Review Article

Helminthic infections mimicking malignancy: a review of published case reports

Florian H. Pilsczek

Immunology Research Group, Department of Physiology and Biophysics, University of Calgary, Calgary, Alberta, Canada

Abstract

Background: Infectious diseases, including infections with helminths, can initially present similarly to malignancies. The goal of the article is to review reports of helminthic infections that are initially diagnosed as malignancy.

Methodology: The database PubMed was searched for English language references published as of July 2009.

Results: The following published case reports and case series, mainly from Asia and Africa, were identified: Nematodes: 8 publications (1 patient with *Angiostrongylus cantonensis*, 2 *Stronglyloides stercoralis*, 1 *Toxocara* species, 1 *Dioctophyma renale*, 1 *Ascaris* species, 1 *Gnathostoma spinigerum*, 1 *Dirofilaria repens*); *Trematodes*: 7 publications (46 patients with *Schistosoma* species, 2 *Fasciola hepatica*, 1 *Paragonimus westermani*); Cestodes: 6 publications (10 patients with *Echinococcus* species, 1 *Sparganum mansoni*).

Conclusion: To avoid unnecessary investigations and treatment, physicians should be aware when diagnosing patients from Asia or Africa that a large number of helminthic infections can present similar to malignancies.

Key words: Helminths, malignancy, misdiagnosis

J Infect Dev Ctries 2010; 4(7):425-429.

(Received 16 January 2010 – Accepted 15 April 2010)

Introduction

Infectious diseases can have an initial presentation similar to that of malignancy. For example, infection with *Actinomyces* species bacteria causes infiltrative tissue growth similar to that seen in lung cancer, pelvic tumor, or colon cancer [1]; protozoal disease, *e.g.* with *Entamoeba histolytica*, can involve the colon and cause ulceration of the mucosa similar to carcinoma [2]; viral infection with Epstein-Barr virus can cause proliferation of lymphocytes similar to T-cell leukemia [3]; and fungal infection with *Cryptococcus gattii* can cause lesions similar to those of lung and brain cancer [4].

Familiarity with infections presenting with features similar to malignancy is useful because infections initially diagnosed as malignancy and then managed and treated accordingly, can lead to unnecessary interventions, including invasive procedures. Infections, however, are effectively treated with antibiotics and early diagnosis will be beneficial. Therefore, this article focuses on helminthic infections and reviews published case reports of helminthic infections which were initially considered to be malignancies.

Materials and methods

PubMed was searched for English language references published as of July 2009 using different combinations of the following terms: "helminth", "nematode", "trematode", "cestode", "malignancy", "mimicking", "misdiagnosis". Spelling variants of the search terms were included. Reports of patients with the final diagnosis of infection with helminths, but where the cause of the disease was initially considered to be malignancy, were included in the study. Reports describing infections (*e.g.* *Opisthorchis* species and *Clonorchis* species) with coexisting malignancy were excluded.

Results

This review identified 21 published reports of helminthic infections, describing in total 68 patients, which were initially considered to be malignancies (Table 1).

Table1. Summary of published reports of patients with helminthic infection, which were initially considered to be malignancies.

