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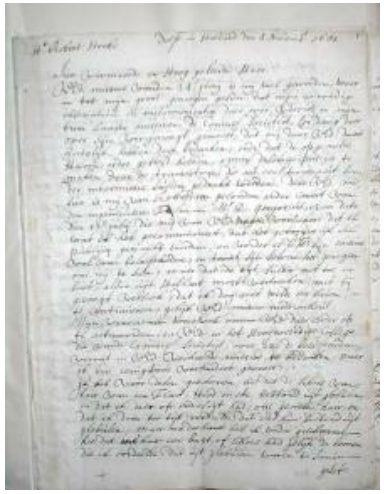


"I weigh about 160 pounds, and have been of very nigh the same weight for some 30 years, and I have ordinarily of a morning a well-formed stool; but now and then hitherto I have looseness, at intervals of 2, 3 or 4 times a day. But this summer this befell me very often, and especially when I partook of hot smoked beef, that was a bit fat, or ham, which food I´m very fond of; indeed, it persisted once for three days running, and whatever food I took, I kept in my body not much above 4 hours… My excrement being so thin, I was at divers times persuaded to examined it; and each time I kept in mind what food I had eaten, and what food I had drunk, and what found afterwards" […] "All the particles aforesaid lay in a clear transparent medium, wherein I have sometimes also seen animalcules a-moving very prettily; some of them a bit bigger, others a bit less, than a blood-globule, but all of one and the same make. Their bodies were somewhat longer than broad, and their belly, was flattish, furnished with sundry little paws, where with they made such a stir in the clear medium and among the globules, that you might even fancy you saw a woodlouse running up against a wall; and albeit they made a quick motion with their paws, yet for all that they made but slow progress"

1681

Giardiasis: de la epidemiología de una parasitosis desatendida a su cuadro clínico y tratamiento

Contenido:

1. Aspectos de salud pública de la infección por *Giardia*
2. Epidemiología
3. Espectro de síntomas y signos
4. Diagnóstico y diagnóstico diferencial
5. Estrategias terapéuticas

Contenido:

1. Aspectos de salud pública de la infección por *Giardia*
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Una enfermedad desatendida

- Naturaleza relativamente benigna; usualmente no requiere hospitalización.
- Disponibilidad de métodos diagnósticos y de drogas efectivas en el tratamiento (aunque cuentan con efectos colaterales).
- La comunidad científica ha estado más concentrada en otras enfermedades.
- La infección por *Giardia* se enmascara con enfermedades infecciosas y no infecciosas.
- Aún en los países subdesarrollados esta infección ocurre entre las personas de más bajos ingresos.

La industria farmacéutica se ha visto menos comprometida en el desarrollo de nuevos fármacos.
La nitazoxanida es la primera droga desarrollada en ~20 años.

"Access to Essential Drugs in Poor Countries, A Lost Battle?"
Journal of the American Medical Association, January 27, 1999.

Enfermedad y AVAD

Table 2. Median number of foodborne illnesses, deaths, and Disability Adjusted Life Years (DALYs), with 95% uncertainty intervals, 2010.

PATHOGEN	ILLNESSES (95% UI)	DEATHS (95% UI)	DALYs (95% UI)	PROPORTION FOODBORNE (95% UI)	FOODBORNE ILLNESSES (95% UI)	FOODBORNE DEATHS (95% UI)	FOODBORNE DALYS (95% UI)
Diarrheal Disease	**1,912,159,038 (1,413,002,730–2,849,323,016)**	**715,196 (603,325–846,397)**	**55,139,959 (46,746,114–65,120,623)**	**0.29 (0.22–0.36)**	**548,285,159 (369,733,377–888,360,956)**	**199,892 (136,903–286,616)**	**15,780,400 (11,043,288–22,251,264)**
Campylobacter spp. *	166,175,078 (92,227,873–300,877,905)	37,604 (27,738–55,101)	3,733,822 (2,857,037–5,273,652)	0.58 (0.44–0.69)	95,613,970 (51,731,379–177,239,714)	21,374 (14,604–32,584)	2,141,926 (1,535,985–3,137,980)
Cryptosporidium spp.	64,003,709 (43,049,455–104,679,951)	27,553 (18,532–44,654)	2,159,331 (1,392,438–3,686,925)	0.13 (0.07–0.24)	8,584,805 (3,897,252–18,531,196)	3,759 (1,520–9,115)	296,156 (119,456–724,660)
Entamoeba histolytica	103,943,952 (47,018,659–210,632,459)	5,450 (2,194–17,127)	515,904 (222,446–1,552,466)	0.28 (0.14–0.44)	28,023,571 (10,261,254–68,567,590)	1,470 (453–5,554)	138,863 (47,339–503,775)
Enteropathogenic *E. coli*	81,082,327 (40,716,656–171,419,480)	122,760 (97,115–154,869)	9,717,390 (7,602,047–12,387,029)	0.30 (0.17–0.48)	23,797,284 (10,750,919–62,931,604)	37,077 (19,957–61,262)	2,938,407 (1,587,757–4,865,590)
Enterotoxigenic *E. coli*	240,886,759 (160,890,532–377,471,599)	73,857 (53,851–103,026)	5,887,541 (4,190,610–8,407,186)	0.36 (0.24–0.50)	86,502,735 (49,136,952–151,776,173)	26,170 (14,887–43,523)	2,084,229 (1,190,704–3,494,201)
Giardia spp.	183,842,615 (130,018,020–262,838,002)	0 (0–0)	171,100 (115,777–257,315)	0.15 (0.08–0.27)	28,236,123 (12,945,655–56,996,454)	0 (0–0)	26,270 (11,462–53,577)
Norovirus	684,850,131 (490,930,402–1,122,947,359)	212,489 (160,595–278,420)	15,105,714 (11,649,794–19,460,578)	0.18 (0.11–0.30)	124,803,946 (70,311,254–251,352,877)	34,929 (15,916–79,620)	2,496,078 (1,175,658–5,511,092)

Enfermedad y AVAD por edades

Table 4. Median number of foodborne illnesses, deaths, and Disability Adjusted Life Years (DALYs) by age group, with 95% uncertainty intervals, 2010.

PATHOGEN*	Age Group: <5 Years of Age			Age Group: ≥5 Years of Age			Ratio <5:≥5		
	ILLNESSES Number (95% UI)	DEATHS Number (95% UI)	DALYs Number (95% UI)	ILLNESSES Number (95% UI)	DEATHS Number (95% UI)	DALYs Number (95% UI)	ILLNESSES Ratio <5:≥5 (95% UI)	DEATHS Ratio <5:≥5 (95% UI)	DALYs Ratio <5:≥5 (95% UI)
Diarrheal Disease	**216,839,210 (148,937,428–309,926,253)**	**91,621 (62,442–132,707)**	**8,547,149 (5,903,945–12,254,175)**	**327,209,075 (179,670,939–643,705,133)**	**107,500 (69,907–163,979)**	**7,205,002 (4,790,026–10,747,526)**	**0.66 (0.32–1.28)**	**0.86 (0.60–1.16)**	**1.19 (0.86–1.60)**
Campylobacter spp.**	47,988,357 (22,436,891–102,663,926)	13,861 (8,754–23,670)	1,383,499 (911,878–2,279,897)	42,883,268 (18,350,672–112,061,441)	7,436 (4,930–9,974)	750,578 (540,003–956,663)	1.11 (0.34–3.47)	1.91 (1.21–3.08)	1.87 (1.26–2.92)
Cryptosporidium spp.	5,986,213 (2,569,532–12,738,924)	1,989 (678–5,683)	185,057 (64,847–518,497)	2,253,036 (774,628–8,639,265)	1,673 (638–4,149)	104,794 (40,408–256,055)	2.61 (0.69–8.01)	1.23 (0.42–2.72)	1.83 (0.65–3.93)
Entamoeba histolytica	8,480,759 (1,593,697–30,849,576)	896 (90–4,852)	92,213 (15,997–444,002)	17,828,477 (5,378,578–50,963,825)	524 (218–1,110)	43,984 (20,149–85,551)	0.48 (0.08–2.38)	1.75 (0.18–8.71)	2.14 (0.38–9.49)
Enteropathogenic *E. coli*	17,312,780 (6,767,766–54,104,398)	22,156 (11,944–37,473)	2,004,543 (1,084,856–3,389,584)	5,458,601 (2,145,370–16,561,005)	14,647 (7,305–25,447)	911,012 (457,215–1,575,768)	3.20 (0.85–11.78)	1.52 (1.03–2.29)	2.21 (1.52–3.29)
Enterotoxigenic *E. coli*	38,352,806 (21,144,875–64,795,160)	14,056 (7,045–26,784)	1,303,490 (668,837–2,446,758)	46,811,878 (20,306,649–103,801,449)	11,933 (6,382–18,887)	767,975 (419,834–1,204,273)	0.82 (0.35–1.96)	1.21 (0.63–2.10)	1.74 (0.95–2.93)
Giardia spp.	18,773,028 (8,075,497–38,649,748)	0 (0–0)	20,677 (8,552–44,101)	8,693,968 (3,337,657–24,195,602)	0 (0–0)	5,016 (1,945–13,791)	2.11 (0.84–5.22)	N/A	4.04 (1.57–10.28)
Norovirus	34,582,700 (19,595,826–59,592,939)	8,992 (4,251–19,347)	844,376 (406,822–1,776,252)	89,056,582 (46,054,795–206,532,318)	25,807 (11,201–61,642)	1,638,925 (730,924–3,844,771)	0.38 (0.19–0.73)	0.35 (0.22–0.54)	0.52 (0.33–0.78)

