



Ascariasis of Urinary Bladder, Kidney and The Urinary Tract: Review and Update

Anthony kodzo-grey venyo

North Manchester General Hospital Delaunays Road Crumpsall M8 5rb Manchester England United kingdom

*Corresponding Author: Anthony kodzo-grey venyo, North Manchester General Hospital Delaunays Road Crumpsall M8 5rb Manchester England United kingdom.

Submitted: 06 Feb 2024

Accepted: 12 Feb 2024

Published: 18 Feb 2024

Citation: Anthony Kodzo-Grey Venyo (2024). Ascariasis of Urinary Bladder, Kidney and The Urinary Tract: Review and Update. *J of Clin Case Stu, Reviews & Reports* 2(2),1-9.

Abstract

Only a few of reports are available that had described the location of adult *Ascaris* forms within the urinary bladder, ureter or kidney and diagnosis of *Ascaris* infection of the kidney, ureter or urinary bladder requires a high index of suspicion otherwise there could be delay in the diagnosis or the infection could be missed. The manifestation of Ascariasis of the urinary tract has tended to be asymptomatic or the symptoms tend to be non-specific including lower urinary tract voiding symptoms, loin pain, non-visible and visible haematuria. Because of the rarity the article has been written to provide a general overview of Ascariasis as well as Miscellaneous Narrations and Discussions from some case reports, case series, and studies related to Ascariasis of the Urinary bladder, kidney and urinary tract to provide updating information for all readers including the diagnosis, treatment and outcome of the infection.

Keywords: Ascariasis of Urinary Bladder; Bladder Ascariasis; Ascariasis of Kidney; Ascariasis of Ureter; Stool Examination; Microscopy; Histopathology; Post-Mortem; Ultrasound Scan; Computed Tomography; Treatment; Surgery; Medications.

Introduction

In 2023, it was stated that about one billion people globally are infected with *Ascaris lumbricoides*, and more than 60,000 people die from the disease each year [1]. It has been documented that Ascariasis affects mostly tropical and sub-tropical countries around the world, and Ascariasis has frequently been documented within Sub-Saharan Africa, Latin America, China, and East Asia [1]. It furthermore been iterated that ascariasis is a neglected tropical disease which causes an estimated loss of 1.2 to 1.5 disability-adjusted years [1-4]. Ascariasis most commonly afflicts organs of the gastrointestinal tract but sporadic cases of Ascariasis had been reported to have afflicted the urinary bladder or a urinary tract organ. Because of extensive global travel these days, a case of Ascariasis of the urinary bladder or a urinary tract organ could be reported anywhere in the world. Considering that Ascariasis of the urinary bladder and the urinary tract organs is very rare, it would be envisaged that majority of clinicians practising in the world would not have encountered a case of Ascariasis of the urinary bladder or urinary tract organ before. The ensuing article on Ascariasis of the urinary bladder and urinary tract organs has been divided into two parts: (A) Overview, and (B) Miscellaneous Narrations and Discussions from Some Case Reports, Case Series, and Studies Related to Ascariasis of the Urinary Bladder and Urinary Tract Organs.

AIM: To review and update the literature on Ascariasis of the urinary bladder, and urinary tract organs.

Method: Internet data bases were searched including: Google;

Google Scholar; Yahoo; and PUBMED. The search words that were used included: Ascariasis of urinary bladder; Ascariasis of urinary tract; Ascariasis of Kidney. Twenty-eight (28) references were identified which were used to write the article which has been divided into two parts: (A) Overview, and (B) Miscellaneous Narrations and Discussions from Some Case Reports, Case Series, and Studies Related to Ascariasis of the Urinary Bladder and Urinary Tract Organs.

Results

A: Overview

Definition and General Statements

- It has been iterated that *Ascaris lumbricoides*, which is the causative agent of ascariasis, is the commonest parasitic worm that afflicts human beings [1].
- It has been documented that with regard to manifestation, Ascariasis could be asymptomatic, causing only malnutrition and growth retardation, or it might manifest with abdominal pain, nausea, vomiting, bloating, and diarrhoea [1].

Etiology and other General Statements

- The ensuing summations had been made regarding the etiology of Ascariasis [1].
- *Ascaris lumbricoides*, is a soil-transmitted large nematode, which causes Ascariasis.
- The female adult *Ascaris* organism could reach up to 20 cm to 30 cm in length, and the adult males could reach up to 15 cm to 20 cm.

- The nematodes tend to be found as pink/yellow/white roundworms.
- The female worms are thicker and are seen to have a straight rear end.
- The male worm is more-slender with a ventrally incurvated rear end with two retractile copulating spicules.
- The average life of the adult parasite is one year, following which it dies, and it is spontaneously eliminated as it evacuates through the digestive tract.
- This is the reason why a spontaneous cure of disease could happen if there is no reinfection.
- It has been iterated that adult *Ascaris* worms do not multiply within the human host [1,5,6].

