

MANAGEMENT CHALLENGES IN NEMATODE AND TREMATODE INFECTIONS

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UNIVERSIDAD PERUANA
CAYETANO HEREDIA

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ALEXANDER VON HUMBOLDT

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**I HAVE NO CONFLICTS OF INTEREST
TO DECLARE**

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OBJECTIVES



To review complex nematode and trematode infections that represented a challenge in management



To review epidemiological and clinical features of these infections



To review therapeutic strategies for these infections



To propose potential solutions to these dilemmas

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AGENDA

- Which route should be used to treat this complex infection?
- When to consult with a surgeon?
- No response to treatment, any suggestions?

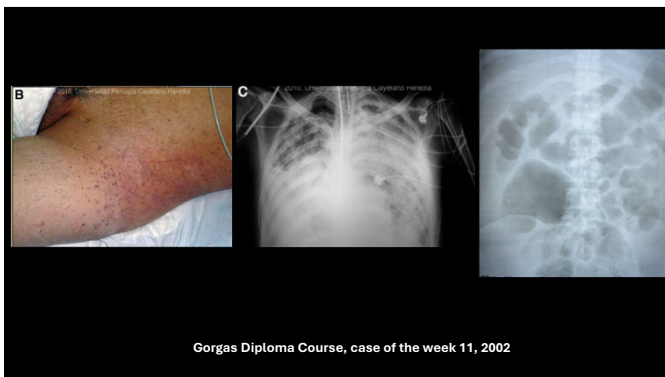
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WHICH ROUTE SHOULD BE USED TO TREAT THIS COMPLEX PATIENT?

- 24-year-old male from the jungle of Peru
- 6-month history of diarrhea, weight loss, and pruritic skin lesions
- BP 70/40, pulse 120, resp 23, limb edema, crusted lesions all over the body; distended abdomen
- progresses to ARDs and ARF

	On admission
Hemoglobin	7.3 g/dl (NN)
WBC	9600 (80 N, no eos)
Creatinine	2.3 mg/dl
Albumin	2.3 mg/dl
ALT/AST	100/27 [59/72 IU/L]
HIV ELISA;	Non-reactive;
HTLV-1;	REACTIVE

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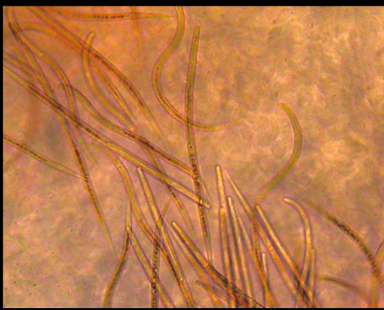


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WHAT IS THE MOST LIKELY DIAGNOSIS?

- A. Balantidiasis
- B. Intestinal amebiasis
- C. Typhoid fever
- D. Strongyloidiasis
- E. Tuberculosis

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Clin Infect Dis 2009;49 (1 October)

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WHAT IS THE DRUG OF CHOICE?

- A. Albendazole
- B. Moxidectin
- C. Ivermectin
- D. Thiabendazole
- E. Emodepside

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WHICH ROUTE SHOULD BE USED TO TREAT THIS COMPLEX PATIENT?

- A. Oral
- B. Nasogastric tube
- C. Rectal (enema)
- D. Sub cutaneous
- E. More than one

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WHAT WE KNOW ON THE TOPIC 1

- Systematic review on hyperinfection from 1998-2020
- 339 cases; India, Brazil, USA
- Median age 49.7 years (32-67); 71% male
- **93.5% comorbidities; steroids, chemo**
- Bacteremia 10%
- **Mortality rate of 44.8% (152/339)**
- **Males; 60-79; cancer; lack of treatment**
- **NO information on treatment**

Trans R Soc Trop Med Hyg 2023; 117: 682-696

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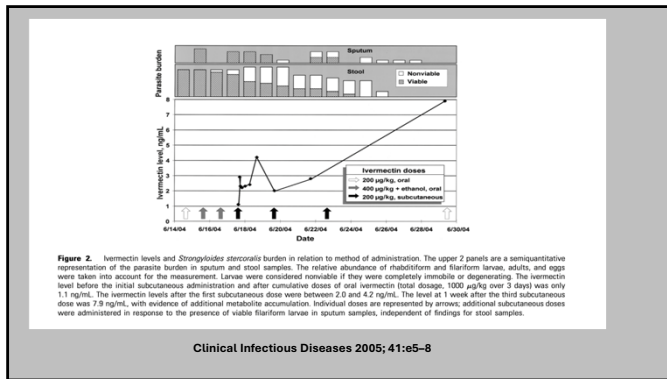
WHAT WE KNOW ON THE TOPIC 2