Table 3. Median rates of foodborne illnesses, deaths and Disability Adjusted Life Years (DALYs) per 100,000 persons, by region, with 95% uncertainty intervals, 2010.

PATHOGEN*	African Region (AFR)			Region of the Americas (AMR)			Eastern Mediterranean Region (EMR)		
	ILLNESSES (95% UI)	DEATHS (95% UI)	DALYs (95% UI)	ILLNESSES (95% UI)	DEATHS (95% UI)	DALYs (95% UI)	ILLNESSES (95% UI)	DEATHS (95% UI)	DALYs (95% UI)
Diarrheal Disease	9,830 (3,969–21,567)	9 (5–14)	687 (369–1,106)	7,900 (4,497–13,850)	0.5 (0.3–0.7)	44 (30–63)	16,387 (7,729–34,176)	4 (2–6)	354 (218–544)
Campylobacter spp.**	2,221 (335–8,482)	0.8 (0.4–1)	70 (41–112)	1,389 (490–3,207)	0.07 (0.04–0.1)	13 (8–18)	1,873 (488–5,608)	1 (0.6–1)	90 (56–130)
Cryptosporidium spp.	205 (35–813)	0.2 (0.04–0.4)	13 (3–37)	114 (32–355)	0.007 (0.002–0.02)	0.6 (0.2–2)	346 (52–1,287)	0.04 (0.004–0.2)	4 (0.4–20)
Entamoeba histolytica	796 (98–3,868)	0.05 (0.009–0.4)	5 (0.9–39)	212 (16–1,209)	0.001 (0–0.009)	0.3 (0.03–1)	737 (79–3,110)	0.02 (0.002–0.2)	2 (0.3–14)
Enteropathogenic *E. coli*	454 (125–1,215)	2 (0.6–3)	140 (50–282)	189 (35–730)	0.06 (0.01–0.1)	5 (1–12)	430 (116–1,222)	0.7 (0.2–2)	57 (18–131)
Enterotoxigenic *E. coli*	982 (312–2,480)	1 (0.6–3)	109 (46–216)	1,281 (299–3,295)	0.05 (0.01–0.1)	5 (1–12)	4,971 (1,685–10,849)	0.4 (0.1–1)	35 (11–89)
Giardia spp.	809 (172–2,574)	0 (0–0)	0.8 (0.2–3)	309 (62–1,249)	0 (0–0)	0.3 (0.05–1)	670 (133–2,193)	0 (0–0)	0.6 (0.1–2)
Norovirus	1,749 (491–5,060)	1 (0.3–3)	81 (24–185)	2,491 (898–6,186)	0.1 (0.04–0.3)	9 (3–23)	2,796 (744–7,376)	0.4 (0.1–1)	33 (9–76)
Salmonella enterica, non-typhoidal	896 (175–2,994)	1 (0.5–2)	89 (42–147)	1,002 (378–1,990)	0.1 (0.06–0.2)	7 (4–12)	1,610 (147–14,052)	0.6 (0.3–1)	54 (26–87)
Shigella spp.	523 (45–2,865)	0.5 (0.1–2)	43 (8–124)	278 (35–1,443)	0.02 (0.003–0.05)	1 (0.3–5)	627 (55–4,648)	0.4 (0.07–1)	38 (6–117)
Shiga toxin-producing *E. coli*	5 (2–9)	0 (0–0.002)	0.05 (0.02–0.1)	16 (9–30)	0.004 (0.001–0.01)	0.3 (0.1–0.9)	65 (37–97)	0.002 (0–0.004)	0.2 (0.1–0.5)
Vibrio cholerae	43 (13–101)	2 (0.5–4)	1 12 (35–252)	0.02 (0.008–0.05)	0 (0–0)	0 (0–0)	9 (0.4–28)	0.3 (0.01–1)	20 (0.7–69)

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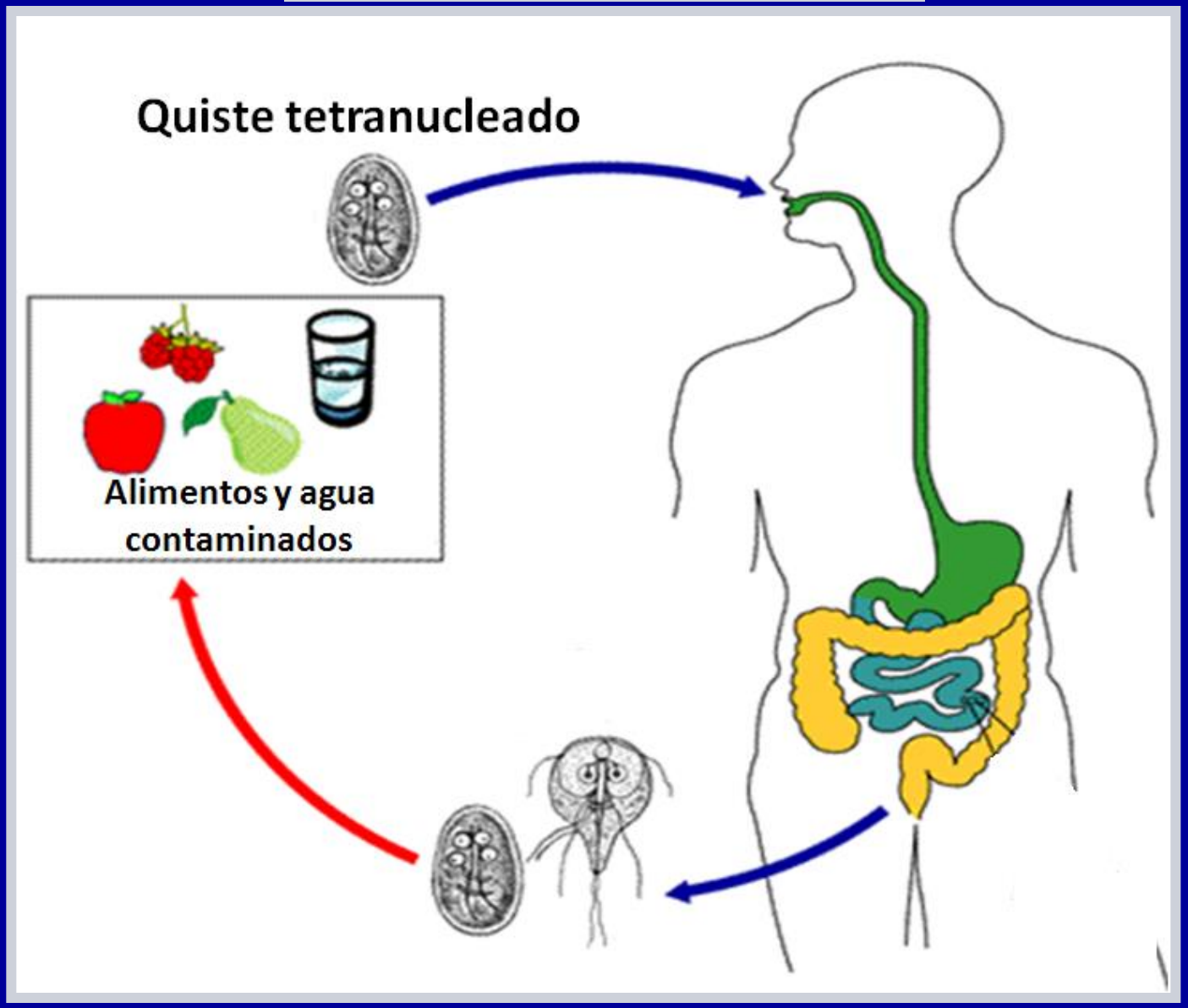
El parásito

