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SHORT COMMUNICATION

Strongyloides stercoralis larvae in the urine of a patient with transitional cell carcinoma of the bladder: a case report

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Abstract Disseminated infection with *Strongyloides stercoralis* refers to the massive migration of infective larvae from the gastrointestinal tract to other organs that are not involved in the normal life cycle of the parasite. We describe the case of a Nigerian male with transitional cell carcinoma of the bladder in whom larvae of *S. stercoralis* was identified in the urine. This report involves a 60-year old male Nigerian presenting to the Urology clinic of the Jos University teaching hospital, Nigeria with disseminated *S. stercoralis.* The index patient presented with a 5 month history of total haematuria, urinary frequency, urgency, nocturia, straining to pass urine, feeling of incomplete voiding and terminal dribbling. He also had episodes of suprapubic pain. Physical examination revealed a cachexic patient who had mild suprapubic tenderness. Urinary examination showed numerous red blood cells and rhabditiform larvae of *S. stercoralis*. Abdominal ultrasound revealed a heterogeneous mass in the urinary bladder measuring 4.0 × 3.3 cm. Abdominal computed tomography also showed an irregular mass measuring 4.2 × 3.8 cm with HU of 41 projecting into the bladder from the posterior wall towards the dome. Histology of the biopsy specimen revealed transitional cell carcinoma. The patient was treated with a single dose of oral ivermectin but died 1 week later. Physicians working in areas that are endemic for *S. stercoralis* should consider investigating immunocompromised patients for *S. stercoralis* infection given the poor prognosis of disseminated infection in this group of patients.

Keywords *Strongyloides stercoralis* · Jos · Disseminated · Transitional cell cancer · Ivermectin

Introduction

Strongyloides stercoralis is a common parasitic roundworm which is estimated to infect 30–100 million people worldwide (Puthiyakunnon et al. 2014). *S. stercoralis* exists in three forms namely the infective filariform larva, rhabditiform larva and the adult. The filariform larva pierces the skin or mucous membranes and migrates from the subcutaneous or submucosal sites via venous circulation to the lungs (Brooker and Bundy 2009). In the lungs the larva ascend the bronchi and trachea and are subsequently swallowed, and reach the small intestine where eggs are produced (Mahmoud 1996). The eggs hatch in the bowel into rhabditiform larvae which are passed out in the faeces and then develop into filariform larvae. Autoinfection occurs when rhabditiform larvae become infective filariform larvae which reinvade the bowel (internal autoinfection) or skin (external autoinfection).

Here we describe the case of a patient with transitional cell carcinoma of the bladder with larvae of *S. stercoralis* in the urine.

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Case presentation

A 60-year old male presented to the Urology clinic of the Jos University teaching hospital with a 5 month history of total haematuria, urinary frequency, urgency, nocturia, straining to pass urine, feeling of incomplete voiding and terminal dribbling. He also had episodes of suprapubic pain. There was no previous history of childhood haematuria or exposure to agricultural or industrial chemical agents. He was a never-smoker. He did not have diabetes and had never been on steroid medications. Physical examination revealed a cachexic patient who was afebrile and not pale. Abdominal examination revealed mild suprapubic tenderness but there were no masses felt and ascites was not present. A HIV test was negative for antibodies to HIV 1 and 2.

Urinary examination showed numerous red blood cells and rhabditiform larvae of *S. stercoralis* (Fig. 1). Abdominal ultrasound revealed a heterogeneous mass in the urinary bladder measuring 4.0 × 3.3 cm. Abdominal computed tomography (CT) also showed an irregular mass measuring 4.2 × 3.8 cm with HU of 41 projecting into the bladder from the posterior wall towards the dome. No ascites, liver deposits or abdominal lymph nodes were found. Cystoscopy confirmed the presence of the mass and histology of the biopsy specimen revealed transitional cell carcinoma.

A diagnosis of invasive bladder transitional cell carcinoma and vesical strongyloidiasis was made. The patient was treated with 12 mg of oral ivermectin daily as a single dose and the plan was to work up the patient for radical cystectomy and urinary diversion. Unfortunately, the patient died 1 week after the treatment with ivermectin but the causes of death was not ascertained as no autopsy was carried out (Fig. 2).

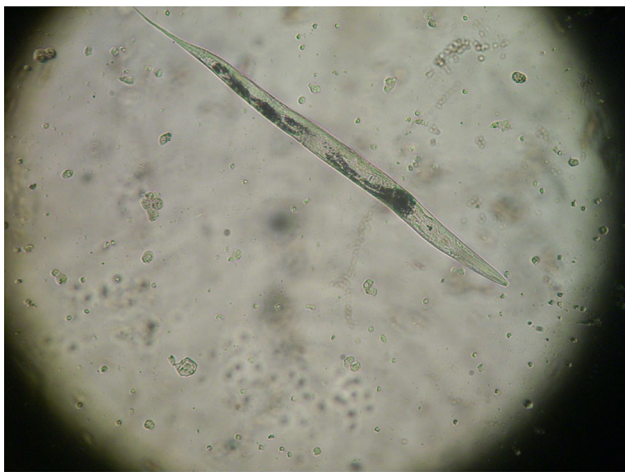

Fig. 1 Rhabditiform larva of *Strongyloides stercoralis* as seen in urine sediment (× 100)