Epidemiology

- The epidemiology of Ascariasis has been generally summarized as follows [1].
- Ascariasis is one of the commonest encountered human parasitic infections.
- Ascariasis is encountered globally.
- Ascariasis had represented a disease which has affected the global population for centuries.
- Ascariasis was described in ancient Egyptian papyruses and had been identified in Egyptian mummies from around 800 B.C.
- Even Hippocrates and Aristotle had documented the helminth.
- Ascariasis had been documented in children and adults within the tropical and sub-tropical areas of the world with poor sanitation and poor personal hygiene and within areas of the world where human faeces are utilised as fertilizer.
- There is a higher risk of Ascariasis infection in non-Ascariasis-endemic areas of the world in view of increased rate of migration and travel globally [7,8].

Pathophysiology

The ensuing summations had been made regarding the pathophysiology of Ascariasis [1].

- Ascariasis infection does tend to occur when the host ingests *Ascaris* eggs that had been found within stool-contaminated soil.
- Once the *Ascaris* is within the duodenum, larvae are released and they enter the circulation through the enteric mucosa.
- Once within the capillaries (venous, arterial or lymphatic), the *Ascaris* reaches the liver through the portal vein and then reaches the lungs within the first week.
- Within the lung, the *Ascaris* organisms then damage the alveolar membrane and mature within the alveolus.
- Eventually, the *Ascaris* larvae are expectorated and swallowed, re-entering the gastrointestinal tract.
- Once the *Ascaris* is within the small intestine lumen, the larvae mature into adult worms in about 20 days.
- When the adult female and male worms are present, they copulate, and the female *Ascaris* organism could produce about 200,000 eggs per day. They are later eliminated within the faeces of the soil. In the appropriate conditions of a moist, shady, and warm environment, the eggs then mature into infective form in two to eight weeks and they remain viable for up to 17 months. They can be ingested and

re-commence the infective cycle [6,9,10].

Manifestation Including History and Clinical Examination Findings

- The manifestation of Ascariasis has been generally summarized as follows [1].
- Some patients who are infected with ascariasis could be asymptomatic, only demonstrating long-term presentations of growth retardation and malnutrition [1].
- If symptoms are reported, manifestations of abdominal pain, bloating, nausea, vomiting, anorexia, intermittent diarrhoea had tended to be the most common presentations [1].
- If the number of larvae passing through the lung is significant, pneumonitis and eosinophilia can be observed which is referred to as Loeffler syndrome [1]. The presenting symptoms include wheezing, dyspnoea, cough, haemoptysis, and pyrexia [1].
- In Ascariasis superinfection, adult worms could migrate to tubular structures like the biliary and pancreatic system which then cause cholecystitis, cholangitis, pancreatitis, small bowel obstruction, volvulus, appendicitis, as well as intussusception [1].
- Children are more susceptible to complications in comparison with adults [1].

Laboratory Tests and Investigations

Stool Examination

- Microscopy examination of stool samples of individuals afflicted by Ascariasis tend often to demonstrate the *Ascaris* depending upon the stage of the infection.

Hematology and Biochemistry Blood Tests

- Full blood count and INR are routine tests that tend to be undertaken in cases of Ascariasis but generally the results would tend to be normal.
- There tends to be high eosinophil counts

Routine Biochemistry Tests

- CRP, serum urea and electrolytes, liver function tests, bone profile and random blood glucose are general assessment tests that tend to be undertaken in cases of Ascariasis but the results would not be diagnostic of Ascariasis.

Urine examination

- Urinalysis, urine microscopy and urine culture plus sensitivity are general tests that constitute general assessment investigations of patients who have ascariasis.

Radiology Investigations

- Some of the radiology image investigations options that are available but do not tend to be undertaken often include:
 - Ultrasound scan
 - Computed Tomography Scan
 - Magnetic Resonance Imaging (MRI) scan

Miscellaneous statements related to investigation of Ascariasis [1].

- It has been iterated that a female *Ascaris* worm is capable of producing up to 200,000 eggs per day. This makes retrieval

Ascaris from a stool specimen examination easier.

- The documented best diagnostic test for Ascariasis is still stool examination for ova and parasites, looking for large oval brown tri-layered eggs with a mamillated coat.
- It is important to take note of the fact that the result of stool microscopy examination could be negative without finding any evidence of Ascaris while the worm migrates and matures for about one month.
- It is only when the Ascaris worms are mature that they do commence secreting eggs.
- In some scenarios, an adult Ascaris worm could be visualised within the stool or exuding out of the rectum, as well as it could also be expectorated up or passed within voided urine.
- A full blood count could demonstrate eosinophilia during the active migration phase of Ascaris from the intestine to the lungs, and the larvae of Ascaris could be identified within the expectorated sputum.
- The undertaking of abdominal radiographs could be sensitive but not specific when a whirlpool sign is demonstrated.
- It has been iterated that ultrasound (US) scan and computed tomography (CT) scans could be undertaken in order to visualise Ascaris worms within the bile duct and in the gallbladder. [1]
- It has also been documented that the undertaking of endoscopic retrograde cholangiopancreatography (ERCP) could be done in order to establish the diagnosis of Ascariasis as well as to prove therapy for Ascariasis [1,11].