Agente

G. agilis	Anfíbios	20-29/4-5
G. ardeae	Aves	~10/~6,5
G. psittasi	Aves	~14/~6
G. muris	Roedores	9-12/5-7
G. microti	Roedores	12-15/6-8
G. duodenalis		12-15/6-8
Ensamble A	Hombre, primates, ganado, mascotas, animales salvajes	
Ensamble B	Hombre, primates, ganado, perro, castores, ratas, animales salvajes	
Ensamble C	Perros y otros canidos domésticos y salvajes	
Ensamble D	Perros y otros canidos domésticos y salvajes	
Ensamble E	Rumiantes y cerdos	
Ensamble F	Gatos	
Ensamble G	Ratas	
Ensamble H	Mamíferos marinos	

Ciclo de vida



Giardiasis: Global distribution

Disease is found worldwide or in virtually every country

Giardiosis: en países industrializados

Alemania 48% de los casos no estuvo asociada a viaje al exterior.

En Nueva Zelanda el agua no tratada fue encontrada como principal factor de riesgo de giardiasis esporádica.

En el Reino Unido, tragar agua durante el baño en piscinas, el uso de aguas con fines recreativos y el comer lechuga tuvieron relación en un estudio de casos y controles realizado entre personas que no habían viajado al exterior.

Recientemente, Adam analizó los brotes de giardiasis notificados al CDC de 1971-2011 y encontró que este protozoo causaba brotes por múltiples modos de transmisión:
agua (74,8%)
alimentos (15,7%)
persona a persona (2,5%)
contacto con animales (1,2%)
desconocida (5,4%)

Importancia para la salud veterinaria

Importancia en la salud veterinaria de la giardiosis

- La prevalencia es variable, según las técnicas empleadas, la edad del animal, la alimentación y el manejo del animal.
- Curiosamente, gatos y perros han sido los menos estudiados.
- Se encuentra sin síntomas o se manifiesta con diarreas.
- Pocos estudios sobre el efecto en los animales de producción; así como el crecimiento o ganancia de peso después del tratamiento (resultados contradictorios).

Importancia en la salud veterinaria de la giardiosis

Table 5. Samples, gender, age groups, and animal models most frequently studied in articles on giardiasis covered by PubMed, 1971–2010

	n	%	1971–1980	1981–1990	1991–2000	2001–2010
Humans	4,619	66.33	794	1,189	1,115	1,521
Animals	4,064	58.36	162	708	1,213	1,981

Escobedo *et al*. A bibliometric study of international scientific productivity in giardiasis covering the period 1971–2010.
J Inf Dev Ctries 2015; 9(1):076-086.

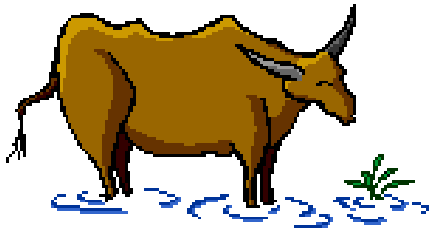
JIDC | THE JOURNAL OF INFECTION IN DEVELOPING COUNTRIES

Animales domésticos

El ensamble E es prevalente

Ensamble A, (+ AI)

Ensamble B casi ausente



El ensamble F es prevalente

Ensamble A, (+ AI)

Ensamble B y C son raros

Los ensambles C y D son prevalentes

Ensamble A es común

Ensamble B es raro

Las infecciones mixtas son comunes

Algunos de los subtipos de ensambles A y B que han sido identificados en animales, son genéticamente idénticos a los de humanos.

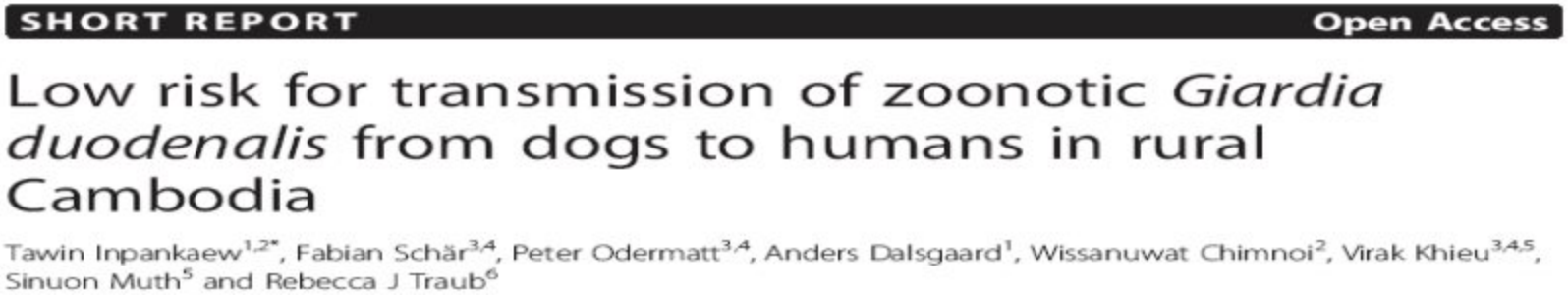
Se necesitan estudios bien diseñados !!!!!

- La evidencia epidemiológica respalda la transmisión zoonótica entre humanos y perros que viven en la misma comunidad.

India: Traub RJ, Monis PT, Robertson I, Irwin P, Mencke N, Thompson RC. Epidemiological and molecular evidence supports the zoonotic transmission of Giardia among humans and dogs living in the same community. Parasitology. 2004 Mar;128(Pt 3):253-62.

Tailandia: Inpankaew T, Traub R, Thompson RC, Sukthana Y. Canine parasitic zoonoses in Bangkok temples. Southeast Asian J Trop Med Public Health. 2007 Mar;38(2):247-55.

