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Ileus Ascariasis: An Integrative Perspective on Clinical, Diagnostic, and Management Strategies

I Nyoman Dwi Suputra Diarsa[1], Alia[1], Fiyna Alyatun Afifah[1], Komang Dewi Savitri[1], Rafi Radityo Daniswara[1], Aisya Ayudia Azharani[1], Fatimatuz Zahro Annaafi'ah[1], Nada Maharani[1], Syawaliah Novanti Mahfudah[1], Lalu Andika Fathul M.[1], Ni Kadek Sintha Amanda[1], Olivia Reynoko Putri [1], Mutia Rizka Dania[2]

[1]Medical Study Program, Faculty of Medicine and Health Sciences, University of Mataram, Mataram

[2]Department of Surgery, Faculty of Medicine and Health Sciences, University of Mataram, Mataram

*Korespondensi: inyomandwisuputra@gmail.com

Abstract

Background: Ileus ascariasis is a severe complication of Ascaris lumbricoides infection, predominantly affecting children in endemic regions with poor sanitation. Despite global control programs, it continues to cause significant morbidity and mortality, yet fragmented evidence limits comprehensive understanding. This review was conducted to integrate clinical, diagnostic, management, and preventive perspectives.

Methods: A structured literature search was performed across PubMed, Scopus, ScienceDirect, Google Scholar, and additional sources using boolean operators. Eligible publications included case reports, original studies, reviews, clinical guidelines, and public health reports in English and Indonesian. Evidence was synthesized narratively and thematically by an academic team under faculty supervision.

Discussion: The review highlights that ileus ascariasis typically manifests as small bowel obstruction caused by worm boluses, sometimes complicated by volvulus, intussusception, or perforation. Diagnostic modalities such as ultrasonography and CT scans are useful but limited in accessibility within resource-constrained settings. Management ranges from conservative approaches, including decompression, and antibiotics, to surgical intervention when obstruction persists or complications occur. Preventive strategies such as mass drug administration, sanitation improvement, and health education show potential but are challenged by reinfection, low awareness, and uneven implementation. Knowledge gaps remain regarding optimal diagnostic pathways, comparative effectiveness of conservative and operative strategies, also integration of prevention with community-based programs.

Conclusion: Ileus ascariasis is both a clinical emergency and a persistent public health concern. Strengthening early detection, optimizing treatment protocols,

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and linking preventive measures with sustainable community interventions are crucial to reducing its impact on vulnerable populations.

Keywords: ileus ascariasis; ascaris lumbricoides; intestinal obstruction

INTRODUCTION

Ascaris lumbricoides is one of the most prevalent intestinal nematodes worldwide, with an estimated global burden of 446 million cases in 2019, and the highest prevalence observed in South Asia, Southeast Asia, and Sub-Saharan Africa[1]. In Indonesia, the prevalence of soil-transmitted helminths remains considerable, ranging from 2.5% to 62%, with 5.7% occurring in children under 10 years of age, thus persisting as a significant public health concern[2,3]. Although most infections are mild or asymptomatic, a small proportion of cases can lead to severe complications, including ileus ascariasis, which accounts for up to 72% of intestinal obstruction in endemic regions, with a mortality rate of 8.6%, particularly in cases with delayed management[4].

Preventive efforts through improved sanitation, health education, and Mass Drug Administration (MDA) programs have been implemented; however, their effectiveness is hindered by rapid reinfection, poor sanitation access, and uneven drug distribution[5,6,7]. As a result, complication rates remain high, especially among vulnerable groups such as children in rural areas with poor nutritional status. In clinical practice, delayed referral frequently necessitates emergency laparotomy, although laparoscopic or conservative approaches have been introduced, with limited success in selected cases[8,9,10,11].

From a diagnostic perspective, bedside ultrasonography featuring characteristic signs such as the spaghetti sign and rail-track sign, offers rapid detection but is highly operator-dependent. Whereas CT scanning, though more accurate, remains largely inaccessible in resource-limited settings[12,13]. The majority of the literature consists of case reports or small case series with a predominant focus on surgical aspects, while public health perspectives and evaluations of preventive programs in reducing ileus ascariasis complications are rarely addressed.

