

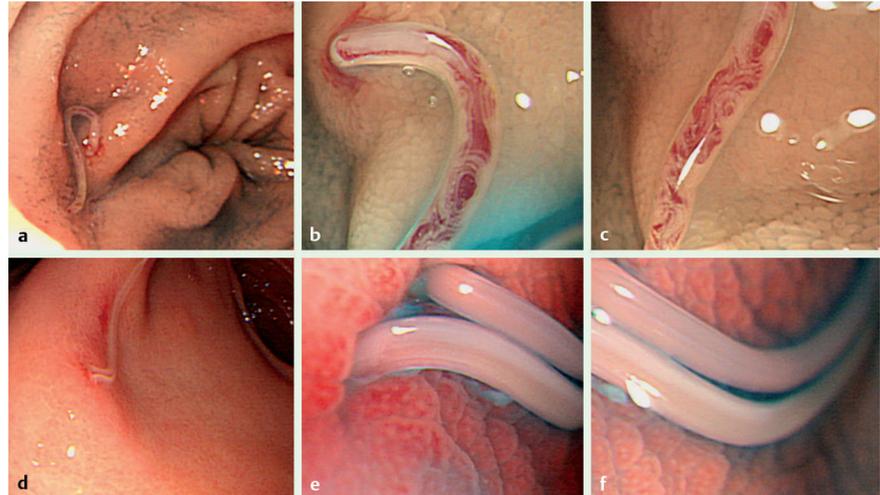
## Comparison of magnified endoscopic images of *Ancylostoma duodenale* (hookworm) and *Anisakis simplex*

A 77-year-old woman with chronic iron deficiency anemia had a medical examination in May 2002. She was diagnosed as having anisakiasis after upper endoscopy of the antrum of the stomach, and a worm was removed. Three years later, an upper endoscopy showed several worms in the first and second portions of the duodenum, but there were no symptoms. Ten live worms were removed using standard biopsy forceps and were identified by microscopic examination as hookworm (*Ancylostoma duodenale*).

Magnified endoscopy clearly revealed the internal organs of the hookworm sucking blood from the duodenal mucosa, as well as whitish erosion with slow oozing at the anchorage point of the hookworm. It was noted that the conventional endoscopic images of the hookworm were similar to those of *Anisakis simplex*, but the magnified endoscopic images were clearly different (▶ Fig. 1).

Examination of a stool sample by a formalin-ethyl acetate concentration technique revealed hookworm eggs. A single dose of pyrantel pamoate (500 mg) was administered. Two weeks later, upper endoscopy showed clearance of the worms, and 1 month later, examination of a fresh stool sample revealed no hookworm eggs.

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**Fig. 1** Comparison of endoscopic images of *Ancylostoma duodenale* and *Anisakis simplex*. **a** Conventional endoscopic image of *A. duodenale*. **b** Magnified endoscopic image of the upper part of the body of *A. duodenale*. A long esophagus, intestine, and ovary with eggs are seen. The anchorage point of the worm shows whitish erosion with slow bleeding from the duodenal mucosa. **c** Magnified image of the middle part of the body of *A. duodenale*. The intestine and ovary with eggs are seen. **d** Conventional endoscopic image of two *A. simplex* worms. **e** Magnified endoscopic image of the upper part of the body of two *A. simplex* worms. The anchorage point of the worm is seen as a slightly red swelling of the mucosa without bleeding. **f** Magnified image of the middle part of the body of *A. simplex*. Translucent white bodies are visualized but the internal organs cannot be differentiated.

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### Bibliography

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