Pero:…

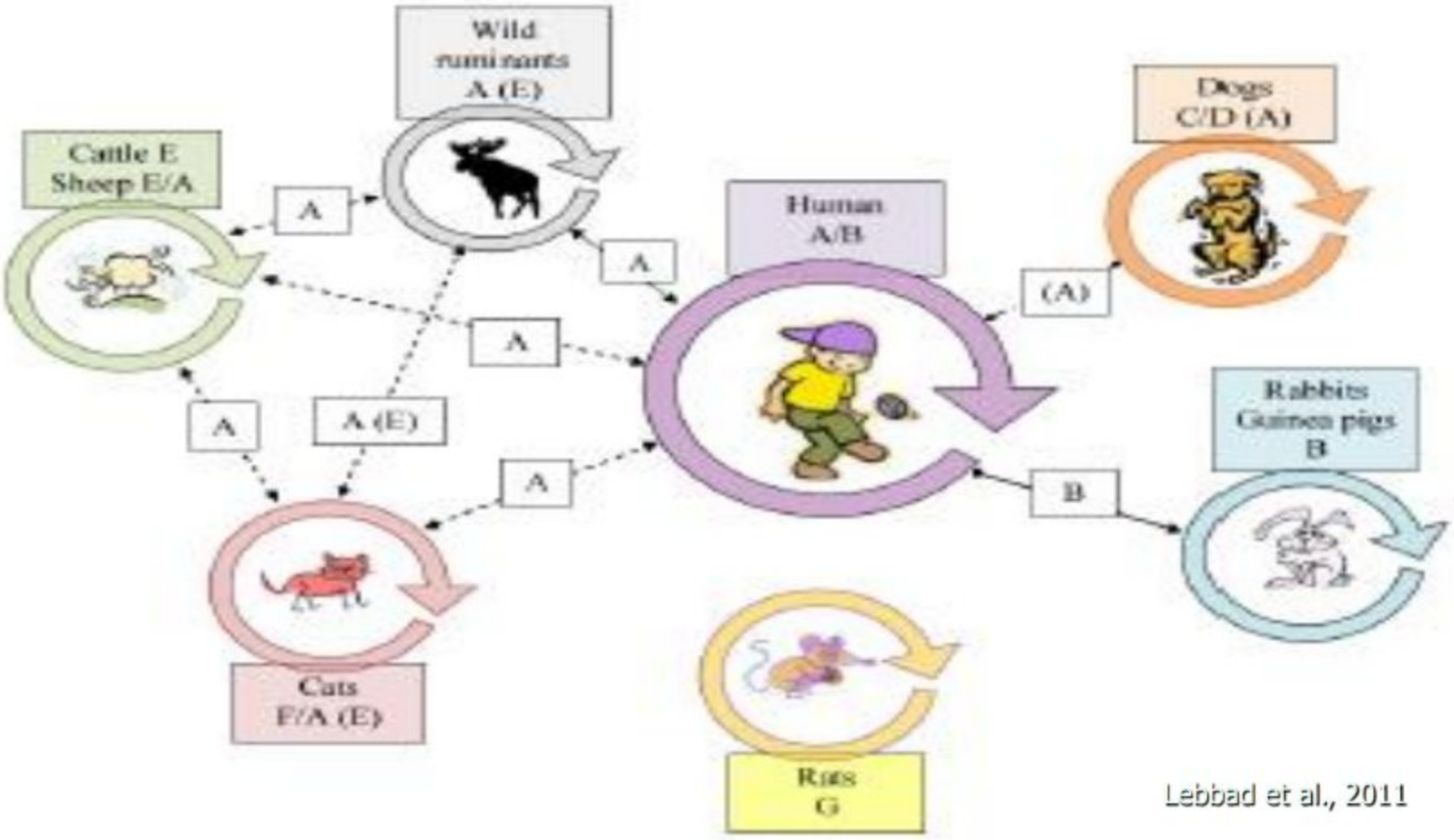


SHORT REPORT Open Access

Low risk for transmission of zoonotic *Giardia duodenalis* from dogs to humans in rural Cambodia

Tawin Inpankaew[1,2*], Fabian Schär[3,4], Peter Odermatt[3,4], Anders Dalsgaard[1], Wissanuwat Chimnoi[2], Virak Khieu[3,4,5], Sinuon Muth[5] and Rebecca J Traub[6]

Formas fundamentales de transmisión zoonotica de *Giardia*



Prevalence of zoonotic and non-zoonotic genotypes of *Giardia intestinalis* in cats: a systematic review and meta-analysis

Sebastián Ramírez-Ocampo[1,2], Juan David Cotte-Alzate[1,2], Ángel A. Escobedo[3,4,5], Alfonso J. Rodríguez-Morales[1,2,4,5,6]

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[2]School of Veterinary Medicine and Zootechnics (DVM), Faculty of Health Sciences, Universidad Tecnologica de Pereira, Pereira, Risaralda, Colombia;
[3]Department of Microbiology and Parasitology, Academic Paediatric Hospital Pedro Borrás, La Habana, Cuba;
[4]Working Group on Zoonoses, International Society for Chemotherapy, Aberdeen, United Kingdom;
[5]Committee on Clinical Parasitology, Pan-American Association for Infectious Diseases (Asociación Panamericana de Infectología), Panama, Panama;
[6]Medical School, Faculty of Health Sciences, UniFranz, Cochabamba, Bolivia

ARTICLE OPEN

Vaccination of domestic animals with a novel oral vaccine prevents *Giardia* infections, alleviates signs of giardiasis and reduces transmission to humans

Marianela C Serradell[1], Alicia Saura[1,2], Lucia L Rupil[1,2], Pablo R Gargantini[1,2], Marcela I Faya[3], Paulina J Furlan[3] and Hugo D Lujan[1,2]

Giardia lamblia is a human intestinal parasite and one of the most frequent enteric pathogen of companion animals. Clinical manifestations of giardiasis, such as diarrhoea, anorexia, weight loss and lethargy, have been associated with *Giardia* infections in both domestic and farm animals. A few anti-parasitic drugs are routinely used to treat giardiasis, but re-infections are common and drug-resistant strains have already been reported. Unfortunately, efficient vaccines against *Giardia* are not available. *Giardia* undergoes antigenic variation; through this mechanism, parasites can avoid the host's immune defenses, causing chronic infections and/or re-infections. Antigenic variation is characterised by a continuous switch in the expression of members of a homologous family of genes encoding surface antigens. In a previous report, we indicated that in *Giardia*, the mechanism responsible for the exchange of variant-specific surface proteins (VSPs) involves the RNA interference (RNAi) pathway. From a repertoire of ~200 VSP genes, only one is expressed on the surface of single trophozoites; however, RNAi machinery disruption generates trophozoites that express the complete VSP repertoire. We also demonstrated that gerbils orally immunised with VSPs isolated from these altered parasites showed high levels of protection. Here we tested this vaccine in cats and dogs, and found that it is highly efficient in preventing new infections and reducing chronic giardiasis in domestic animals both in experimental and natural infections. Remarkably, immunisation of dogs in a highly endemic area strongly decreased the percentage of infected children in the community, suggesting that this vaccine would block the zoonotic transmission of the disease.

Estudios que correlacionaron Ensambles humanos de *Giardia* con la sintomatología clínica de los hospederos estudiados.

Ensamble asociado	Síntomas clínicos	No. de aislamientos o muestras	Edad (Años)	País	Año
B	Diarrea actual severa o persistente	18	8-60	Holanda	**2001**
A	Diarrea	23	1-5	Australia	**2002**
A (A-II)	Diarrea	211	1-10	Bangla Desh	**2005**
B	Dolor abdominal y diarrea	44	2-52	Etiopía	**2007**
A (A-II)	Dolor abdominal, pérdida de peso, cólicos diarreas.	104	2-72 (sólo en <5 años)	España	**2007**
B	Pérdida de peso y mayor duración de la diarrea	18	1-5	Cuba	**2007**
B	Síntomas Digestivos	42	≤ 12	Malasia	**2009**
B	flatulencia	207	<6	Suecia	**2011**
B	Dolor abdominal	94	2-14	Argentina	**2011**
B	Diarrea aguda	40	6-11	Arabia Saudita	**2011**

Consideraciones generales en la epidemiología de la giardiosis humana

- Muchos casos son transmitidos por el agua
- Ocurre la transmisión humano a humano
- Ocurre la transmisión por alimentos
- Transmisión zoonótica

Potential impact of macroclimatic variability on the epidemiology of giardiasis in three provinces of Cuba, 2010—2012

Angel A. Escobedo[a,b,c], Pedro Almirall[d], Raisa Rumbaut[e], Alfonso J. Rodríguez-Morales[b,f,g,*]

- Prevalencia nacional ~6 %
- Tasas de prevalencia más elevadas en niños
- Causa de ingresos en hospitales
- La transmisión ocurre todo el año.

