

Human Pentastomiasis

Odalys Rivera^{1,2}, Abdul Subulr Yakubu^{1,3}, Manuel Betancourt Benjamin^{2,4}

Departments of ¹Medicine, and ⁴Radiology, Tamale Teaching Hospital, P. O. Box 16, ²University for Development Studies School of Medicine and Health Sciences, Tamale, ³Internal Medicine Resident, Korle bu Teaching Hospital, Accra, Ghana

Correspondence: Dr. Abdul-Subulr Yakubu, Department of Medicine, Tamale Teaching Hospital, P. O Box 16, Tamale, Northern Region, Ghana. E-mail: subulr87@gmail.com

ABSTRACT

Pentastomiasis is a parasitic zoonotic disease caused by the larval stages of pentastomes, most often *Armillifer armillatus*. Human infections are rarely symptomatic, and diagnosis is usually made incidentally. We report here, the case of a 60-year-old man who was diagnosed with human pentastomiasis while being worked-up and treated for multiple myeloma. The diagnosis was made radiologically based on the characteristic multiple crescentic/C-shaped opacities seen on the abdominal and chest X-rays in keeping with *Armillifer* species infection. He also had the compatible history of exposure to and consumption of snake meat. This is the first documented case of human pentastomiasis at our facility and to the best of our knowledge the first to be associated with snake-eating in Ghana.

Key words: *Armillifer armillatus*; pentastomiasis; zoonosis

Introduction

Human pentastomiasis is a parasitic zoonosis caused by larvae of pentastomes. The majority of human cases are caused by nymphs of *Linguatula* and *Armillifer* species with *Armillifer armillatus* responsible for most documented human infections especially in West and Central Africa where an increasing number of human infections are being recognized.^[1] The pentastomids are widely distributed with *A. armillatus* and *A. grandis* found in Africa, whereas *A. agkistrodontis* and *A. moniliformis* predominate in Asia.^[2]

Human pentastomiasis was officially first documented in Ghana in 2006^[3] and has been linked with python totemism.^[4] We report here a case of pentastomiasis, diagnosed radiologically, in a 60-year-old male with a history of consumption of snake meat.

Case Report

We present a 60-year-old farmer who presented to our facility on March 5, 2014 with 2 weeks history of abdominal and

waist pains and weakness of both lower limbs. He had a cough productive of whitish sputum and had significant weight loss. He is a peasant farmer, does not consume alcohol but smokes cigarettes. He admitted consuming the undercooked meat of snakes (mainly python) that he had often killed on his farm. He started consuming the meat of snakes since he was a child.

Examination revealed an emaciated elderly man who was pale, afebrile, and anicteric. He was dehydrated and had bilateral inguinal lymphadenopathy. He had a respiratory rate of 22 cpm with bronchial breath sounds and coarse crepitations on the right lower lung zones. He had right upper quadrant and right flank tenderness. His liver was palpable 6 cm below the right costal margin. The kidneys and spleen were not palpable. His prostate gland was firm and moderately enlarged. Blood pressure was 140/100 mmHg and pulse 82 bpm with normal heart sounds. He had tenderness in the lumbosacral region and reduced power in both lower limbs (3/5) but normal in the upper limbs (5/5) and no sensory deficit.

Plain abdominopelvic [Figures 1-3] radiographs showed multiple C-shaped (crescentic) opacities in all quadrants of the

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Figure 1: Abdominal X-ray showing multiple crescentic calcifications in all quadrants



Figure 2: Close-up view of abdominal X-ray demonstrating characteristic horseshoe-shaped calcifications

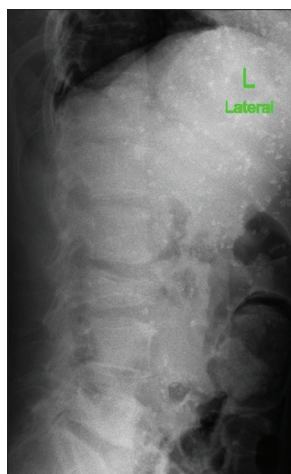


Figure 3: Lateral abdominal X-ray showing multiple C-shaped calcifications

abdomen consistent with the calcified nymphs of *Armillifer* species infestation.^[4] Abdominal ultrasound confirmed multiple hyperechoic lesions in the liver and spleen.