Malignancy	Infection	Location	Diagnostic study	Patient details*	Management	Duration of symptoms[#]	Outcome
Nematodes							
Spinal cord tumor(15)	*Angiostrongylus cantonensis*	Spinal cord (T7-T10)	Histology	26, male, Thailand	Resection	6 months	Unknown
Lung cancer(16)	*Stronglyloides stercoralis*	Lung	Cytology	79, male, Spain	Thiabendazole	1 week	Death
Duodenum adenocarcinoma(17)	*Stronglyloides stercoralis*	Duodenum	Histology	40, female, Iran	Thiabendazole	10 years	Death (2 days)
Disseminated tumor(18)	*Toxocara* species	Liver, lung, spinal cord Past medical history of retinoblastoma	Serology	4, male, Canada	Albendazole Prednisone	Unknown	Unknown
Retroperitoneal mass(19)	*Dioctophyma renale*	Retroperitoneum	Histology	50, male, China	Resection	4 weeks	Unknown
Liver metastasis(20)	*Ascaris* species	Past medical history of malignant melanoma	Histology	40, male, Germany	Liver resection	NA	Unknown
Spinal cord tumor(21)	*Gnathostoma spinigerum*	Cervical and thoracic spine	Histology	4, male, Thailand	Albendazole Metronidazole	2 weeks	Improved
Scrotal tumor(22)	*Dirofilaria repens*	Scrotum	Histology Serology	28, male, Tunisia	Excision	3 weeks	Unknown
Trematodes							
Cervical cancer(5)	*Schistosoma* species	Cervix	Histology	40 patients, Tanzania	Unknown	Unknown	Unknown
Spinal cord tumor(10)	*Schistosoma mansoni*	Thoracic spinal cord	Serology Histology	46, male, Brazil	Praziqunatel	1 year	Improved symptoms
Spinal cord tumor(11)	*Schistosoma mansoni*	Spinal cord T7 – T11	Histology Stool	6, female, Sierra Leone	Praziquantel	2 days	Walking with braces (6 months)
Brain tumor(6)	*Schistosoma* species	Dura mater	Histology	21, female, Brazil	Oxamniquine Resection	3 months	Unknown
As above	*Schistosoma mansoni*	Cerebellum	Histology Stool	31, male, Brazil	Oxamniquine Resection	1 month	Unknown
As above	*Schistosoma* species	Cerebellum	Histology	11, male, Brazil	Oxamniquine Dexamethasone Resection	3 months	Recovered
As above	*Schistosoma mansoni*	Frontal lobe and thalamus	Histology Stool	38, male, Brazil	Praziquantel Prednisone	3 months	Unknown
Colon tumor(23)	*Fasciola hepatica*	Colon	Histology, Serology	55, male, Turkey	Bithionol	1 year	Stable (1 year)
Peritoneal carcinomatosis(24)	*Fasciola hepatica*	Peritoneum	Histology Serology	37, male, France	Praziquantel, triclabendazole	7 months	"favorable"
Lung cancer(25)	*Paragonimus westermani*	Lung	Histology	66, female, Japan	Praziquantel Resection	3 months	Stable (21 days)

Table1. Continued

Cestodes							
Soft tissue tumor (7)	*Echinococcus* species	Upper and lower extremities	Histology Serology (2 cases)	33-75, 5 patients (2 male, 3 female), Turkey	Excision Hypertonic saline (2 cases) Albendazole	5 months – 8 years	One recurrence (24-54 months)
Metastasis(12)	*Echinococcus multilocularis*	Lung, abdomen, iliac bone	Histology Serology	22, female, Turkey	Albendazole	1 year	6 months
Brain tumor(13)	*Echinococcus multilocularis*	Thalamus	Histology	27, female, Turkey	Excision	2 month	Unknown
Abdominal tumor(14)	*Echinococcus* species	Right hypochondrium	Cytology	50, male, India	Unknown	3 months	Unknown
Pancoast tumor (8)	*Echinococcus* species	Ribs	Histology	27, male, Turkey 38, female, Turkey	Resection Albendazole	2 months	No recurrence (9 years; 3 months)
Brain tumor(26)	*Sparganum mansoni*	Occipitiotempo ral lobes	Histology	29, female, India	Excision	16 months	Seizure-free (9 months)
Notes: *(age, sex, country of origin); #before diagnosis; NA, Not applicable.							

Nematodes

Eight reports of patient case histories with infections with nematodes, which were initially considered to be malignancy, were identified (one patient with *Angiostrongylus cantonensis* infection, two *Stronglyloides stercoralis*, one *Toxocara species*, one *Dioctophyma renale*, one *Ascaris* species, one *Gnathostoma spinigerum*, one *Dirofilaria repens*) (Table 1). Seven infections were diagnosed based on histology or cytology and one infection based on serology. The average age of the reported patients was 33.8 years (range 4-79 years). The duration of symptoms before diagnosis was between one week and 10 years. Four patients were treated with medication and 4 patients were treated with resection. Four patients were from Asia, two from Europe, one from Africa, and one from North America.

Trematodes

Seven reports of patient case histories with infections with trematodes, which were initially considered to be malignancy, were identified (46 patients with *Schistosoma* sp. infection, two *Fasciola hepatica*, one *Paragonimus westermani*. One report [5] included 40 patients and one report [6] included four patients. In all reports, histology of lesions was used for diagnosis. The average age of reported patients was 38.8 years (range 6-66 years (Swai *et al*. [5] excluded). All were treated with drug therapy. Four patients had a tumor resected. The duration of symptoms before diagnosis was between two days and one year. Forty-one patients were from Africa and five from South America. One autochthonic patient was from Europe and two were from Asia. One report [5] described 40 patients with *Schistosoma* sp. infection of the cervix, who were initially considered to have cervical cancer. The other reported patients with *Schistosoma* species infection were initially considered to have malignancies of the spinal cord (two case reports [10,11]) or brain (four case reports [6]) (Table 1).