Figure 1 Study locations in Cuba during the period of January 2010—December 2012: the provinces of Havana (3), Ciego de Ávila (9) and Guantánamo (15).

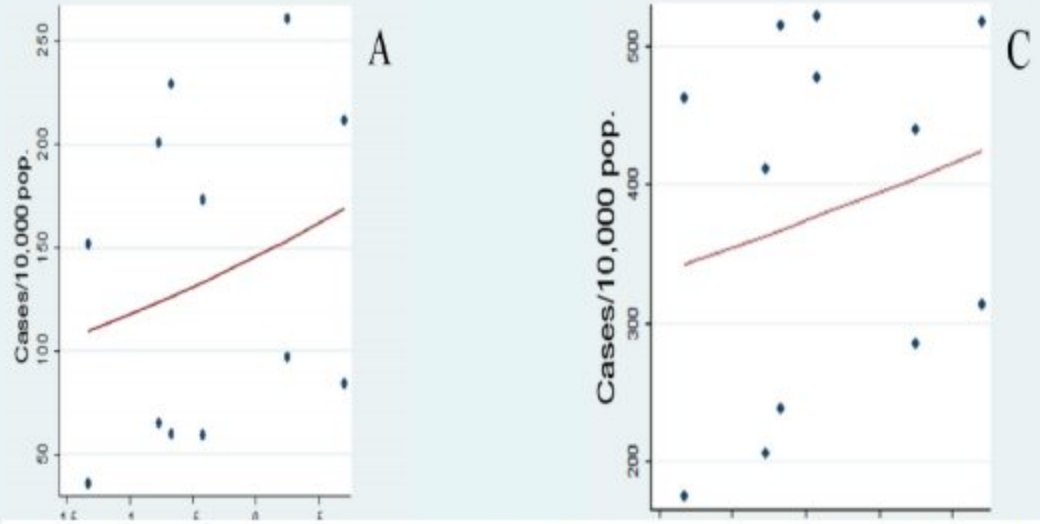


Figure 4 Regression models for Havana (A), Ciego de Ávila (B) and Guantánamo (C).

Contenido:

1. Aspectos de salud pública de la infección por *Giardia*
2. Epidemiología
3. Espectro de síntomas y signos
4. Diagnóstico y diagnóstico diferencial
5. Estrategias terapéuticas

Giardiosis

Una enfermedad dinámica

Historia natural de la infección por *Giardia*

Acute symptoms
Abdominal discomfort
Nausea
Diarrhoea
Flatulence

Chronic symptoms
Weight loss
Malnutrition
Intermittent abdominal symptoms
Lethargia

Exposure

Giardia cysts in stool

Weeks

Outcomes
Complete recovey – spontaneous/treated
Chronic giardiasis – (a)symptomatic
Continuing abdominal symptoms

Diarrea y *Giardia*

- La habilidad de causar diarreas es incuestionable después de los estudios de Nash (Nash TE, Herrington DA, Losonky GA, et al. Experimental human infections with Giardia lamblia. J Infect Dis 1987;156(6):974–84.)

GIARDIA EPIDEMIOLOGY

Despite the clear implication of *Giardia* as a diarrheal pathogen in industrialized countries, its role in diarrhea in developing countries is less certain. In GEMS, detection of *Giardia* by immunoassay was not associated with diarrhea at any site or in any age stratum.[5] This observation was confirmed using molecular detection methods.[27] Interestingly, some sites reported a protective epidemiologic association of *Giardia* against moderate to severe diarrhea, although a mechanism to account for this observation was not suggested.[5] Speculation regarding different roles for *Giardia* as an enteric pathogen in industrialized versus developing countries focuses on possible age-related susceptibility, protective effects of prior experience with the pathogen, heterogeneous virulence of individual isolates, or the possibility that low levels of exposure may induce colonization without symptomatology.

Tabla 2. Relación de síntomas o datos de laboratorio en coprológicos con *Giardia lamblia* y *Blastocystis hominis* en 328 niños de 1 a 7 años de 35 hogares del ICBF de la ciudad de Armenia 2003-2004

Síntomas	*Giardia lamblia*				*Blastocystis hominis*			
	#	OR	IC 95 %	p	#	OR	IC 95%	p
Congestión nasal	23	0,6	0,3-1,2	0,24	18	5,4	1,2–23,8	0,02 *
D abdominal								)5
Diarrea	4	0,5	0,1-1,5	0,35	4	1,3	0,4–4,3	0,8
Fiebre	17	1,4	0,7-2,7	0,38	8	1,3	0,5–0,43	0,6
Moco en heces	18	3,3	1,7-6,6	0,0005 *	3	0,63	0,18-2,23	0,66
Sangre en heces	1	3,4	0,3-39	0,84	0	0,0	0,0–0,0	0,44
Tos	27	1,1	0,5-2,2	0,82	13	1,16	0,4–3,0	0,9

Giardiasis no está relacionado con diarrea en estudios poblacionales!

Clinical Infectious Diseases

Clinical Infectious Diseases Advance Access published July 7, 2016

EDITORIAL COMMENTARY

Giardia lamblia – Pathogen or Commensal?

Kurt Hanevik[1,2]

[1]Department of Clinical Science, University of Bergen, and [2]Centre for Tropical Infectious Diseases, Haukeland University Hospital, Bergen, Norway

Keywords. *Giardia*; pathogenicity; long-term consequences; stunting; malnutrition.

Giardiosis: ¿entonces cuál es su importancia en salud humana?
¡Su efecto en los niños!

- La giardiosis afecta más a los niños que a los adultos
- Transmisión fecal - oral a través del agua
- Los niños con más de **dos episodios de giardiosis** por año tienen **menor desarrollo cognitivo** -retardo psicomotor- (Lancet, Febrero 2002)

Desarrollo pondo estatural

A more recent and possibly more important implication of *Giardia* in human disease has focused on childhood growth. Donowitz and colleagues[65] have recently conducted a prospective longitudinal birth cohort study in Bangladesh, in which stools were assayed for *Giardia* monthly and whenever diarrhea occurred. In this study, the presence of *Giardia* in the monthly surveillance stools within the first 6 months of life resulted in a decreased length-for-age Z score at 2 years of age by 0.4. Bartelt and colleagues[66] have developed a mouse model that recapitulates this effect. Persistent shedding of *Giardia* in the mice was associated with decreased growth in the absence of diarrhea. This effect was exacerbated by inducing a state of malnutrition in the mice.

- Donowitz JR, Alam M, Kabir M, et al. A prospective longitudinal cohort to investigate the effects of early life giardiasis on growth and all cause diarrhea. Clin Infect Dis 2016;63(6):792–7.
- Bartelt LA, Roche J, Kolling G, et al. Persistent G. lamblia impairs growth in a murine malnutrition model. J Clin Invest 2013;123(6):2672–84.

