



Research Article

DETAILED MICROSCOPIC STUDY OF THE MORPHOLOGY OF THE DIGESTIVE TRACT OF THE FEMALE WHIPWORM OR FEMALE TRICHURIS TRICHIURA

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ABSTRACT

Objective: To do detailed microscopic study of the morphology of the digestive tract of the female whipworm. **Methods:** All patients who had undergone colonoscopy for a period of 5 years from November 2009 to October 2014 were examined for the presence of parasitic worms. **Results:** Out of these patients, parasitic worm was found in only one patient. But the stool examination of the patient was negative for ova or eggs. The parasitic worm found in this patient was identified as whipworm or trichuris trichiura by its characteristic whip like shape. **Conclusion:** Hence colonoscopy is a very useful investigation to diagnose whipworm infection especially when the stool examination is negative for its ova or eggs.

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INTRODUCTION

There has been reports of finding whipworm in the large intestine of human beings while doing colonoscopy in many parts of the world. (1 to 15). Usually whipworm (trichuris trichiura) infection is diagnosed by finding its ova or eggs in stool examination (1,8,12,13,15). But the patient who had whipworm in our study had negative stool examination for ova or eggs. Hence colonoscopy is a very useful investigation to diagnose whipworm infection especially when the stool examination is negative for its ova or eggs.

MATERIALS AND METHODS

This study was conducted in the department of general surgery, Aarupadai Veedu Medical College and Hospital, Puducherry. All patients who had undergone colonoscopy for a period of 5 years from November 2009 to October 2014 were examined for the presence of parasitic worms.

RESULTS

Out of these patients, parasitic worm was found in only one patient. The parasitic worm found in this patient was identified as whipworm or trichuris trichiura by its characteristic whip like shape.

DISCUSSION

Usually only the ova or eggs or rarely the larva of the adult parasitic worms are studied in detail by stool examination. A detailed microscopic study of morphology of adult parasitic worms in the gastrointestinal tract causing disease is only

possible by retrieving these adult parasitic worms while doing gastroduodenoscopy and colonoscopy. The parasitic worm found in this patient was retrieved out using biopsy forceps and immediately sent for microbiological examination to do detailed microscopic study of the morphology of the parasitic worm.

1. The parasitic worm found in this patient has a narrow anterior end and broader posterior end and hence gives it a "whip-like" appearance. Hence the parasitic worm found in this patient was identified as whipworm or trichuris trichiura.
2. The tail of the male whipworm is coiled.
3. The tail of the parasitic worm retrieved out using biopsy forceps is straight without any coil.

So the parasitic worm found in this patient was identified as female whipworm or female trichuris trichiura .

Detailed microscopic study of the morphology of the digestive tract of the female whipworm or female trichuris trichiura

1. a. Whipworms are relatively large (30-50mm).
b. Whipworms have a narrow anterior end (Fig 1) and broader posterior end(Fig5, 6).
2. a. At the anterior (head) end there is a mouth (Fig 1).
b. Whipworm occur in the large intestine of human beings where they embed their anterior end beneath the mucosal surface and feed on cells in the lamina propria.

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3. a. The mouth opens into the characteristic pharynx (Fig 1).
b. The pharynx is comprised of a nerve ring (Fig 1).
4. a. The pharynx lacks stichocytes (Fig1). The pharynx continues into the esophagus (stichosome) (Fig 1).
b. **Stichosome** (from Greek *stichos* (= row); *soma* = body) is a multicellular organ that is very prominent in whipworm and consists of a longitudinal series of 40-200 glandular unicellular cells (stichocytes) (Fig 1 to 4) arranged in a row along the esophagus that form the posterior esophageal glands(Fig 3). Stichosome has both secretory and absorptive functions.
5. a. **Stichocytes** are arranged along the posterior portion of the esophagus (Fig 3), in a row each of which communicates by a single pore with the lumen of the esophagus.
b. They contain mitochondria, rough endoplasmic reticulum, abundant Golgi apparatuses, and usually 1 of 2 types of secretory granules, α -granules and β -granules, indicating secretory function. They open into the esophageal lumen and stichocytes apparently function as secretory glands and as a storage organ.
6. a. Collectively stichocytes form the stichosome (Fig 1 to 4).
b. Stichocytes - are single column of secretory cells (Fig 1 to 4).
7. a. Stichocytes secrete material that aid in digestion and that modulate the host reaction to the parasite.
b. The entire esophagus is referred to as the stichosome (Fig 3).
8. a. The esophagus of whipworm is long and narrow.
b. The esophagus (stichosome) opens into the intestine (Fig 4).
9. a. The intestine (Fig 4 to 6) itself is a straight tube formed of a single layer of cells.
b. The rectum (Fig 6) connects the terminal portion of the intestine (Fig 6) to the anus (Fig 6) in females.
10. a. The anus is located near the tip of the tail in females (Fig 6).
b. The females deposit eggs into the intestinal lumen and so they pass out with the faeces.
11. a. The broad posterior part of the whipworm is occupied by intestine and reproductive organs (Fig5, 6).
b. The narrow anterior part of the whipworm is occupied almost entirely by a long esophagus(stichosome) (Fig 1 to 4), a short pharynx (Fig 1) and a small mouth (Fig 1).