Cestodes

Six reports of patient case histories of infections with cestodes which were initially considered to be malignancy were identified (10 patients with *Echinococcus* sp. infection, one with *Sparganum mansoni*; one report [7] included five patients and one report [8] included two patients). In all reports histology or cytology of lesions was used for diagnosis. The average age of reported patients was 33.8 years (range 22-75 years). Eight Patients were

treated with drugs, two with hypertonic saline solution irrigation, and two had resection only. The duration of symptoms before diagnosis was between two months and eight years. All reports were from Asia including four reports of nine patient case histories from Turkey.

Discussion

The infections most frequently reported were infections with Schistosoma species (46; 68% cases) and *Echinococcus* species (10; 15% cases), and all were initially considered to be cancer. Patients with *Schistosoma* species infection were from Africa and South America and patients with *Echinococcus* species infection were from Asia.

Providing clinicians with related information may be useful and an online database for infections presenting similar to malignancy could be developed comparable to OMIM (Online Mendelian Inheritance in Man) of the National Center for Biotechnology Information [9]. For example, clinical data of patients from Africa or South America with spinal tumors caused by *Schistosoma* species granuloma similar to the cases describe by Camargos *et al*. [10] or Selwa *et al*. [11], as shown in Table 1, could be collected in the database. Users would enter search terms such as "spinal tumor" and "Africa" and receive in return reports of infections presenting similar to spinal tumor including infections with *Schistosoma* species. *Echinococcus* species infections in patients from Asia, which can present similarly to liver and lung malignancy [7,8,12-14] (Table 1), could also be included in a database. to suggest to clinicians searching terms such as "lung tumor" and "Asia" the possibility of infection in patients from Europe and Asia presenting with apparent liver and lung malignancy.

Based on the reported cases in this review, it could not be determined whether earlier recognition of a parasite infection, which can be treated with antibiotics, can improve morbidity and mortality. However, diagnosis of helminthic infection was reported for some patients [6,20,23] based on histology studies from tissue samples obtained during surgery for perceived malignancy. Invasive procedures and investigations can probably be avoided in some cases by considering helminthic infections early.

In summary, this review identified published reports of helminthic infections presenting similarly to malignancy. Familiarity with this presentation may help clinicians to come to timelier diagnoses of treatable infections when seeing patients with apparent cancer and avoid unnecessary tests and treatment. Clinicians may benefit from access to an online database for reports of infections presenting similarly to malignancy when seeing patients from Asia and Africa with apparent malignancy.

References

1. Ergul Z, Hoca O, Karahan MA, Seker D, Hucumenoglu S, Ozakkoyunlu S (2008) A transverse colonic mass secondary to Actinomyces infection mimicking cancer. Turk J Gastroenterol 19: 200-1.
2. Fernandes H, D'Souza CR, Swethadri GK, Naik CN (2009) Ameboma of the colon with amebic liver abscess mimicking metastatic colon cancer. Indian J Pathol Microbiol 52: 228-30.
3. Hu Q, Popa I, Fu K, Chen M, Chan WC (2007) Clonal CD8+ lymphocytic proliferation associated with Epstein-Barr virus infection mimicking T-cell leukemia. Leuk Lymphoma 48: 1651-3.
4. Oliveira Fde M, Severo CB, Guazzelli LS, Severo LC (2007) Cryptococcus gattii fungemia: report of a case with lung and brain lesions mimicking radiological features of malignancy. Rev Inst Med Trop Sao Paulo 49: 263-5.
5. Swai B, Poggensee G, Mtweve S, Krantz I (2006) Female genital schistosomiasis as an evidence of a neglected cause for reproductive ill-health: a retrospective histopathological study from Tanzania. BMC Infect Dis 6: 134.
6. Pittella JE, Gusmao SN, Carvalho GT, da Silveira RL, Campos GF (1996) Tumoral form of cerebral schistosomiasis mansoni. A report of four cases and a review of the literature. Clin Neurol Neurosurg 98: 15-20.
7. Basarir K, Saglik Y, Yildiz Y, Yetis T, Cebesoy O (2008) Primary muscular hydatidosis mimicking soft tissue tumour: a report of five cases. J Orthop Surg (Hong Kong) 16: 368-72.
8. Akin H, Aysun O, Melek H, Medetoglu B, Dincer I (2007) Hydatid disease of the ribs mimicking pancoast tumor: report of two cases. Thorac Cardiovasc Surg 55: 525-7.
9. Amberger J, Bocchini CA, Scott AF, Hamosh A. McKusick's Online Mendelian Inheritance in Man (OMIM) (2009) Nucleic Acids Res 37: D793-6.
10. Camargos ST, Dantas FR, Teixeira AL (2005) Schistosomal myelopathy mimicking spinal cord neoplasm. Scand J Infect Dis 37: 365-7.
11. Selwa LM, Brunberg JA, Mandell SH, Garofalo EA (1991) Spinal cord schistosomiasis: a pediatric case mimicking intrinsic cord neoplasm. Neurology 41: 755-7.
12. Ozkok A, Gul E, Okumus G, Yekeler E, Gulluoglu MG, Kiyan E, Arseven O (2008) Disseminated alveolar echinococcosis mimicking a metastatic malignancy. Intern Med 47: 1495-7.
13. Senturk S, Oguz KK, Soylemezoglu F, Inci S (2006) Cerebral alveolar echinoccosis mimicking primary brain tumor. AJNR Am J Neuroradiol 27: 420-2.
14. Babu KS, Goel D, Prayaga A, Rao IS, Kumar A (2008) Intraabdominal hydatid cyst: a case report. Acta Cytol 52: 464-6.
15. Petjom S, Chaiwun B, Settakorn J, Visrutaratna P, Rangdaeng S, Thorner PS (2002) Angiostrongylus cantonensis infection mimicking a spinal cord tumor. Ann Neurol 52: 99-101.

