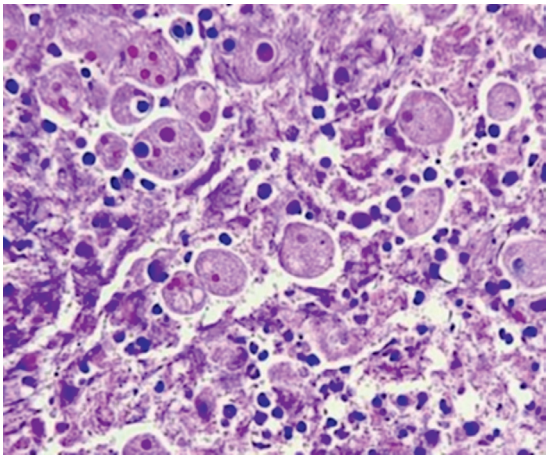


Figure 9: Trophozoites of amoeba showing erythrophagocytosis. HE (400X)

A biopsy was received from ulceroproliferative growth in sigmoid colon of 76 yrs male with clinical suspicion of malignancy. Microscopy showed normal colonic mucosa and necrotic tissue with no evidence of malignancy however necrotic tissue showed trophozoites of amoeba showing erythrophagocytosis (Fig 9). Entamoeba histolytica is a pathogenic protozoan responsible for amoebic colitis. It is the 2nd most leading cause of death from parasitic infections worldwide. Clinical symptoms are cramping abdominal pain, watery bloody diarrhea, weight loss, fever and anemia. Complications are toxic megacolon, perianal ulceration and colonic perforation. Infection begins with ingestion of mature, quadrinucleated cysts found in contaminated food or water.

- **Calcified Guinea worm**

Seventy five years (75 yrs) female complaining of swelling over left iliac crest. On microscopic examination dermis and deeper tissue shows irregular calcified focus. Adjacent fibrocollagenous tissue shows focal and diffuse lymphoplasmacytic cell infiltration with scattered giant cells. Dracunculus medinensis guinea worm is causative agent for guinea worm disease[12]. Every year millions of people in the Middle East, India, and Africa are affected with Dracunculosis.

Similar study on parasitic infestation has been conducted by Inbasekaran P. et al in tertiary care centre in Salem, Tamil Nadu. In their 3 yrs study they have found 3 cases were of hydatid cyst, two cases of cysticercosis, 4 cases of Enterobius vermicularis.

Summary

Incidentally diagnosed parasitic infestations are more common. Maximum number of cases were of E. vermicularis, which is one of the commonest intestinal nematode in our country. Each parasite has their different route of entry, habitat, life cycle and clinical presentation.

Conclusion

Histopathological examination is gold standard for diagnosis of various diseases including infectious conditions. It plays important role in detecting parasites and to assess the area of tissue damage. Various clinical manifestations can be seen in Parasitic infections. Increased immunodeficient conditions, antibiotic tolerance, change in life style and malnutrition are major causes which make it important to look for parasites meticulously in tissue.

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