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

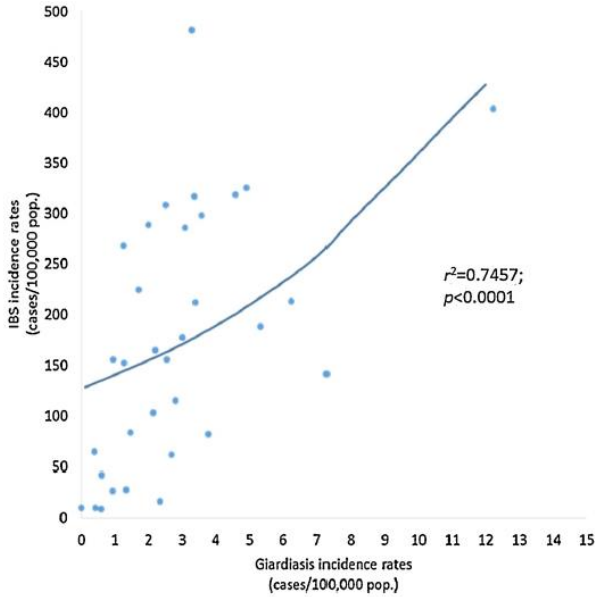
journal homepage: www.elsevier.com/locate/ijid

Editorial

Sequelae of giardiasis: an emerging public health concern

- Fatiga crónica
- Síndrome de intestino irritable post-infeccioso
- Malnutrición por defecto
- Trastornos en el aprendizaje

en niños pequeños



Estudio cuantitativo

TABLE 1: Responses to questions on communicable nature, mode of transmission, possibility of cure, and knowledge about symptoms of giardiasis among 202 caregivers.

Response to questions	No.	(%)
Is it a modern problem?		
Yes	147	(72.7)
No	45	(22.3)
Do not know	10	(5.0)
May lead to death		
Yes	79	(39.1)
No	96	(47.5)
Do not know	27	(13.4)
The organ affected by *Giardia*		
Small intestine	125	(61.9)
Gallbladder	66	(32.7)
Liver	54	(26.7)
Stomach	11	(5.4)
Lungs	1	(0.5)
Bones	1	(0.5)
Colon	1	(0.5)
Do not know	39	(19.3)

Parental Perceptions of Giardiasis: A Study in an Outpatient Paediatric Hospital Setting in Havana, Cuba

Pedro Almirall,[1] Angel A. Escobedo,[2] Yohana Salazar,[3] Maydel Alfonso,[4] Ivonne Ávila,[5] Sergio Cimerman,[6] and Isabel V. Dawkins[5]

Care-seeking behaviour and diagnostic processes for symptomatic giardiasis in children attending an academic paediatric hospital

Angel A. Escobedo[1,2,3], Pedro Almirall[3,4], Ivonne Ávila[5], Yohana Salazar[6], Maydel Alfonso[7]

[1]Academic Paediatric Hospital "Pedro Borrás", La Habana, Cuba, [2]Working Group on Zoonoses, International Society for Chemotherapy, Aberdeen, UK, [3]Working Group on Clinical Parasitology, Panamerican Association of Infectology, La Habana, Cuba, [4]Municipal Centre of Hygiene, Epidemiology and Microbiology "Plaza", La Habana, Cuba, [5]Academic Paediatric Hospital "Centro Habana", La Habana, Cuba, [6]National Institute of Hygiene, Epidemiology and Microbiology, La Habana, Cuba, [7]Faculty of Medicine 'Comandante Manuel Fajardo', La Habana, Cuba

Giardiasis is one of the commonest intestinal parasitic infections in Cuba. In order to determine care-seeking behaviour and diagnostic processes in paediatric in-patients with giardiasis, structured questionnaires were administered by interview mothers of children with giardiasis during January to December 2010. During the study period, 97 children were diagnosed with giardiasis, of whom 86 (88.6%) caregivers were interviewed. The median number of days from symptoms onset to the first presentation in a health unit was 2 days (range: 0–15 days). The pattern of care-seeking behaviour was variable; 41 (47.7%) of children initially visited the emergency unit in a paediatric hospital. Sixty-six children had, at least, one further contact for help before diagnosis of giardiasis was made (range: 1–5 contacts) and of the 128 contact visits, 94 (73.4%) were also targeted more to hospitals. There was a median time of 6 days between the first presentation to a health unit until diagnosis, which was mainly made by microscopic examination of duodenal aspiration. Among factors investigated in mothers, only knowing other person with giardiasis had significant association with their ability to suspect giardiasis [odds ratio (OR): 29.8, 95% confidence interval (CI): 3.71–239.4, P=0.001]. Requesting a faecal specimen or ordering duodenal aspiration for microscopic examination during the first visit appeared associated with correct diagnosis (OR: 3.84, 95% CI: 1.57–9.40, P=0.003). Efforts should be made to increase doctors' awareness of- and diagnostic skills for childhood giardiasis. At the same time, it is necessary to improve caregivers' awareness about giardiasis.

Keywords: Care-seeking behaviour, Caregivers, Cuba, Children, Diagnosis, Giardiasis

Opinion

Trends in Parasitology Vol.26 No.2

Giardiasis – why do the symptoms sometimes never stop?

Lucy J. Robertson[1], Kurt Hanevik[2], Angel A. Escobedo[3], Kristine Mørch[2,4] and Nina Langeland[2,4]

Posibles razones de continuidad de los síntomas después del tratamiento de la giardiosis

- Daño en la mucosa y cambios en la arquitectura
- Déficit transitorio de lactasas
- Síndrome de intestino irritable post infeccioso (PI-IBS)
- Sobrecrecimiento bacteriano
- Giardiasis crónica

Factores involucrados

Giardiasis crónica

Giardiasis crónica

- No está adecuadamente definida.
- Previamente, 6-meses de duración (Chester 1985).
- 12 de 14 prisioneros infectados eliminaron espóneamente la infección entre los días 5 y 41 días después del inicio de la excreción de quistes.

  2 casos continuaron excretando quistes (>100 días). (Rendtorff 1952).

Definición de giardiasis crónica en humanos

Presencia de *Giardia*, con síntomas o no, por más de 2 meses.

EXPERT REVIEWS

Management of chronic *Giardia* infection

Expert Rev. Anti Infect. Ther. Early online, 1–15 (2014)

Angel A Escobedo*[1–3], Kurt Hanevik[4], Pedro Almirall[3,5], Sérgio Cimerman[3,6] and Maydel Alfonso[7]

[1]*Academic Paediatric Hospital "Pedro Borrás", Calle F No. 616 esquina 27, Plaza, La Habana, CP 10400, Cuba*
[2]*Working Group on Zoonoses,*

Advances in our understanding of chronic giardiasis (CG) may improve our care of patients in this stage of the disease. This review proposes a new concept of CG and highlights the recent advances in our understanding and management of this condition. According to this review, management requires, initially, an accurate diagnosis, which may exclude several conditions that can mimic CG. Optimal treatment requires a tailored approach which includes the recognition of the known modifiable causes of this health condition, assessment of symptoms and potential complications, their treatment utilizing, if necessary, a multidisciplinary team, and an ongoing monitoring for the effect of therapy – weighing the efficacy of individual drugs – all of these together may lead to a successful treatment of CG.

Factores de riesgo de la giardiasis crónica

- Pacientes con inmunodepresión (HIV parece ser la excepción).
- Disminución en la capacidad de producir anticuerpos anti-*Giardia*.
- Coinfección por otros agentes microbianos que reten la respuesta inmune regulatoria.

Cronicidad y síntomas

Diarrea, hipersecreción de cloruros y aumento del tránsito intestinal.

Malabsorción intestinal (esteatorrea, déficit de vitaminas B12, A y folatos.

CG puede causar ruptura de las uniones del epitelio intestinal y apoptosis de los enterocitos.

Contenido:

1. Aspectos de salud pública de la infección por *Giardia*
2. Epidemiología
3. Espectro de síntomas y signos
4. Diagnóstico y diagnóstico diferencial
5. Estrategias terapéuticas

Pasos para el diagnóstico

1. Asistencia del paciente a consulta
2. Sospecha médica y orientación de exámenes específicos
3. Disponibilidad del recurso laboratorio

Factores que influyen en la demora en el diagnóstico

Muchas personas no desarrollan manifestaciones clínicas, pero expulsan quistes por largos periodos.

Los que desarrollan manifestaciones clínicas dependen de experiencia de médicos que sospechan y de los laboratoristas y sus técnicas para diagnóstico:

En estudios se ha demostrado poco conocimiento en cuanto a la terapéutica (**Krueger A, Schulkin J, L Jones J.** Survey of obstetrician-gynecologists about giardiasis. *Infect Dis Obstet Gynecol* **2007**;2007:21261.)