Lumbosacral spine X-rays showed lytic changes and the collapse of the 3rd lumbar vertebra. His complete blood count showed a total white cell count of $10.34 \times 10^3/\mu\text{l}$ (neutrophils 32%, lymphocytes 58%, monocytes 8%, basophils 0.3%, and eosinophils 1.1%), hemoglobin of 6.9 g/dl and platelets of $87 \times 10^3/\mu\text{l}$. A blood film showed the rouleaux formation of red blood cells. Plasma cells made up 4% of nucleated cells. Erythrocyte sedimentation rate was 140 mm/h, and serum total protein was markedly elevated with a globulin fraction of 96 g/L and albumin of 27 g/L with slightly elevated liver enzymes. Serum creatinine was elevated at 141.4 $\mu\text{mol/L}$ with potassium at 2.8 mmol/L, sodium 138 mmol/L, calcium 6.1 mg/dl, and uric acid 716.4 $\mu\text{mol/L}$. His serum prostate-specific antigen was 0.65 ng/ml. *Klebsiella pneumonia* was cultured from his sputum, and was sensitive to ciprofloxacin.

An impression of multiple myeloma complicated by pneumonia, anemia, and thrombocytopenia with paraparesis was made. This was confirmed by a paraprotein band on serum protein electrophoresis and bone marrow smear showing numerous malignant plasma cells. A radiological diagnosis of pentastomiasis due to *Armillifer* species infestation was made based on the characteristic radiographic features,^[5,6] and history of contact and consumption of inadequately processed snake meat.

He had several episodes of epistaxis shortly after admission. He received multiple blood transfusions and intravenous ciprofloxacin for the *K. pneumonia* infection and a course of anthelmintics (mebendazole and praziquantel).

He progressively deteriorated with worsening fever and epistaxis and died on the April 2, 2014 from overwhelming sepsis with coagulopathy 4 weeks after admission. He had not been started on chemotherapy before his death. His relatives declined an autopsy citing religious reasons.

Discussion

More than 90% of human visceral pentastomiasis cases are caused by the nymphs of only two species, *L. serrata* and *A. armillatus*.^[6] The majority of cases have been reported from Africa, Malaysia, and the Middle East.

Adult *Armillifer* spp. inhabit the respiratory tract of large snakes.^[7] They produce large amounts of ova that are shed into the environment in snake feces and secretions. Intermediate hosts such as rodents ingest the ova, which hatch and larvae migrate to the viscera, encyst, and molt several times. The life cycle is completed when these rodents are ingested by the snake. Humans become accidental intermediate hosts after uptake of environmental parasite ova from respiratory secretions or feces from the final hosts (large snakes) or by consumption of contaminated snake meat.^[8] Risk factors for infestation include eating poorly-cooked snake meat and

contact with live snakes and exposure to their secretions as occurs in snake farming and pet keeping, harvesting snake skins or tribal totemism.^[1,4]

Most cases of human pentastomiasis are usually identified incidentally during the autopsy, surgery or during workup for an unrelated condition.^[6,9,10] When symptoms are attributable to the presence of pentastomids, it usually depends on the organ system involved and results from the death of the nymphs or their migration.^[6] Patients may develop abdominal pain, chronic cough, or night sweats.^[6] In heavy infections with *Armillifer* spp., death may occur due to secondary septicemia, pneumonia, severe enterocolitis or liver failure. Unlike cysticercosis, which has a predilection for skeletal muscle and brain, pentastomids tends to reside in subperitoneal tissue, in the intestinal wall, liver parenchyma and abdominal lymph nodes, and are not found in skeletal muscle.^[9,11] Our patient had tender hepatomegaly and right flank associated with the very heavy parasitic infestation as evidenced by the numerous calcified nymphs seen on the abdominal radiograph. It is noteworthy that the patient had so many larvae and a normal eosinophil count.

Definite diagnosis often relies on histopathological examinations.^[5,6] Recently, polymerase chain reaction has been developed for diagnosis though not widely available.^[8] Diagnosis can be made radiologically when calcified nymphs of *Armillifer* spp. and less often *L. serrata* are detected on the chest or abdominal radiographs, showing a horseshoe or C-shaped structure.^[5,6]

In asymptomatic patients, no treatment is necessary. In symptomatic infections with heavy infestations, surgery is recommended to relieve obstruction and compressive symptoms. There is no proven effective antiparasitic chemotherapy for pentastomiasis; however mebendazole, ivermectin, and praziquantel have been used in individual cases with apparent success in some cases.^[12,13]

The first human infection by pentastomids was described by Prunner in 1847 in Cairo, Egypt.^[11] Human pentastomiasis was officially first documented in Ghana by Dakubo *et al.* in 2006 in a 55-year-old farmer as an incidental finding during laparotomy for small bowel obstruction.^[3] In a series of 30 autopsies, a pentastomiasis prevalence of 45.4% was found in adult aborigines in West Malaysia^[10] where snake-eating is common.

The accidental discovery of an abnormal radiograph, in this case, fits the usual mode of presentation of this condition and should be considered in the differential diagnosis of abnormal calcification on radiographs. Even though it is impossible to discriminate between the various species of pentastomids by X-ray, *A. armillatus*, which predominates in West Africa, is the most likely species involved in this case.

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Conflicts of interest

There are no conflicts of interest.

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