16. Mayayo E, Gomez-Aracil V, Azua-Blanco J, Azua-Romeo J, Capilla J, Mayayo R (2005) Strongyloides stercolaris infection mimicking a malignant tumour in a non-immunocompromised patient. Diagnosis by bronchoalveolar cytology. J Clin Pathol 58: 420-2.
17. Daneshbod Y, Daneshbod K, Negahban S Aledavud A, Taghavi A, Saberi-Firuzi M, Fattahi MR, Salahi H (2008) Intraoperative touch imprint diagnosis of Strongyloides stercoralis infection mimicking a malignant tumor. Acta Cytol 52: 387-9.
18. Ota KV, Dimaras H, Heon E, Babyn PS, Yau YC, Read S, Budning A, Gallie BL, Chan HS (2009) Toxocariasis mimicking liver, lung, and spinal cord metastases from retinoblastoma. Pediatr Infect Dis J 28: 252-4.
19. Sun T, Turnbull A, Lieberman PH, Sternberg SS (1986) Giant kidney worm (Dioctophyma renale) infection mimicking retroperitoneal neoplasm. Am J Surg Pathol 10: 508-12.
20. Maier M, Tappe D, Topfer C, Rosenwald A, Gassel HJ, Timm S (2006) Nematode infection of the liver mimicking metastasis of malignant melanoma. Liver Int 26: 742-5.
21. Bunyaratavej K, Pongpunlert W, Jongwutiwes S, Likitnukul S (2008) Spinal gnathostomiasis resembling an intrinsic cord tumor/myelitis in a 4-year-old boy. Southeast Asian J Trop Med Public Health 39: 800-3.
22. Fleck R, Kurz W, Quade B, Geginat G, Hof H. Human dirofilariasis due to Dirofilaria repens mimicking a scrotal tumor (2009) Urology 73: 209.e1,209.e3.
23. Makay O, Gurcu B, Caliskan C, Nart D, Tuncyurek M, Korkut M (2007) Ectopic fascioliasis mimicking a colon tumor. World J Gastroenterol 13: 2633-5.
24. Rangheard AS, N'Senda P, Dahan H, Tubiana JM, Arrive L (1999) Peritoneal location of fascioliasis mimicking a peritoneal carcinomatosis. J Comput Assist Tomogr 23: 699-700.
25. Osaki T, Takama T, Nakagawa M, Oyama T (2007) Pulmonary Paragonimus westermani with false-positive fluorodeoxyglucose positron emission tomography mimicking primary lung cancer. Gen Thorac Cardiovasc Surg 55: 470-2.
26. Rengarajan S, Nanjegowda N, Bhat D, Mahadevan A, Sampath S, Krishna S (2008) Cerebral sparganosis: a diagnostic challenge. Br J Neurosurg 22: 784-6.

Corresponding author

Dr. Pilsczek
New York University School of Medicine
550 First Avenue
New Bellevue Medical Center NBV 16N1
New York, NY 10016
USA
Tel: 1-212-263-6275
Email: f.h.pilsczek@gmail.com

Conflict of interests: No conflict of interests is declared.