Given these circumstances, knowledge gaps persist regarding the relative effectiveness of conservative versus operative therapy, diagnostic validation in resource-constrained areas, and the impact of referral pathways on patient outcomes[14,15]. Evaluations of MDA programs have typically emphasized reductions in infection prevalence rather than complication outcomes. Therefore, a

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comprehensive review is warranted to synthesize the fragmented evidence, position ileus ascariasis not only as a clinical entity but also as a pressing public health issue, and to formulate research agendas and intervention strategies that are more feasible and impactful for vulnerable populations

METHODS

This narrative review was developed through a structured literature search and thematic synthesis. The approach adopted combined principles of Community-Based Research and service learning, as the writing process was conducted collaboratively within an academic group under faculty supervision, aiming not only to synthesize knowledge but also to strengthen capacity for critical appraisal of scientific evidence.

This narrative review was developed through a structured literature search across PubMed, Scopus, ScienceDirect, Google Scholar, and others using boolean operators such as (“Ileus Ascariasis” OR “intestinal obstruction” AND “Ascaris lumbricoides”). The search was restricted to English and Indonesian articles. Relevant sources included peer-reviewed original research, case reports, systematic reviews, clinical guidelines, and public health reports, while studies focusing solely on unrelated helminths, animal-based experiments, or inaccessible full texts were excluded.

From an initial pool of identified articles, we synthesized the evidence narratively and thematically to address definitions, etiology, risk factors, epidemiology, life cycle, pathogenesis, clinical manifestation, diagnostics, management, preventive strategies, and complications of ileus ascariasis. The review was conducted collaboratively using a service- learning approach in which each team member was responsible for specific subtopics, followed by integrative discussions under faculty supervision. The outcomes were evaluated qualitatively through reflective learning within the team, contextual linkage with national health policies, and assessment of the review’s clarity and comprehensiveness as an academic output.

DISCUSSION

Defining Ileus Ascariasis

Ileus ascariasis is a severe complication of Ascaris lumbricoides infection, characterized by intestinal obstruction, most commonly in the ileum, due to a mass of worms and associated inflammation[16,17]. This condition may present with abdominal pain, vomiting, distension, and constipation, and if untreated, can lead to perforation or peritonitis requiring urgent intervention[16,17]. Ascariasis itself is a soil-transmitted helminth infection prevalent in tropical regions with poor sanitation, affecting mainly children, and ileus

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represents one of its most frequent abdominal complications[18].

Etiology

Ascariasis induced ileus arises from massive infestation of Ascaris lumbricoides, in which large clusters of adult worms obstruct the intestinal lumen, most frequently at the ileocecal valve. The worms may form compact boluses, and their coiling or intertwining behavior further aggravates the blockage. Such worm masses can also act as a lead point for intussusception or serve as a pivot for volvulus. In addition, the release of neurotoxins, anaphylatoxins, and hemolysins triggers inflammation and smooth muscle contractions, contributing to luminal narrowing and acute intestinal obstruction. The terminal ileum and ileocecal region are the most common sites of predilection, although heavy worm burdens may also be found in the jejunum[19,20].

Risk Factors

Children are more susceptible to Ascaris lumbricoides infection, and the risk is further increased in populations with poor environmental sanitation, low educational levels, inadequate personal hygiene, and low socioeconomic conditions. Limited access to clean water, sanitation facilities, and healthcare services also contributes to persistent transmission. Moreover, residence in endemic regions of developing countries, particularly in Asia, Latin America, and Africa, remains a significant determinant. In South and Southeast Asia, Ascaris is the most prevalent soil transmitted helminth, with a prevalence of 18%, followed by Trichuris (14%) and hookworm (12%)[19,20].

Epidemiology

Ascaris lumbricoides is a large roundworm capable of causing intestinal infection, with intestinal obstruction representing one of its most severe complications. A study in Louisiana reported 21 pediatric cases of obstruction due to Ascaris within three years, with prevalence rates among children aged 1–12 years ranging from 8% to 28%. The infection was observed to be three times more common in Black children than in White children, and most obstruction cases occurred in those aged 1–5 years[21].