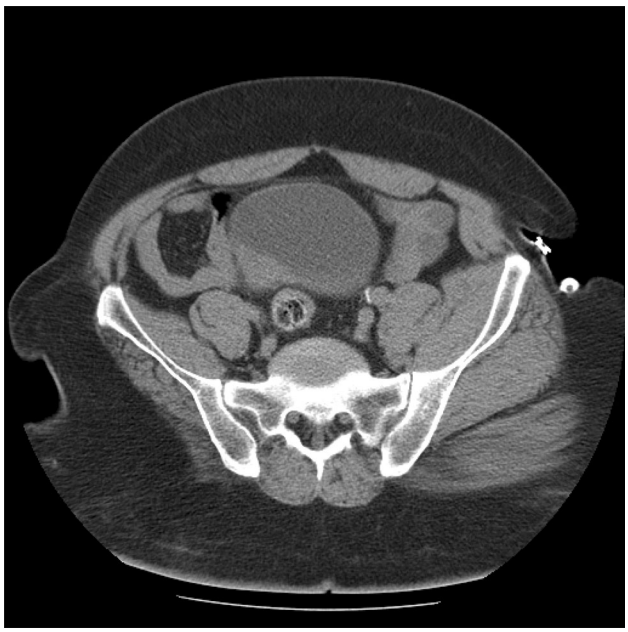

Fig. 2 Pelvic computed tomography scan showing enhancing bladder mass in the right posterior wall of the urinary bladder

Discussion

This finding of *S. stercoralis* occurring in the setting of advanced transitional cell carcinoma of the bladder was unexpected and caused us to review the clinical syndromes associated with *S. stercoralis* infection. These include: acute and chronic strongyloidiasis, hyperinfection and disseminated infection (Keiser and Nutman 2004). Hyperinfection and disseminated disease are severe forms that occur in immunocompromised patients. In hyperinfection, the parasite's life cycle is amplified and the larvae does not spread outside of the usual migration route of the gastrointestinal tract and the lungs (Puthiyakunnon et al. 2014). This is typically seen in the setting of impaired immunity such as impaired T cell function (Mahmoud 1996). In disseminated disease, the infective larvae migrate to other organs aside from the lungs e.g. skin, liver, mesenteric lymph nodes, gallbladder, heart, and central nervous system (Puthiyakunnon et al. 2014; Mahmoud 1996). Both hyperinfection and disseminated *Strongyloides* disease have been associated with a host of conditions such as diabetes mellitus, nephrotic syndrome, haematologic malignancies, HTLV-1 infection, immunosuppressive drug therapy and HIV-AIDS (Purvis et al. 1992; Safdar et al. 2014; Malakoutian et al. 2015; Gotuzzo et al. 1999; Stewart et al. 2011; Roxby et al. 2009; Azira and Zeehaida 2010; Mori et al. 1998; Altintop et al. 2010).

Our finding the larvae of *S. stercoralis* in the urine of this patient reflects disseminated disease. In disseminated strongyloidiasis, cough, haemoptysis, pneumonia and

respiratory failure may occur where the infective larvae migrate from the gastrointestinal tract to the lungs. Meningitis and brain abscesses are sequelae of migration of larvae into the central nervous system. Other complications of disseminated strongyloidiasis include sepsis and meningitis following translocation of gram negative bacteria into the bloodstream through ulcers in the bowel. Disseminated strongyloidiasis is a very serious disease as mortality approaches 100% if untreated and may exceed 25% despite treatment (Maguire 2015).

Urinary strongyloidiasis has been reported in a patient diagnosed with hypopharyngeal cancer who was receiving a combination of fluorouracil, cisplatin and corticosteroids (Pasqualotto et al. 2009), in another diagnosed with genitourinary infection of *S. stercoralis* (Whitehill and Miller 1944), and among a cohort of kidney transplant patients (Pocaterra et al. 2016). To the best of our knowledge, this is the first report of *S. stercoralis* in the urine of a patient with transitional cell carcinoma of the bladder in an endemic country.

Despite the high mortality that is attributable to disseminated strongyloidiasis, there is a dearth of literature on this in endemic countries. A systematic review of case reports of severe *S. stercoralis* cases revealed several cases which have been described in non-endemic countries (Buonfrate et al. 2013; Fowler et al. 1982; Morgan et al. 1986). However, two of the conditions that predispose to severe strongyloidiasis namely: HIV/AIDS and malnutrition particularly abound in endemic countries. Although the index patient had of transitional cell carcinoma of the bladder, it is plausible that malnutrition could have contributed to the development of disseminated strongyloidiasis. Ivermectin is considered to be the drug of choice in cases of severe strongyloidiasis. It is better tolerated than thiabendazole and has better rates of larval clearance from stool than albendazole (Keiser and Nutman 2004).

Conclusion

This case report highlights the need for physicians working in areas that are endemic for *S. stercoralis* to investigate immunocompromised patients for *S. stercoralis* infection given the poor prognosis of disseminated infection in this group of patients.

Authors' contribution IOI conceived the case report; ICA was directly involved in treating the patient; IOI and KIO ran the laboratory tests; IOI, AAO and ICA made the first draft; all authors read and edited the first draft for intellectual content.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Informed consent Informed consent was obtained from the next of kin of this patient to proceed with this report.

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