Ascaris lumbricoides: A case report

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This is a case presentation of a multiple trauma patient who was infested with Ascaris lumbricoides, a roundworm. The infestation was undiagnosed until after extubation. Intraoperative anesthesia was uneventful and the patient was discharged 7 days after admission.

Key words: Ascariasis, Ascaris lumbricoides, endotracheal tube, parasitic infections, roundworm.

Introduction
Roundworm infection with Ascaris lumbricoides is a worldwide health concern. An estimated 25% of the world's population is infected. Prevalence increases to 90% in Third World countries where poor sanitation, poverty, and crowded living conditions are widespread.1 The majority of cases in the United States are immigrants from developing areas of the world who seek urban medical care. Most infected persons are asymptomatic, and the worm's presence is not apparent or is attributed to other illnesses.

Anesthesia providers should be aware of the possibility of ascariasis infestation, especially in immigrant patients. Upper airway obstruction and obstruction of endotracheal and nasogastric tubes by ascariasis have been reported in cases related and unrelated to anesthesia.2-5

Case report
A 23-year-old, 80-kg, ASA physical status II, Hispanic male was admitted for orthopedic surgery after being beaten with a baseball bat. There was report of a loss of consciousness and alcohol use at the time of admission. The physical examination revealed a deep scalp laceration and a grossly deformed left upper extremity with open lacerations. The Glasgow Coma Scale score was 15, the most favorable score that can be achieved.

Preliminary head computed axial tomography indicated no abnormalities. Computed abdominal tomography revealed an intraparenchymal hepatic hematoma. Radiographs of the left upper extremity indicated a left radius and ulnar fracture and an open left metacarpal fracture. Pertinent laboratory results included a blood alcohol level of 0.007 g/dL, white blood cell count of 16,200/mm³, and the following differential cell counts: neutrophils, 93%; lymphocytes, 13%; and eosinophils, 6%.

The patient was taken to the operating room for an open reduction and internal fixation of the left metacarpal fractures and an incision and drainage of the open hand fracture by the orthopedic team. Preanesthetic medications were sodium citrate, 30 mL by mouth; famotidine, 20 mg intravenously; metoclopramide, 10 mg intravenously; and midazolam, 3 mg intravenously.

The patient was preoxygenated and a rapid sequence induction with cricoid pressure was performed uneventfully with fentanyl, 250 µg; sodium thiopental, 375 mg; and succinylcholine, 140 mg in-
travenously. An 8.0-mm internal diameter endotracheal tube was inserted orally via direct laryngoscopy, and the tube was taped securely in place. Breath sounds were clear and equal bilaterally to auscultation. An esophageal temperature probe and orogastric tube were atraumatically placed. The stomach contents were emptied by suctioning the orogastric tube.

Anesthesia was maintained with oxygen, nitrous oxide, isoflurane, and incremental doses of fentanyl. Muscle relaxation was maintained with rocuronium in response to train-of-four monitoring. The patient was ventilated to maintain normocapnia as determined by end-tidal carbon dioxide monitoring.

The 5-hour surgical procedure was well tolerated by the patient. It was decided at that time to observe the hepatic laceration and treat it conservatively. At the end of the surgical procedure, neuromuscular relaxation was reversed with neostigmine, 5 mg, and glycopyrrolate, 0.8 mg, intravenously. The stomach and oropharynx were suctioned, and the esophageal probe and orogastric tube were removed. When fully awake, the patient was extubated and given oxygen via face mask. The endotracheal tube was noted to be coated with copious thick yellow secretions.

After moving the patient to a gurney for transportation to the surgical intensive care unit, he regurgitated a large roundworm measuring approximately 15 cm. The specimen was sent to the microbiology laboratory, and it was identified as an adult female *A lumbricoides* (Figure 1). After transportation to the surgical intensive care unit, the infectious disease service was consulted, and the patient was treated with mebendazole, 100 mg orally twice a day, for 3 days. Mebendazole is an anthelmintic that works by inhibiting glucose uptake in susceptible helminths, thus depleting the glycogen stores needed for survival and reproduction.

The patient had an uneventful postoperative course, and on the day of discharge, ova and parasite stool cultures were negative. The patient was to have follow-up in the community clinic to prevent the spread of a communicable disease.

**Discussion**

Human infestation with *A lumbricoides* is acquired by swallowing eggs from contaminated soil. The ingested eggs hatch in the stomach and upper small intestines. The hatched larvae invade the intestinal mucosa and migrate via the circulatory and lymphatic systems to the lungs where they mature to the worm stage. The worm ascends the bronchial tree to the oropharynx, is swallowed by the host, and returns to the small bowel where it continues to grow. The entire process from egg ingestion to adult worm takes 2 to 3 months. *Ascaris lumbricoides* is the largest intestinal nematode parasite of humans. A fully grown worm can reach a length of 45 cm and a diameter of 5 mm and can live up to 2 years.

Clinical disease arises from intestinal complications and pulmonary hypersensitivity. Signs and symptoms of infestation include nausea, diarrhea, constipation, malaise, headache, low-grade fever, dyspnea, wheezing, substernal pain, pulmonary consolidations, urticaria, and eosinophilia. Severity of symptoms depends on the number of worms present and which organs they invade. Adult worms predominantly invade the intestines and lungs but have also been found in the heart, bladder, and fallopian tubes. Migrating *Ascaris* parasites probe and force themselves into any aperture they may encounter. Jaundice or pancreatitis can result when they block the biliary and pancreatic ducts.

*Ascaris* worm survival depends on host homeostasis. This symbiotic relationship is disrupted by clinical manifestations of disease, such as fever, or by chemical irritants, such as anesthetic agents and drugs. The worm wanders in response to these environmental changes in the host. Routes of escape include migration through the bowel with evacuation in stool or up the esophagus into the oropharynx, provoking coughing and oral expulsion of the worm. In addition, the worms may mi-
gagate up to the esophagus and be vomited or may be aspirated and cause airway obstruction.\textsuperscript{1,6-8}

An occluded upper airway or endotracheal tube is a life-threatening medical emergency. Common causes of upper airway obstruction include foreign bodies, such as food and coins; however, obstruction by \textit{A lumbricoides} worms are unusual and are rarely reported.

One such report was of a 64-year-old patient who underwent successful aortic valve replacement in a hospital in New York but had an unexplained cardiac arrest 9 hours after surgery. The patient was resuscitated, however, and did poorly in the following days. During routine endotracheal suctioning, a 20-cm \times 3.5-mm \textit{A lumbricoides} worm was suctioned from the endotracheal tube. Bronchoscopy revealed multiple large worms in both major bronchi. An autopsy was not permitted; however, it was speculated that decreased oxygenation from airway obstruction precipitated the ventricular irritability and subsequent cardiac arrest.\textsuperscript{3}

A second case of fatal acute respiratory failure and cardiac arrest due to tracheal tube obstruction from an \textit{A lumbricoides} worm was reported from a hospital in Brazil. Postmortem examination revealed a 25-cm \textit{A lumbricoides} worm in the lumen of the endotracheal tube.\textsuperscript{5}

Although \textit{A lumbricoides} is relatively rare in urban areas, anesthesia providers should be aware of the possibility of this infestation, particularly in patients from endemic areas. In the current case report, a 23-year-old multiple trauma patient regurgitated an \textit{A lumbricoides} worm after extubation and had an uneventful recovery. However, endotracheal tube obstruction from the roundworm has been reported in other cases. Despite its rarity, acute laryngeal obstruction by \textit{A lumbricoides} is a possibility and can be fatal if unrecognized.

\textbf{REFERENCES}


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