Treatment Strategy for Eradication of Ascariasis

- The treatment strategy for Ascariasis has been summated as follows [1].
- It has been recommended that even mild cases of Ascaris infection should be treated in order to prevent the development complications emanating from the migration of the Ascaris, and nevertheless, during active phase of Ascaris migration traversing through the lungs, medical therapy has tended not to be recommended, secondary to the increased risk of development of pneumonitis [1].
- Undertaking of medical treatment with utilisation of albendazole 400 mg as a single dose is the medicament of choice [1].
- The second option of choice of therapy for Ascariasis is utilisation of mebendazole 100 mg twice a day for three days or 500 mg as a single dose or ivermectin 100 microgram/kg to 200 microgram/kg once [1].
- During pregnancy, piperazine 50 mg/kg/day for five days or 75 mg/kg one dose or pyrantel pamoate (11 mg/kg up to a maximum of 1 g) is given as a single dose; the latter is the medication of choice [1].
- Medical treatment would target the adult worms, which is the reason why the therapy should be repeated after one to three months, in order to give time to larvae that could be present to mature to adulthood and be susceptible to treatment [1].
- Alternative agents for the treatment of Ascariasis include nitazoxanide and levamisole [1,12-14].
- In the scenario of the finding of presence of partial bowel

obstruction, a nasogastric tube should be placed in situ, and nothing should be provided by mouth, as well as intravenous fluids and piperazine should be provided [1].

- When there is clinical evidence of total bowel obstruction, then the patient might need to undergo laparotomy for enterotomy for the extraction of the worms; nevertheless, if there is evidence of necrosis, then the necrosis areas would need resection and re-anastomosis. Once the surgery is undertaken and intestinal transit is restored, medical anti-parasitic treatment should be provided to kill any residual Ascaris eggs [1].

Differential Diagnoses of Ascariasis

Some of the differential diagnoses of Ascariasis afflicting intra-abdominal organs and the lungs had been summated to include the ensuing [1].

- Acute cholangitis
- Acute pancreatitis
- Appendicitis
- Ascending cholangitis
- Asthma
- Cholecystitis and biliary colic
- Hookworm infection
- Intussusception of bowel
- Large bowel obstruction
- Small bowel obstruction

Prognosis

The prognosis of Ascariasis has been summated as follows [1].

- Studies that had been undertaken in Asia and Africa had demonstrated that single-dose therapy with albendazole does result in provision cure rates of over 95% with a gradual reduction in eggs over the next few weeks in 995 of cases.
- Nevertheless, patient relocation is important to prevent the subsequent development of recurrence of Ascariasis.
- There is also a great need to improve upon provision of basic good sanitation and provide clean drinking water in these Ascariasis infection areas.
- Many communities are now being targeted for the attainment of improvement in their socioeconomics in order to help reduce the burden of ascariasis.
- Avoidance of contact with manure, wearing proper shoes, and education are vital in the prevention of ascariasis.

Complications of Ascariasis

- The complications of Ascariasis afflicting intraabdominal organs had been summated to include the ensuing [1].
- Bleeding per rectum
- Development of bowel obstruction
- Appendicitis
- Hepatobiliary disease
- Development of pancreatic pseudocyst

Enhancing Health Care Team Outcomes

- Summations that had been made regarding enhancing health care team outcomes include the ensuing [1].
- Various programs had been commenced by the WHO in order to help diagnose and manage ascariasis [1].

- Nevertheless, *Ascaris* parasite does afflict close to 1.2 billion people, and an interprofessional approach is the only way to fight the infection [1].
- It has been pointed out that besides infectious diseases, the primary care provider, including nurses and pharmacists, do play a pivotal role in the education of the patient and their families on sanitation, washing food, and the importance of clean water [1,12,15].

Outcomes

- The ensuing recommendations had been made regarding steps that should be taken to reduce the incidence of as well as to improve the outcome of Ascariasis generally as follows [1].
- Ascariasis needs to be tackled upon a broader spectrum rather than just healthcare management.
- There is a necessitation for improvement in farming practices, food and personal hygiene, as well as the availability of clean drinking water.
- Also of importance is the need to remove cultural perceptions and improve upon compliance with medical treatment of Ascariasis
- Ascariasis is associated with enormous morbidity and afflicts many organs within the body.
- While the mortality rates associated with Ascariasis are not known, the numbers are not small.
- The World Health Organization (WHO) had stepped in and is working with an interprofessional group of healthcare workers in order to lower the burden of *Ascaris* parasite [16,17].

Ascariasis of the Urinary Bladder and the Urinary Tract Organs.

- Ascariasis of the urinary bladder and urinary tract organs, manifests with non-specific symptoms that more commonly associated with more common conditions that afflict the urinary bladder and urinary tract organs and without a high index of suspicion based upon detailed history taking, the diagnosis may be delayed or there could be mis-diagnosis of the infection.
- In view of the rarity of Ascariasis of the urinary bladder and urinary tract organs, Ascariasis of the urinary bladder and urinary tract organs had been narrated in the second part of the article under the umbrella of Miscellaneous Narrations and Discussions from some case reports, case series, and studies related to Ascariasis of the urinary bladder and urinary tract organs.

B: Miscellaneous Narrations and Discussions from Some Case Reports, Case Series and Studies Related to Ascariasis of The Urinary Bladder and Urinary Tract

- Mesele and Mengistu. [18] stated the following:
- *Ascaris* in urinary bladder is an extremely rare phenomenon.
- Ascariasis of the urinary bladder might occur after fistula formation between urinary and gastrointestinal tract or by retrograde migration of adult worm, and is associated with complications.