- Ivermectin; lipophilic; protein bound; CYP3A4; <1% renal excretion
- The oral route is usually not feasible in these patients
- Subcutaneous ivermectin: veterinary product
 - 200 ug/kg/d until stool negativization
 - adequate serum drug levels are difficult to achieve (50-100 ug/ml)
 - **no consensus guidelines on dosing regimens**
 - **how to monitor response?**
 - **toxicity?; encephalopathy**

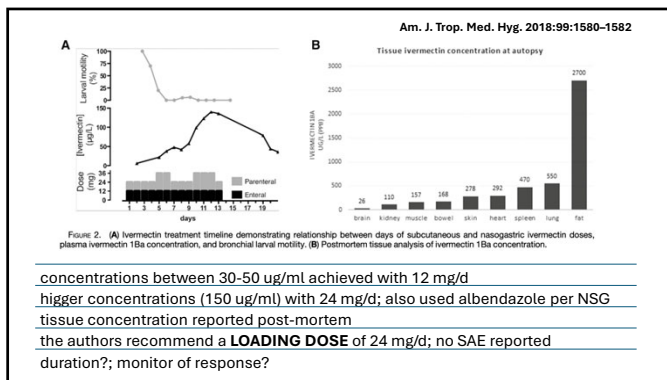
BMC Infect Dis 2013;13:78-88

Am J Trop Med Hyg 2018;99:1580-2

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OUTCOMES WITH THE SC ROUTE

- 24 patients treated until 2016:
 - doses: 75-285 µg/kg/d; most received 200 µg/kg/d on alternate days
 - no parameters to decide when to stop treatment; clinical, parasitological
 - 3-11 days of therapy
 - **11/24 survived; 46%**
- 11 additional patients reported from 2017:
 - doses: 200-353 µg/kg; 6-43 days
 - **7/11 survived; 63%; cumulative 18/35; 51%**
 - no significant toxicity reported

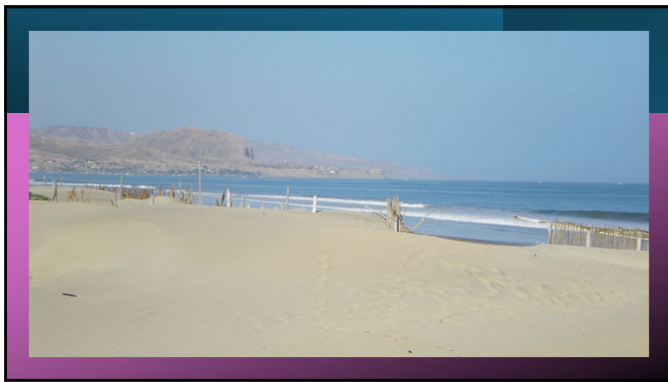
J Antimicrob Chemother 2016;71:220-225 Transp Proc 2018;50:861e866. IDCases 2025;41:e02337

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WHAT WE CAN CONCLUDE

- The **SC route alone** or with enteral (NSG) should be the route of choice
- **Loading doses** to achieve therapeutic levels
- Evaluate **efficacy** with parasite clearance-motility
- **Duration** depends on the response
- Evaluate **adverse events**
- **Urgent need for better drugs**

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WHEN TO CONSULT WITH A SURGEON?

- 52-year-old female from the highlands of Peru
- 3-month history of pain in the right upper quadrant, fever for the last 2 weeks
- no travel history, no PMH
- eats frequently raw vegetables
- normal vital signs, no jaundice, no rash, tender hepatomegaly

	On admission
Hemoglobin	14.2 g/dl
WBC	18,600 (30 N, 62 eos)
Alk phosphatase	274 IU/l (<140)
Albumin	4.3 mg/dl
ALT/AST	75/124 [59/72 IU/L]
HIV ELISA; HTLV-1;	Non-reactive

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Clinical Infectious Diseases 2011;52(9):1137

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Clinical Infectious Diseases 2011;52(9):1137

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WHAT IS THE MOST LIKELY DIAGNOSIS?

- A. Hydatidosis
- B. Amebic liver abscess
- C. Pyogenic liver abscess
- D. Strongyloidiasis
- E. Fascioliasis

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WHAT IS THE DRUG OF CHOICE?