También en relación al pensamiento: solo le orientaban examen de heces a aquellos que tenían diarrea por más de 2 semanas. (**Attias E, *et al.*** *Pediat Therapeut* **2015**;5:254.)

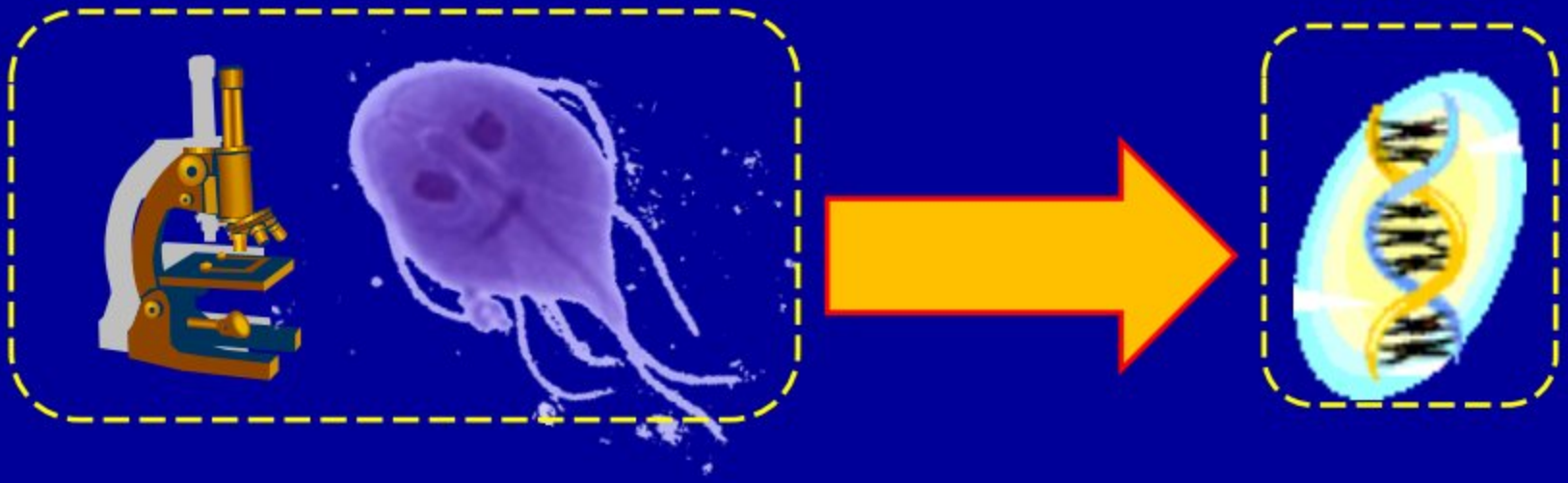
Otros estudios muestran una demora significativa entre la primera visita y el diagnóstico (**Flanagan PA.** *Epidemiology and Infection* **1992**;109:1-22. ; **Addiss DG, *et al.*** *American Journal of Tropical Medicine and Hygiene* **1992**;47:13-19. ; **Nygard K, *et al.*** *BMC Public Health* **2006**;6:141. ; **Cantey PT, *et al.*** *American Journal of Medicine* **2011**;124:1175.)

Hay estudios que muestran un 10% de pacientes tratados con ciprofloxacino (**Cantey PT, *et al.*** Study of nonoutbreak giardiasis: novel findings and implications for research. *American Journal of Medicine* **2011**;124:1175.)

El brote de Bergen, en Noruega, demoró en ser diagnosticado debido a que no había historia de viaje entre sus afectados (**Nygard K, *et al.*** *BMC Public Health* **2006**;6:141.)

Y el laboratorio?????

Diagnóstico



Control de la calidad (problemas identificados)

1) No se utilizan nombres científicos, empleándose nombres vulgares para informar los resultados. Ejemplo: tricocéfalos en vez de *T. trichiura*.
2) No se realiza, al menos, un método de concentración (Willis), usándose sólo el examen directo.
3) Se emplea para el examen coprológico microscopios defectuosos, o de deficiente visión.
4) Los laboratorios no poseen muestras positivas para referencia.
5) No existe un control interno, ni externo de la calidad del diagnóstico parasitológico.

Control de la calidad

Tabla 1

Errores prácticos en la identificación de elementos parasitarios y leucocitos, al comienzo y al finalizar los cursos. Cuba, 1997.

Elemento a identificar	Número de viales usados en cada evaluación		Diagnósticos incorrectos				p*
			1ra evaluación		2da evaluación		
	1ra	2da	n	%	n	%	
Cryptosporidium parvum	15	15	12	80,0	4	26,6	< 0,01
Cyclospora cayetanensis	25	25	18	72,0	3	12,0	< 0,01
Fasciola hepatica	40	58	25	62,5	6	10,3	< 0,01
leucocitos	58	43	35	60,3	4	9,3	< 0,01
Entamoeba histolytica/E. dispar	43	43	24	55,8	13	30,2	< 0,05
Chilomastix mesnilii	18	18	7	38,9	1	5,5	< 0,01
Ancylostomídeos	33	18	12	36,4	0	0,0	< 0,01
Taenia spp.	58	58	15	25,8	1	1,7	< 0,01
Ascaris lumbricoides	30	30	6	20,0	3	10,0	> 0,05
Entamoeba coli	15	15	2	13,3	0	0,0	> 0,05
Giardia lamblia	33	33	4	12,1	0	0,0	> 0,05
Hymenolepis nana	18	18	2	11,1	1	5,5	> 0,05
Enterobius vermicularis	30	48	3	10,0	0	0,0	> 0,05
Blastocystis hominis	43	30	3	6,9	2	6,6	> 0,05

* Comparación de proporciones.

Diagnóstico y diagnóstico diferencial

- Deficit transitorio de disacaridasas
- Enfermedad celiaca
- Enfermedad de Whipple
- Colitis microscópica
- Trastornos gastrointestinales post infecciosos

Contenido:

1. Aspectos de salud pública de la infección por *Giardia*
2. Epidemiología
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Estrategias terapéuticas en GC

¿Está el tratamiento indicado y qué sería lo peor si no tratáramos?

¿Tiene el paciente alguna condición de salud que afecte el curso de la infección?

¿Cuáles agentes terapéuticos están disponibles y aprobados localmente para esta indicación?

¿Cuál será la mejor opción terapéutica para la GC y por cuanto tiempo?

¿Qué hacer si no se alcanza el éxito?

¿Está el tratamiento indicado y qué sería lo peor si no tratáramos?

Evaluar la presencia de síntomas (Rentorff 1952)

Endemicidad

(Gilman *et al*. 1988; Saffar *et al*. 2005)

(Morch *et al*., 2008)

Sin embargo,

Morbilidad residual

¿Tiene el paciente alguna condición de salud que afecte el curso de la infección?

Comorbidilidades: déficit selectivo de IgM, fibrosis quística, síndrome nefrótico, etc.