- Even though it is very extremely rare to have urinary symptoms from ascariasis, it is important to have a high index of suspicion for all possibilities.
- Soil-transmitted helminth (STH) infections like ascariasis are a public health problem within developing countries where adequate method of disposal of human excreta is usually not available and had been iterated to afflict more than one billion people [19,20].
- Individuals who are afflicted by *ascaris* often tend to asymptomatic.
- Ascariasis becomes symptomatic, ascariasis does manifest with myriad of clinical pictures depending upon intensity of the infection, the nutritional and immunologic status of the host, and the possible complications that may emanates.
- The sites of affliction of Ascariasis are mainly the lung during larval migration and intestine after full growth of the helminth.
- *Ascaris* invasion of the biliary ducts and the liver parenchyma might occur.
- The adult *Ascaris* worm had been reported also within the pleural cavity, pancreas, peritoneal cavity, lacrimal duct, middle ear, and femoral artery [21,22].
- Urinary complications of *ascaris* had been iterated to be very rare [23,24].
- There had been very few case reports which had been assumed to emanate from either fistula communication between the genitourinary system and alimentary canal or due to transurethral access of the worm to the genitourinary system [25].

None of the reports had proven the postulated theories; nevertheless, in their reported case, entero-vesical fistula formation had clearly been illustrated during laparotomy, which had consolidated the postulate of fistula formation between the bowel and the urinary system as the reason for finding *ascaris* within the urinary system.

Reported a 47-year-old para five (all alive and healthy) Amhara woman who had presented from rural northwest Ethiopia without any remarkable past medical history who had manifested with a complaint of difficulty to fully evacuate her urinary bladder over the preceding 1 year that was associated with protruding mass per vagina [18]. Later, she had reported that her voiding was only possible after reduction of the prolapsed organs. She also reported having undergone frequent treatment for urinary tract infection with ciprofloxacin and norfloxacin over the preceding 1 year at a nearby health facility. She did not have any history of smoking or alcohol consumption. She was a farmer living with her husband and five of her children, and she was socially active. Upon her examination during her admission, she was noted to be chronically sick looking with normal blood pressure (110/70 mmHg), pulse rate (88 beats per minute), and temperature (36.5 °C).

She had pink conjunctiva, she had non-icteric sclera, and no anterior neck mass, clear and resonant chest, quiet precordium, S1 and S2 heart sound well heard, no murmur or gallop, and flat abdomen without tenderness or a palpable mass. Upon genito-

urinary examination, she was found to have a protruded mass per vagina with uterine cervix as the leading point 6 cm below the hymenal ring. Otherwise, there were no pertinent positive findings on other parts of her body. On neurologic examination, she had intact sensory and motor function. During her laboratory tests, her haematocrit was noted to be 38% with normal renal [blood urea nitrogen (BUN)=20, creatinine=0.6] and liver functions (serum glutamic oxaloacetic transaminase (SGOT)=22, serum glutamic pyruvic transaminase (SGPT)=37); human immunodeficiency virus (HIV) test was negative; urine test showed white blood cell (WBC) count more than 10/high-power field (HPF) and there were no ova or parasites on stool examination. She had ultrasound scan of her abdomen and renal tract which demonstrated a thickened urinary bladder wall with echo debris. There were also thickened bowel and fluid-filled loops of intestine adjacent to her urinary bladder (see figure 1). No further radiography or other radiology imaging scanning was undertaken.



Figure 1: Thickened Bowel and Fluid-Filled Loops of Intestine Adjacent to Urinary Bladder. Reproduced From Under the Creative Commons Attribution License [18].

To investigate her urinary bladder mass, she underwent cystoscopy during which live ascaris was visualised swimming within her urinary bladder (see figure 2). The cystoscopy also demonstrated that there was urinary bladder mucosal oedema everywhere and broad-based non-ulcerated mass which had arisen from the dome of her urinary bladder. Entero-vesical fistula was the provisional diagnosis and explorative laparotomy was undertaken which demonstrated features which had confirmed presence of ilio-vesical fistula (see figure 3). Mass was of inflammatory origin, and there was no evidence of chronic inflammatory bowel disease of the affected small bowel. The fistula was divided and the continuity of the intestine was restored. The inflammatory mass was subjected to histopathology examination which had demonstrated features of benign inflammatory reaction. Two weeks subsequently, her pelvic organ prolapse was managed with hysterectomy and right sacrospinous ligament suspension and bilateral vaginal repair.

She was also treated with albendazole 400 mg po stat and she was discharged cured after 3 days of pelvic organ prolapse surgery. She had follow-up after 6 months and she was found to be doing well.

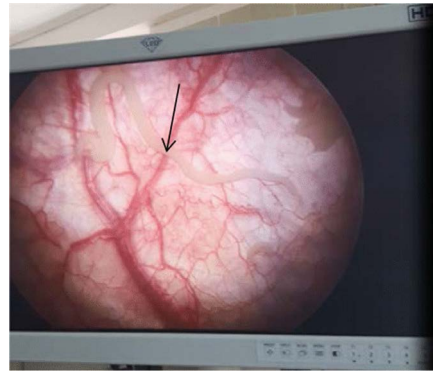


Figure 2: Live Ascaris Swimming Inside the Bladder: Arrow Shows Swimming Ascaris. Reproduced From Under the Creative Commons Attribution License [18].