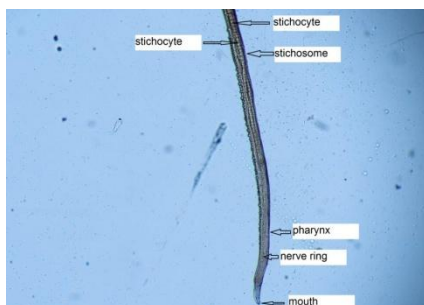


Fig. 1 showing mouth, pharynx, nerve ring and stichocytes forming the stichosome

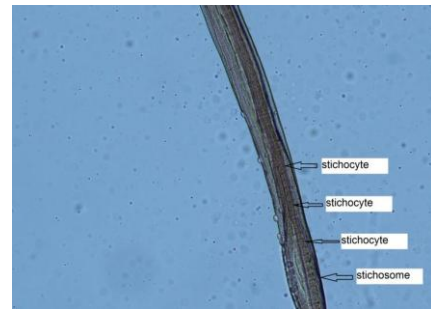


Fig. 2 Showing stichocytes forming the stichosome

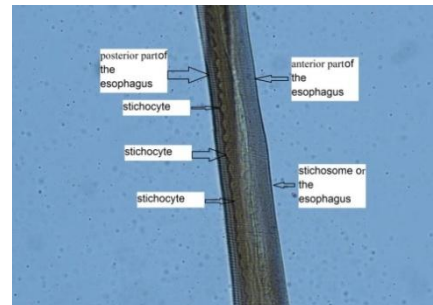


Fig. 3 Showing stichocytes forming the stichosome or the esophagus and stichocytes arranged along the posterior portion of the esophagus

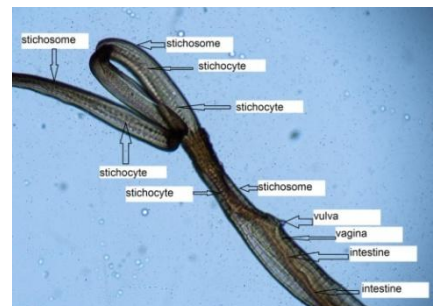


Fig. 4 Showing stichocytes forming the stichosome and the proximal portion of the intestine lying parallel to the vagina

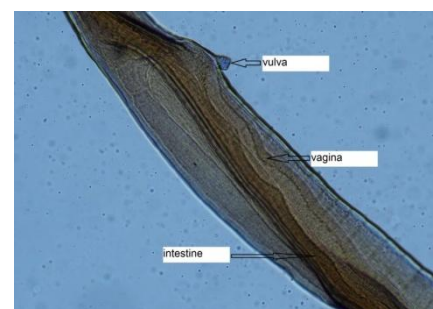


Fig. 5 showing the proximal portion of the intestine lying parallel to the vagina

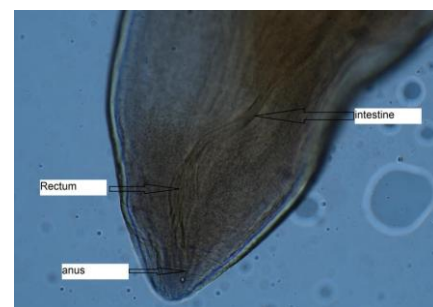


Fig. 6 showing rectum connecting the terminal portion of the intestine to the anus

CONCLUSION

1. Whipworm has a narrow anterior end and broader posterior end.
2. At the anterior (head) end there is a mouth. The mouth opens into the pharynx.
3. The pharynx is comprised of nerve ring and lacks stichocytes. The pharynx continues into the esophagus (stichosome).
4. Stichosome is a multicellular organ that is very prominent in whipworm and consists of a longitudinal series of 40-200 glandular unicellular cells (stichocytes). Collectively stichocytes form the stichosome.
5. The esophagus (stichosome) opens into the intestine.
6. The rectum connects the terminal portion of the intestine to the anus in females.

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