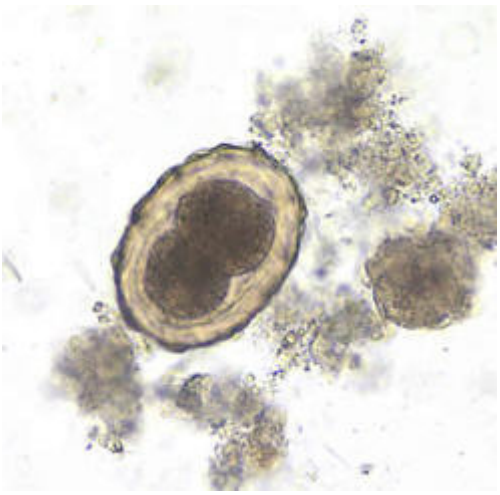
Answer

The barium meal follow-through showed a large number of parasitic worms in the jejunum with tram-track appearance[2] and string sign[2] suggestive of *ascariasis infestation*. A stool examination was done for the patient which revealed *Ascaris lumbricoides* eggs (Figure 3). She was administered albendazole 400 mg.

Figure 3. *Ascaris lumbricoides* fertilised egg with embryo in the early stage of development, in a wet mount (magnification: ×200)



The patient became symptom-free within a week and a stool examination 2 weeks later showed no eggs.

Discussion

This case highlights the importance of basic and low-cost investigations like stool examinations which would have lead to the diagnosis initially; other (more expensive and complex) investigations could have been avoided. Stool examinations are especially relevant in developing countries and for patients from rural areas.

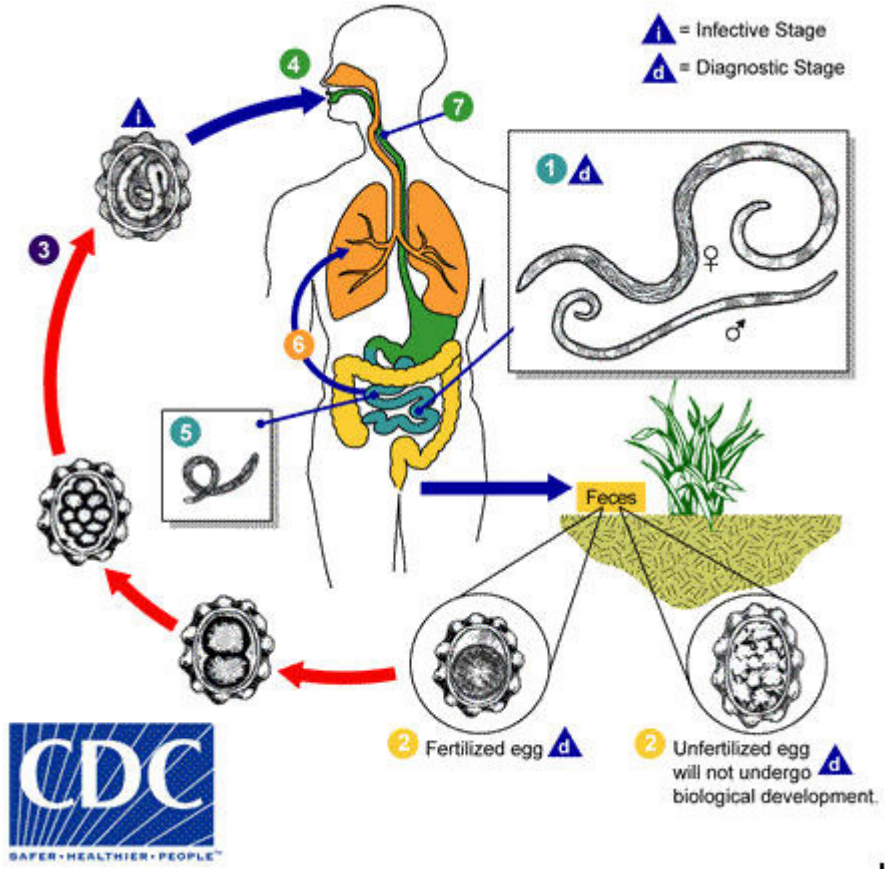
Ascariasis is an infection with *Ascaris lumbricoides*. It is a cosmopolitan parasite inhabiting the gut of one-fourth of the world's population.[1] The highest prevalence is in malnourished people residing in the developing countries[1] and the jejunum and ileum are its preferred habitats. It is particularly common in India, though incidence is falling due to government-sponsored large-scale de-worming in the community.

A. lumbricoides is a large, lumen-dwelling nematode contracted by the ingestion of its larva via eggs. Eggs of *A. lumbricoides* are not immediately infective after leaving the infected host. They require a holding period in a suitable environment and become infective once second-stage larvae have developed in the eggs.

As shown in Figure 4 the larvae hatch from the eggs. Larvae are swallowed and most grow to adulthood in the small intestine where they mature, copulate, and lay eggs in the intestines. Adult worms may live in the gut for 6–24 months. However they can also penetrate the small intestine wall and migrate through the lymphatic system and bloodstream to the liver, and then to the lungs where they enter the alveoli. There they pause for at least 2–3 weeks and molt, giving rise to allergic bronchopneumonia in

previously infected and sensitised individuals. Later, they wander up the bronchi and trachea, giving rise to bronchitis with bronchospasm, urticaria, and occasionally larvae in the sputum.

Figure 4. Life cycle of *Ascaris lumbricoides* and routes of infection



The adult worms are up to 30 cm long and 4 mm wide, and may cause mechanical problems (especially in children) because of their size and cause severe nutritional deficiency due to their numbers and mass. A temperature elevation to 39°C, certain drugs, and some unknown influences may cause the worms to congregate, sometimes resulting in intestinal obstruction and migration out of the gut into the bile duct, oesophagus, mouth, pancreatic duct or appendix, and occasionally the liver causing biliary and pancreatic duct blockages and even obstruction of the appendix.[3]

The migration leaves necrotic tracts in the liver with hypersensitive inflammation produced by adults and eggs. Adult worms may perforate the intestine and pass out of the gut, leading to peritonitis.

References:

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3. Baird JK, Mistrey M, Pimsler M, Connor DH. Fatal human ascariasis following secondary massive infection. Am J Trop Med Hyg. 1986;35:314–8.

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