Life Cycle

Adult Ascaris lumbricoides worms live in the lumen of the small intestine, where female worms are able to produce around 200,000 eggs per day which are then excreted with feces. The development of larvae to become infectious eggs occurs in fertilized eggs after 18 days to several weeks, depending on optimal environmental conditions in the form of moist, warm, and shady soil. After the infectious egg is swallowed, the larvae will hatch, penetrate the intestinal mucosa, then enter the portal and

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systemic circulation until they reach the lungs. Inside the lungs, the larvae mature for 10–14 days, then penetrate the wall of the alveolus, rise through the bronchial ducts to the throat, and are eventually swallowed again. Larvae that return to the small intestine will develop into adult worms. The process from swallowing infectious eggs to adult female worms capable of producing eggs takes about 2-3 months, while the lifespan of adult worms ranges from 1 to 2 years[38]. Because the adult form of A. lumbricoides is in the lumen of the small intestine, the accumulation of large numbers of worms can cause obstruction[28].

Pathogenesis

Based on the life cycle of ascaris worms, it is known that the development of ascaris larvae into adult ascaris worms occurs in the small intestine, especially in the proximal jejunum and ileum[22,23]. If the worms settle in the small intestine exceeding 60 worms, which can be found in conditions of severe infection, then the worms will form a lump that can cause the lumen of the small intestine to become blocked or experience mechanical obstruction. This condition is called obstructive ileus and generally occurs in the distal ileum, ileocaecal junction, and proximal jejunum[23,24,25]. Obstructive ileus occurs not only due to the formation of lumps by adult worms, but also due to volvulus and intussusception[23]. The pathophysiology involved in volvulus in ascariasis is the clumping and mass effect of worms in the intestine, which causes mechanical obstruction, triggering intestinal stretching and increasing intestinal mass. The subsequent consequence of volvulus is reduced vascularization in the area, triggering tissue ischemia, gangrenous necrosis, and peritonitis[26].

Furthermore, based on the hypothesis, the underlying mechanism of intussusception is intestinal hyperperistalsis due to the presence of a worm bolus, which causes very strong bowel movements to push the worm clump. Another mechanism involved is the blockade of distal ileal muscle receptors by toxins produced by the worms, thus disrupting coordination of bowel movements[27]. In addition, obstruction due to ascaris can also be caused by neurotoxins secreted by the worms when they die during their life cycle. These toxin proteins cause spasms in the muscles of the small intestine, especially in the distal ileum, thus facilitating the formation of worm mass accumulation in the intestinal lumen and causing obstruction. In addition to neurotoxins, ascaris worms also secrete other toxins, such as anaphylatoxins, hemolysin, and endocrinolysins, which can cause an inflammatory reaction in the intestinal segment infested with worms. Overall, clinical findings in ascariasis depend on the number of parasites present in the host. If the worm count is low, symptoms are

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mild, such as nausea, anemia, and abdominal discomfort. Complications can occur if there are many worms in the intestinal lumen[23].

Clinical Manifestation

Clinical manifestation of ascariasis ileus can be divided into primary symptoms, clinical symptoms, and systemic symptoms. Primary symptoms can include gastrointestinal disturbances such as intermittent abdominal pain, abdominal distension and bloating, repeated vomiting that sometimes contains adult worms, inability to pass gas or defecate if the obstruction is complete, nausea, weakness, and anorexia as common symptoms[24]. Furthermore, a physical examination may reveal abdominal distension, a palpable worm bolus that can move around, abdominal tenderness, abnormal bowel sounds, and signs of dehydration[29]. Systemic symptoms can also include mild fever, weakness, dehydration, and shock.[30].

Diagnostics

The diagnosis of ileus due to ascariasis is established through a combination of physical examination and supportive investigations. Ancillary diagnostic modalities include plain abdominal radiography, water-soluble contrast studies, ultrasonography, contrast-enhanced computed tomography (CT), magnetic resonance imaging (MRI), colonoscopy, and laboratory tests[31]. On plain abdominal radiographs, findings such as meteorism, the whirlpool sign, and air-fluid levels may indicate intestinal obstruction[32]. In addition, the presence of the cigar bundle sign, representing clusters of worms, suggests partial small bowel obstruction[31].