Figure 3: Perforation of Ileum. Reproduced From Under the Creative Commons Attribution License [18].

Made the Ensuing Summating Discussions [18].

- They had reported a woman who had manifested to their facility with difficulty emptying her urinary bladder and protruding mass per vagina of 1 year duration.
- She underwent ultrasound scanning which demonstrated thickened urinary bladder wall with echo debris and thickened bowel with fluid-filled loops of intestine adjacent to urinary bladder.
- Hence cystoscopy was undertaken, which had demonstrated live ascaris swimming within her urinary bladder.
- It had been iterated that urinary ascariasis (UA) is an extremely rare phenomenon [23,24].
- It had also been iterated that UA is assumed to emanate from either fistula formation between the urinary system and alimentary canal or due to transurethral access of the worm into the urinary system [25].
- The most likely explanation for transurethral access might be a worm which had potentially been forced to migrate and exit per anus by deworming treatment, and subsequently moving transperineally to ascend into the urethra and urinary bladder [24].
- In their reported case, the ascaris had accessed the urinary bladder via the ilio-vesical fistula as demonstrated during laparotomy, which had supported the theory that fistula formation is a reason for urinary bladder ascariasis, which had made their case peculiar since it had not been demonstrated in other case reports so far.
- There was no other pathology identified in the rest of the pa-

tient's bowel; which had made other concomitant systemic pathologies like Crohn's disease, tuberculosis, or malignancy an unlikely cause for the fistula formation.

- The likely explanation was intestinal perforation due to ascariasis, which subsequently had elicited inflammation in the bladder, resulting in fistulous communication between bladder and ileum.
- Made the ensuing conclusions [18].
- Even though it is extremely rare to have urinary symptoms from ascariasis, it is important to have a high index of suspicion for all possibilities, particularly when other possibilities are absent and the patient is not responding to treatments.
- Their reported case had demonstrated the consequence of ascariasis, emphasizing the need for regular deworming for vulnerable sections of the community, such as farmers.
- Stated the following [25].
- The sites of physical migration of adult *Ascaris* do include: a biliary duct, liver parenchyma, pancreas, peritoneum, thoracic cavity, lacrimal duct, Eustachian tube, fallopian tube, brain, and even a pulmonary artery [26].
- Areas which are not organically part of the *Ascaris* migration pattern are accessed through fistulisation from sites which are normally infested with *Ascaris*.
- Only a limited number of reports had been available that had described the location of adult *Ascaris* forms in the urinary system.

They had reported the first description of urinary ascariasis which had caused upper urinary tract obstruction and the first case to describe ureteroscopy manipulation of *Ascaris lumbricoides* [25]. reported a 30-year-old female, who had been admitted from the emergency department (ED) with manifestations of severe sharp pain within her left lumbar region. She had experienced dull pain for two weeks preceding her admission to the hospital. She had an acute worsening of symptoms which had evolved to sharp and severe pain which had made it necessary for her to come to the emergency department. She did not have any previous history of urinary stone disease or urinary tract infections.

At the time of her admission to the emergency department, she had normal vital signs and normal physical findings except tenderness within her left groin and positive left costovertebral angle tenderness. She had ultrasound scan of her abdomen and retroperitoneal region, full blood count, and urinalysis within the emergency department which demonstrated left proximal hydro-ureter and moderate left hydronephrosis. Her laboratory analysis demonstrated mild leucocytosis of 12000/mm³, normal creatinine, and her urinalysis demonstrated calcium oxalate crystals but no evidence of non-visible haematuria. She was admitted into the urology department for presumptive diagnosis of left upper urinary tract obstruction of unknown origin. Conservative treatment was initially pursued and she had a non-contrast CT scan one day after her admission; nevertheless, it did not demonstrate the source of her upper urinary tract obstruction (see figure 4 and figure 5). Exploratory ureteroscopy was then undertaken on hospital day six due to her continuing renal colic type pain.

During ureteroscopy, a six to seven mm wax-like structure was identified within the distal third of her left ureter. This presumed foreign body was relocated with a Dormia N.Stone basket (Coloplast Minneapolis, MN) into her urinary bladder, where it was then extracted cystoscopically with rigid forceps. The removed object was 11cm in length, 6 mm to 7mm wide, dark-brown, and of tight elastic consistency.

The specimen underwent pathologic review and it was determined to be *Ascaris lumbricoides* (see figure 6).

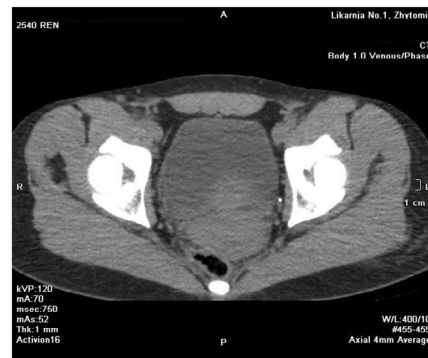


Figure 4: CT Of Pelvis Shows No Obstructing Source in the Pelvis that was Identifiable. Reproduced from [25] Under the Creative Common's Attribution License.