- A. Albendazole
- B. Nitazoxanide
- C. Ivermectin
- D. Triclabendazole
- E. Praziquantel

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WHAT WE KNOW ON THE TOPIC

Open Forum Infect Dis.
2024;11(10):ofae554.
Radiology Case Reports
2025;20 :4209

- Incidence unknown; 2/345 (0.7%) in Peru
- 31 reported; 19 from LA and 13 from Peru; women predominate (18/26)
- Mean age 51; median Hb 10.1g/dl; hypereosinophilia in 19/22
- Median volume 901 ml (14 cm x 5.3cm)
- 6 required surgery (19%); 4 ruptured; 2 unknown
- **NO MORTALITY REPORTED**

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Contrast CT-scan showing a hypodense sub capsular lesion, no uptake of the contrast, and no modification of the liver surface

Clinical Infectious Diseases 2011;52(9):1137

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Open Forum Infectious Diseases

BRIEF REPORT

Subcapsular Liver Hematoma: One of the Many Faces of Acute Fascioliasis

Jorge Alvaro,^{1,2} May Lima,³ Angélica Yarzún,¹ Fatima Casco-Velasco,² Eduardo Gótz,⁴ Carlos Sosa,^{1,2,5} and Miguel M. Cabada^{1,6}

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Subcapsular liver hematoma is an uncommon and underdiagnosed manifestation of fascioliasis. We report 6 cases and review 21 previous reports. The mean age was 51 years; 12 cases were from Peru; and 18 were women. Only 6 patients required surgical drainage. Medical management is the mainstay treatment.

Keywords. fascioliasis; subcapsular liver hematoma; zoonosis.

Open Forum Infect Dis. 2024 Sep 23;11(10):ofae554.

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WHAT WE CAN CONCLUDE

- Subcapsular liver hematoma is a **rare complication** of acute fascioliasis
- **Suspect** in patients from endemic areas with clinical and laboratory abnormalities
- **Contrast CT-scan** is the diagnostic modality of choice
- **Medical** treatment suffices
- **Consult with a surgeon** if hemodynamic instability or suspicion of rupture

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The patient received two doses of triclabendazole, 10 mg/kg every 12 hours, after a fatty meal, but eggs persisted in the stools; she received two additional courses with no response !!

ANY SUGGESTIONS?

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WHAT WE KNOW ON THE TOPIC

PLoS Negl Trop Dis 2016; 10(1): e0004361
 Front Cell Infect Microbiol. 2025;15:1555171
 Pathogens 2022;11: 625.
 Nature Communications 2025;16:2996

- Triclabendazole resistance among cattle/humans reported since 2011
- Zoonotic transmission to humans
- Reduced uptake/parasite metabolism
- In-vitro efficacy linked to geographic, seasonal, and morphometric parameters
- Efficacy influenced by the microbiome?
- Resistance linked to genes involved in microtubule function-surveillance
- **NO SOLUTION TO THE DILEMMA**

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WHAT HAS BEEN TRIED

PLoS Neg Trop Dis 2019;13(9):e0007779
 Ant Ag Chemother 2010;54(11):4596-604
 Gastrointestinal Endoscopy 1999;50(3):345-51.

Nitazoxanide plus triclabendazole

Ivermectin plus triclabendazole

Endoscopic flushing with povidone

Artesunate (in-vitro)

Imatinib?

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A Non-Inferiority Randomized Single Blind Controlled Trial Comparing One and Two Dose Regimes of Oxfendazole versus a Two Dose Regime of Triclabendazole to Treat Chronic Fascioliasis

Project Number SU01A1155323-03	Former Number 1U01A1155323-01	Contact PI/Project Leader GARCIA, HECTOR HUGO Other PIs	Awardee Organization
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Study Overview Brief Summary

<https://clinicaltrials.gov/study/NCT06367361>

Randomized clinical trial comparing the efficacy and safety of oxfendazole at 20 mg/kg per dose in one and two dose regimens with a two-dose regimen of triclabendazole at 10 mg/kg in an endemic region of the highlands of Peru. Adults with fascioliasis in rural communities will be screened for inclusion and exclusion criteria and a total of 336 subjects (112 per study arm) with chronic Fasciola infection will be enrolled and assigned randomly to the study arms in a 1:1:1 ratio. The primary efficacy (cure and egg reduction) endpoints will be assessed on day 7 and 30 post treatment. The secondary safety endpoint visits will be performed in days 0, 3, 7 and 30 post-treatment and Population Pharmacokinetics (PK) modeling studies will be performed in the first 24 hours after the first dose of oxfendazole.

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