Figure 1. Plain Abdominal Radiograph showing the Cigar Bundle Sign[31].

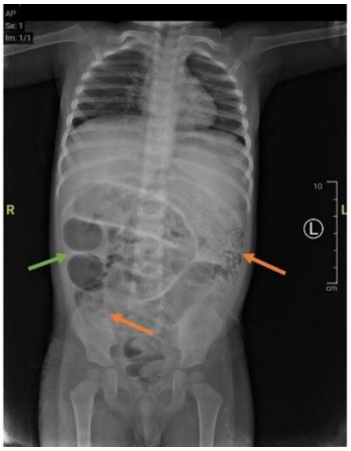

Figure 2. Plain Abdominal Radiograph with Whirlpool Sign (Orange) and Air–Fluid Levels (Green)[32].

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Management of Ileus Acariasis

Intestinal obstruction due to ascariasis is a serious condition with high morbidity and mortality, particularly postoperatively[33]. Most patients are managed conservatively with adequate fluid and electrolyte replacement, nasogastric decompression, and prophylactic antibiotics such as intravenous ceftriaxone and metronidazole. Rehydration remains a critical step, commonly using ringer's lactate or 5% dextrose. Anthelmintics should be avoided initially, as they may worsen obstruction; however, they can be introduced if no clinical response is observed after 24 hours, followed by a repeat dose six weeks later[34]. Radiographic monitoring within 12 hours is recommended to exclude volvulus or intussusception. Surgical intervention is indicated in cases of strangulation, perforation, peritonitis, unresolved partial obstruction after 24 hours, or obstruction occurring post-anthelmintic administration[33].

Preventive Strategies

Preventive measures against ascariasis operate at both population and individual levels. At the population level, the WHO recommends periodic mass deworming with albendazole (400 mg single dose) or mebendazole (500 mg single dose), particularly for preschool and school-aged children in endemic areas, with a frequency of one to two times annually depending on prevalence[36]. In Indonesia, Regulation of the Minister of Health No. 15/2017 mandates at least biannual mass deworming for school-aged children as part of the national helminth control program[37].

At the individual level, preventive strategies include proper handwashing, consumption of thoroughly cooked food, washing fruits and vegetables, use of sanitary latrines, and community health education[36]. Indonesia further emphasizes Perilaku Hidup Bersih dan Sehat (Clean and Healthy Living Behavior), including maintaining nail hygiene, wearing footwear to prevent soil-transmitted helminth infection, and regular deworming in accordance with the national schedule[37].

Complications

High-intensity Ascaris lumbricoides infection can result in serious gastrointestinal complications, particularly among malnourished children in endemic regions. Volvulus caused by a dense worm mass has been documented as a rare but potentially fatal event in pediatric cases, leading to bowel ischemia, necrosis, and perforation[33]. Furthermore, progression from intestinal obstruction to peritonitis and sepsis has been reported, with sepsis contributing substantially to mortality in children[35].

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CONCLUSION

Ileus ascariasis represents a severe complication of massive Ascaris lumbricoides infestation, predominantly affecting children in endemic regions with poor sanitation such as Southeast Asia, Africa, and Latin America. The condition arises when worm boluses obstruct the distal ileum or ileocecal valve, with parasite-derived toxins and inflammatory reactions further narrowing the intestinal lumen. Patients typically present with colicky abdominal pain, vomiting that may contain worms, abdominal distension, and signs of intestinal obstruction; without timely management, outcomes may include perforation, peritonitis, volvulus, intussusception, or sepsis with high mortality risk. Diagnosis is based on clinical evaluation and imaging, while treatment ranges from conservative measures such as decompression, rehydration, and antibiotics to surgical intervention in complete obstruction or complicated cases. Prevention relies on improving sanitation, health education, and mass drug administration (MDA), although reinfection and low community awareness remain major challenges. Thus, effective control requires an integrated approach that strengthens early clinical detection while addressing the broader social and economic impacts in affected communities.

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