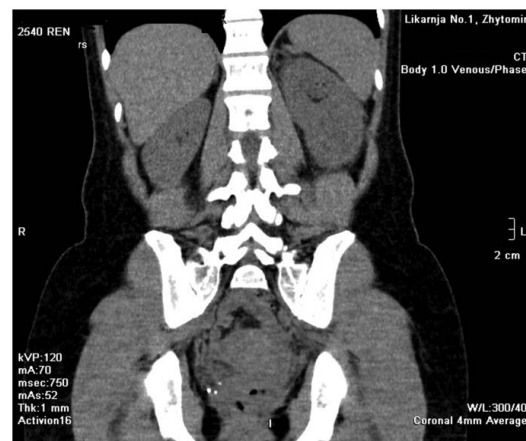


Figure 5: Coronal Images of The Ct of The Abdomen Show no Obstructing Source. Reproduced from [25] under the Creative Commons Attribution License.

The patient was reported to have an uneventful recovery. Her stool was examined for ova and parasites was negative for *Ascaris* eggs, larvae, or worms. The patient did not have any other source of *Ascaris* which was identified during her hospital stay, and she was discharged home in satisfactory condition. Made the ensuing educative discussions [25].

- Previous studies had demonstrated that maturation of the *Ascaris* larva into the adult worm form is only possible within the gastrointestinal tract system.
- At the time of the report of their case, there were only two postulates on how *Ascaris lumbricoides* could be introduced into the urinary tract system. This includes fistula formation between the gastrointestinal and urinary tract system or by

- retrograde migration of the adult worm through the urethra.
- It had been stated that urethral migration is generally precipitated by stressful conditions such as fever, illness, anaesthesia, or previous anthelmintic medications [26,27].
- The most commonly reported site of urinary tract ascariasis is the urinary bladder.
- There were only two other case reports which had reported *Ascaris* localizing to other parts of the urinary tract system.
- Had reported a case of 39-year-old man who had expelled the worm form through micturition and who had no symptoms other than tingling sensation within his penis and painless visible haematuria. His further investigation demonstrated no connection between the gastrointestinal tract and his urinary tract system, but had demonstrated a right renal stone. Examinations for ova and parasites were documented to be negative for *Ascaris* [28].
- Had reported the case of a 51-year-old man who had generalized oedema and anuria. After his urethral catheterization two worms were entrapped into his urine collection bag [23].
- Had reported a case of a 35-year-old-lady with acute urinary retention that commenced two days after mebendazole treatment. *Ascaris lumbricoides* was excreted through the urinary catheter in this case. She also had *Ascaris* noted in her stool analysis and she passed two *Ascaris* forms through her anus in next 24 hours [24].
- Reported the case of a 25 year old female who had a history of three adult *Ascaris* worms released from a subcutaneous abscess.2 During her postmortem examination, a fistula that connected the transverse colon, proximal third of left ureter, and subcutaneous tissue was found. There were also six live adult *Ascaris* forms which had her renal pelvis and major calyces [27]. The middle third of the ipsilateral ureter was blocked with a one cm stone, and was presumptively the reason why only retrograde migration and fistulisation was possible.
- Reported an example of a 6-year-old boy who was admitted to hospital a few days after his anti-helminthic treatment was commenced [26]. He was originally admitted with abdominal pain, cough, loss of appetite, fever, and passage of two adult *Ascaris* worms from the urethra. He had isotope renal scan which showed that his right kidney was non-functional and it was then surgically removed. Upon pathology examination of the nephrectomy specimen, *Ascaris lumbricoides* ova in the kidney specimen were found.
- Given the current data, they had believed that their patient had experienced retrograde invasion of *Ascaris* through urethra. No signs of fistulisation were present either radiographically or by direct visual inspection. The patient also had not had any recent illness preceding the patient's hospitalisation or had not received prior anthelmintic treatment that could precipitate urinary migration of *Ascaris* forms.
- Made the ensuing conclusions [25].
- Their reported case was different and unique from the previous cases that had been reported in the literature.
- Their reported case was the first case of urinary ascariasis manifesting with upper urinary tract obstruction and renal colic.
- Their reported case was also the first ureteroscopy ex-

traction of *Ascaris lumbricoides* which had been reported in the literature.

- The reported case had reinforced the postulate that diagnostic ureteroscopy has a role in patients with signs of obstruction but no true identifiable source.



Figure 6: Adult Form of *Ascaris Lumbricoides* After Ureteroscopic Extraction. Reproduced from under the Creative Commons Attribution License [25].

Reported a 65-year-old Caucasian man who was admitted with visible haematuria with blood clots [22]. The results of his full blood count, serum creatinine, glucose, and electrolytes were normal. His kidney ultrasound scan was normal, and the bladder was difficult to assess because of blood clots. Upon cystoscopy after evacuation of blood clots, his bladder epithelium showed a vascular-appearing structure that appeared to be bleeding. With continued bladder irrigation and the intravenous administration of etamsylate, a synthetic haemostatic agent that shortens bleeding time by increasing platelet amount, the haematuria eventually settled and the patient was discharged. Histopathology examination of the urinary bladder tissue sample revealed chronic cystitis. After discharge, however, his polyuria and painful urination continued. His urine culture tested negative, and despite treatment with anticholinergic agents, the patient's symptoms had persisted. One day during micturition, the patient excreted a worm, which was subsequently identified as *Ascaris lumbricoides*. After this, he was completely asymptomatic. made the ensuing conclusions [22].

- Genitourinary ascariasis is extremely rare because it is not involved in the migration path from the lungs to the intestines.
- The mechanism for genitourinary infection is not clear.
- The worms are considered to enter the urinary bladder transurethrally or via an entero-vesicular fistula.

Conclusions

- Ascariasis of the urinary bladder, or kidney and or upper urinary tract is a rare infection and its diagnosis requires a high index of suspicion.
- Ascariasis of the urinary bladder, kidney, ureter or upper urinary tract may be asymptomatic or manifest with non-specific symptoms which tend to be associated with more common conditions of the urinary bladder, ureter kidney or the urinary tract.
- Even though Ascariasis of the urinary bladder, kidney and upper urinary tract would tend to be more commonly encountered in Ascariasis endemic areas of the world, because

of regular global travels, Ascariasis of the urinary bladder, kidney or urinary tract could be encountered anywhere within the world.

Conflict of Interest – Nil

Acknowledgements

Acknowledgements To: Journal of Medical Case Reports for granting permission for reproduction of figures and contents of their journal article under copyright: Copyright © The Author(s) 2021. Open Access. This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Urology Case Reports and Elsevier for granting permission for reproduction of figures and contents of their journal article under copyright: Copyright © 2018 Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

References

1. De Lima Corvino D F, Horrall F (2023) Ascariasis Start-Pearls Publishing 2024 January Last Updated <https://www.ncbi.nlm.nih.gov/books/NBK430796/>.
2. Fahim SM, Das S, Gazi MA, Mahfuz M, Ahmed T (2018) Association of intestinal pathogens with faecal markers of environmental enteric dysfunction among slum-dwelling children in the first 2 years of life in Bangladesh. *Trop Med Int Health* 23: 1242-1250. <https://pubmed.ncbi.nlm.nih.gov/30133067/>.
3. Darlington CD, Anitha GFS, Ascaridial Volvulus: An Uncommon Cause of Ileal Perforation. *Iran J Med Sci* 43: 432-435. <https://pubmed.ncbi.nlm.nih.gov/30046214/>.
4. Zakzuk J, Casadiego S, Mercado A, Alvis-Guzman N, Caraballo L (2018) *Ascaris lumbricoides* infection induces both, reduction and increase of asthma symptoms in a rural community. *Acta Trop* 187: 1-4. doi: 10.1016/j.actatropica.2018.07.016. Epub 2018 Jul 21. PMID: 30040946. <https://pubmed.ncbi.nlm.nih.gov/30040946/>.
5. Adu-Gyasi D, Asante KP, Frempong MT, Gyasi DK, Iddrisu LF, et al. (2018) Epidemiology of soil transmitted Helminth infections in the middle-belt of Ghana, Africa. *Parasite Epidemiol Control* 3: e00071. doi: 10.1016/j.parepi.2018.e00071. PMID: 29988303; PMCID: PMC6020085. <https://pubmed.ncbi.nlm.nih.gov/29988303/>.
6. Sharma M, Somani P, Prasad R, Jindal S, Pathak A (2017) Biliary ascariasis: mimicker of biliary stent. *VideoGIE* 2: 179-181. doi: 10.1016/j.vgie.2017.04.001. PMID: 29905283; PMCID: PMC5991772. <https://pubmed.ncbi.nlm.nih.gov/29905283/>.
7. Sklyarova VO (2018) [Epidemiological features of parasitary invasis in women of reproductive age with disorders of reproductive health]. *Wiad Lek* 71: 674-677. Ukrainian. PMID: 29783245. <https://pubmed.ncbi.nlm.nih.gov/29783245/>.
8. Claus PE, Ceuppens AS, Cool M, Alliet G (2018) *Ascaris lumbricoides*: challenges in diagnosis, treatment and prevention strategies in a European refugee camp. *Acta Clin Belg*. 73: 431-434. doi: 10.1080/17843286.2018.1436956. Epub 2018 Feb 19. PMID: 29458300. <https://pubmed.ncbi.nlm.nih.gov/29458300/>.
9. Sharma A, Jariwala P, Kaur N (2018) Biliary ascariasis presenting with gangrenous perforation of the gall bladder: report of a case and brief review of literature. *Trop Doct*. 48: 242-245. doi: 10.1177/0049475518768103. Epub 2018 Apr 13. PMID: 29649951. <https://pubmed.ncbi.nlm.nih.gov/29649951/>.
10. Bradbury RS, Harrington H, Kekeubata E, Esau D, Esau T, et al. (2018) High prevalence of ascariasis on two coral atolls in the Solomon Islands. *Trans R Soc Trop Med Hyg* 112: 193-199. <https://pubmed.ncbi.nlm.nih.gov/29800343/>.
11. Ghosh G, Shah S, Maltz C (2018) Ascariasis Diagnosed by Wireless Capsule Endoscopy. *Clin Gastroenterol Hepatol* 16: A23. <https://pubmed.ncbi.nlm.nih.gov/28865763/>.
12. Wright JE, Werkman M, Dunn JC, Anderson RM (2018) Current epidemiological evidence for predisposition to high or low intensity human helminth infection: a systematic review. *Parasit Vectors* 11 :65. doi: 10.1186/s13071-018-2656-4. PMID: 29382360; PMCID: PMC5791198. <https://pubmed.ncbi.nlm.nih.gov/29382360/>.
13. Bharti B, Bharti S, Khurana S (2018) Worm Infestation: Diagnosis, Treatment and Prevention. *Indian J Pediatr* 85: 1017-1024. doi: 10.1007/s12098-017-2505-z. Epub 2017 Nov 11. PMID: 29127616. <https://pubmed.ncbi.nlm.nih.gov/29127616/>.
14. Silber SA, Diro E, Workneh N, Mekonnen Z, Levecke B, Steinmann P, et al. (2017) Efficacy and Safety of a Single-Dose Mebendazole 500 mg Chewable, Rapidly-Disintegrating Tablet for *Ascaris lumbricoides* and *Trichuris trichiura* Infection Treatment in Pediatric Patients: A Double-Blind, Randomized, Placebo-Controlled, Phase 3 Study. *Am J Trop Med Hyg* 97: 1851-1856. doi: 10.4269/ajtmh.17-0108. Epub 2017 Aug 31. PMID: 29016336; PMCID: PMC5805036. <https://pubmed.ncbi.nlm.nih.gov/29016336/>.
15. Mara D (2011) Water- and wastewater-related disease and infection risks: what is an appropriate value for the maximum tolerable additional burden of disease? *J Water Health* 9: 217-224. <https://pubmed.ncbi.nlm.nih.gov/21942188/>.
16. GBD 2015 (2016) Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310

- diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 388: 1545-1602. <https://pubmed.ncbi.nlm.nih.gov/27733282/>.
17. Olds GR (2013) Deworming the world. *Trans Am Clin Climatol Assoc* 124: 265-74. PMID: 23874034; PMCID: PMC3715900. <https://pubmed.ncbi.nlm.nih.gov/23874034/>.
 18. Mesele G, Mengistu Z (2021) Live ascaris in urinary bladder: a case report. *J Med Case Rep* 15: 480. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8482685/>.
 19. Montresor A, Mupfasoni D, Mikhailov A, Mwinzi P, Lucianez A, et al. (2020) The global progress of soil-transmitted helminthiasis control in 2020 and World Health Organization targets for 2030. *PLoS Negl Trop Dis* 14: e0008505. doi: 10.1371/journal.pntd.0008505. PMID: 32776942; PMCID: PMC7446869. <https://pubmed.ncbi.nlm.nih.gov/32776942/>.
 20. Pullan RL, Smith JL, Jasrasaria R, Brooker SJ (2014) Global numbers of infection and disease burden of soil transmitted helminth infections in 2010. *Parasit Vectors* 7: 37. <https://pubmed.ncbi.nlm.nih.gov/24447578/>.
 21. Khuroo MS, Rather AA, Khuroo NS, Khuroo MS (2016) Hepatobiliary and pancreatic ascariasis. *World J Gastroenterol* 22: 7507-7517. doi: 10.3748/wjg.v22.i33.7507. PMID: 27672273; PMCID: PMC5011666. <https://pubmed.ncbi.nlm.nih.gov/27672273/>.
 22. Purpurowicz Z, Roslan M, Purpurowicz Ł, Ciepliński J (2017) Hematuria from urinary ascariasis. *Kidney Int* 91: 1521. <https://pubmed.ncbi.nlm.nih.gov/28501309/>.
 23. Gupta P, Sundaram V, Abraham G, Shantha GP, Mathew M (2009) Obstructive uropathy from *Ascaris lumbricoides*. *Kidney Int* 75: 1242. doi: 10.1038/ki.2008.428. PMID: 19444277. <https://pubmed.ncbi.nlm.nih.gov/19444277/>.
 24. Singh D, Vasudeva P, Dalela D, Sankhwar SN (2010) *Ascaris lumbricoides*: a stranger in the urinary bladder causing urinary retention. *J Postgrad Med* 56: 222-223. doi: 10.4103/0022-3859.68641. PMID: 20739775. <https://pubmed.ncbi.nlm.nih.gov/20739775/>.
 25. Baralo B, Gurram S, Steckel J, Chulii M, Sharpilo A (2018) *Ascaris* in the urinary tract: A case report and review of the literature. *Urol Case Rep* 17: 82-84. <https://pubmed.ncbi.nlm.nih.gov/29387563/>.
 26. Taylor KL (1995) Ascariasis of the kidney. *Pediatr Pathol Lab Med* 15: 609-615. doi: 10.3109/15513819509026996. PMID: 8597847. <https://pubmed.ncbi.nlm.nih.gov/8597847/>.
 27. Bustamante-Sarabia J, Martuscelli A, Tay J (1977) Ectopic ascariasis: report of a case with adult worms in the kidney. *Am J Trop Med Hyg* 26: 568-569. doi: 10.4269/ajtmh.1977.26.568. PMID: 869110. <https://pubmed.ncbi.nlm.nih.gov/869110/>.
 28. Quick G, Sheikho SH, Walker JS (2001) Urinary ascariasis in a man with hematuria. *South Med J* 94: 454-455. PMID: 11332920. <https://pubmed.ncbi.nlm.nih.gov/11332920/>.

Copyright: ©2024 Anthony kodzo-grey venyo. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.