A veces se hace necesario consultar otros especialistas

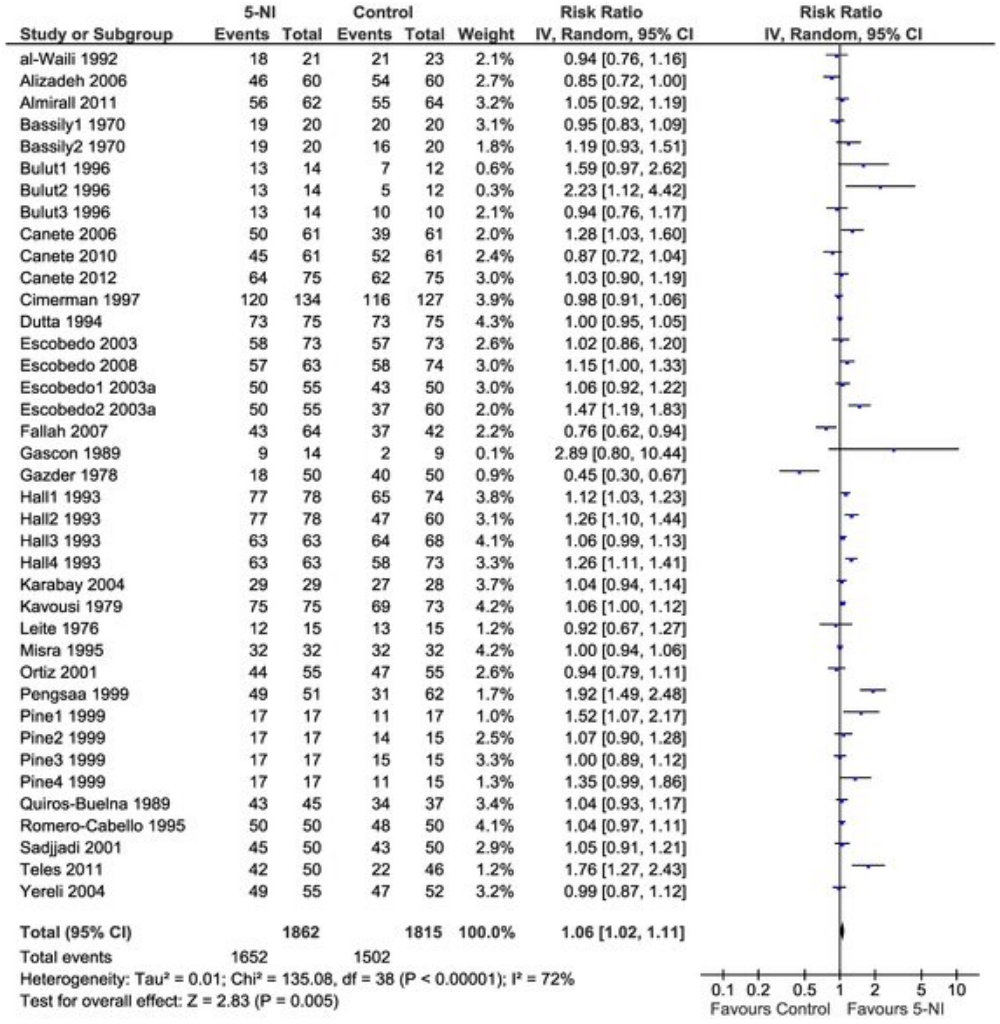
¿Cuáles agentes terapéuticos están disponibles y aprobados localmente para esta indicación?

- Metronidazol
- Tinidazol
- Secnidazol
- Ornidazol
- Albendazol
- Quinacrina
- Nitazoxanida
- Furazolidona
- Paromomicina

¿Cuál será la mejor opción terapéutica para la GC y por cuánto tiempo?

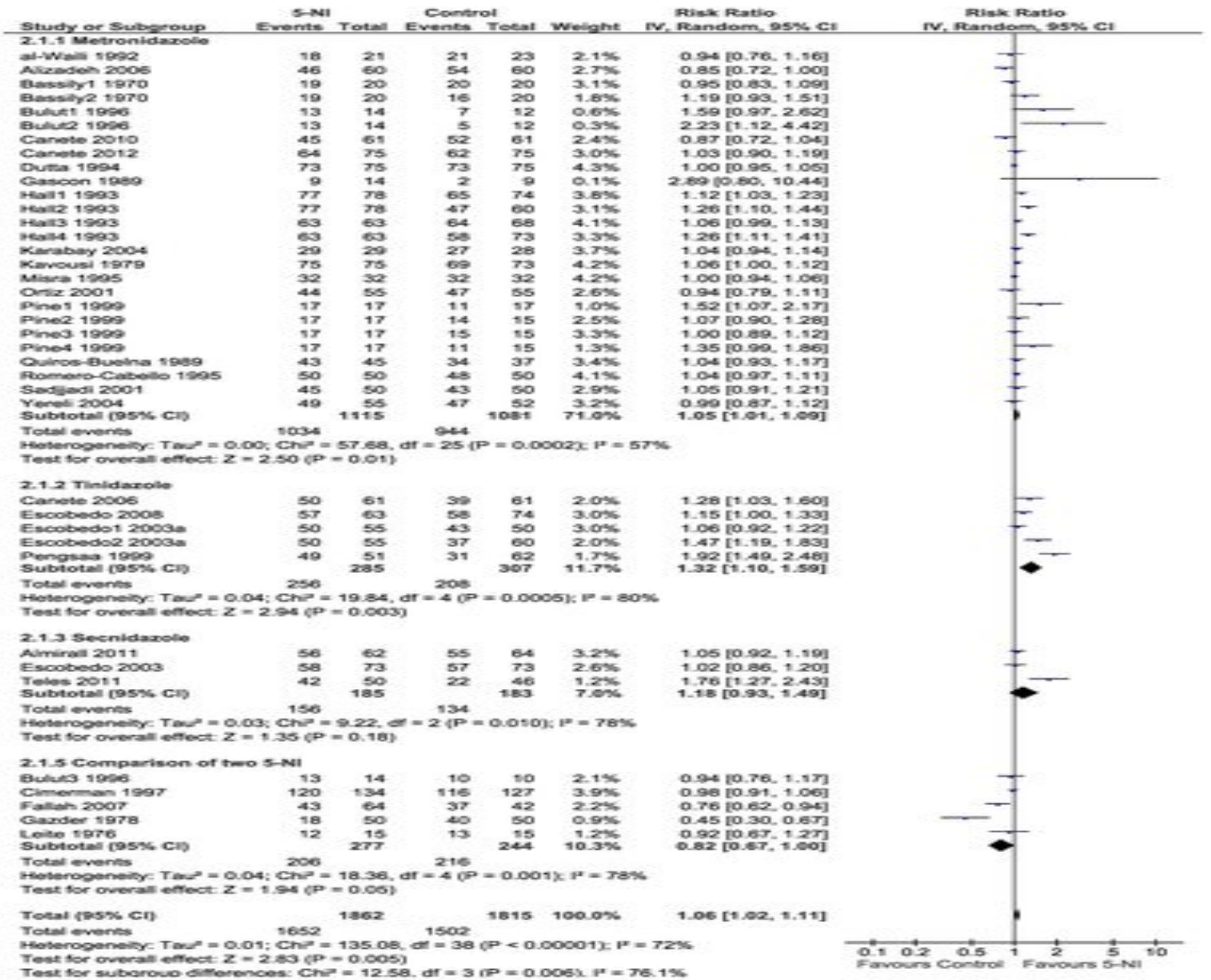
- Monoterapia con compuestos 5-nitroimidazoles

Figure 3. Forest plot showing efficacy of 5-NIs in the treatment of giardiasis.



Pasupuleti V, Escobedo AA, Deshpande A, Thota P, et al. (2014) Efficacy of 5-Nitroimidazoles for the Treatment of Giardiasis: A Systematic Review of Randomized Controlled Trials. PLoS Negl Trop Dis 8(3): e2733. doi:10.1371/journal.pntd.0002733
http://www.plosntd.org/article/info:doi/10.1371/journal.pntd.0002733

Figure 4. Forest plot showing efficacy of 5-NIs in the treatment of giardiasis; stratified by type of drug.



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http://www.plosntd.org/article/info:doi/10.1371/journal.pntd.0002733

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Acta Tropica

journal homepage: www.elsevier.com/locate/actatropica

Caregiver perspectives for the prevention, diagnosis and treatment of childhood giardiasis in Havana City, Cuba. A qualitative study

Angel A. Escobedo[a,*], Pedro Almirall[b], Maydel Alfonso[b], Ivonne Ávila[c], Sérgio Cimerman[d], Yohana Salazar[e], Isabel V. Dawkins[c], Rosa M. García[b]

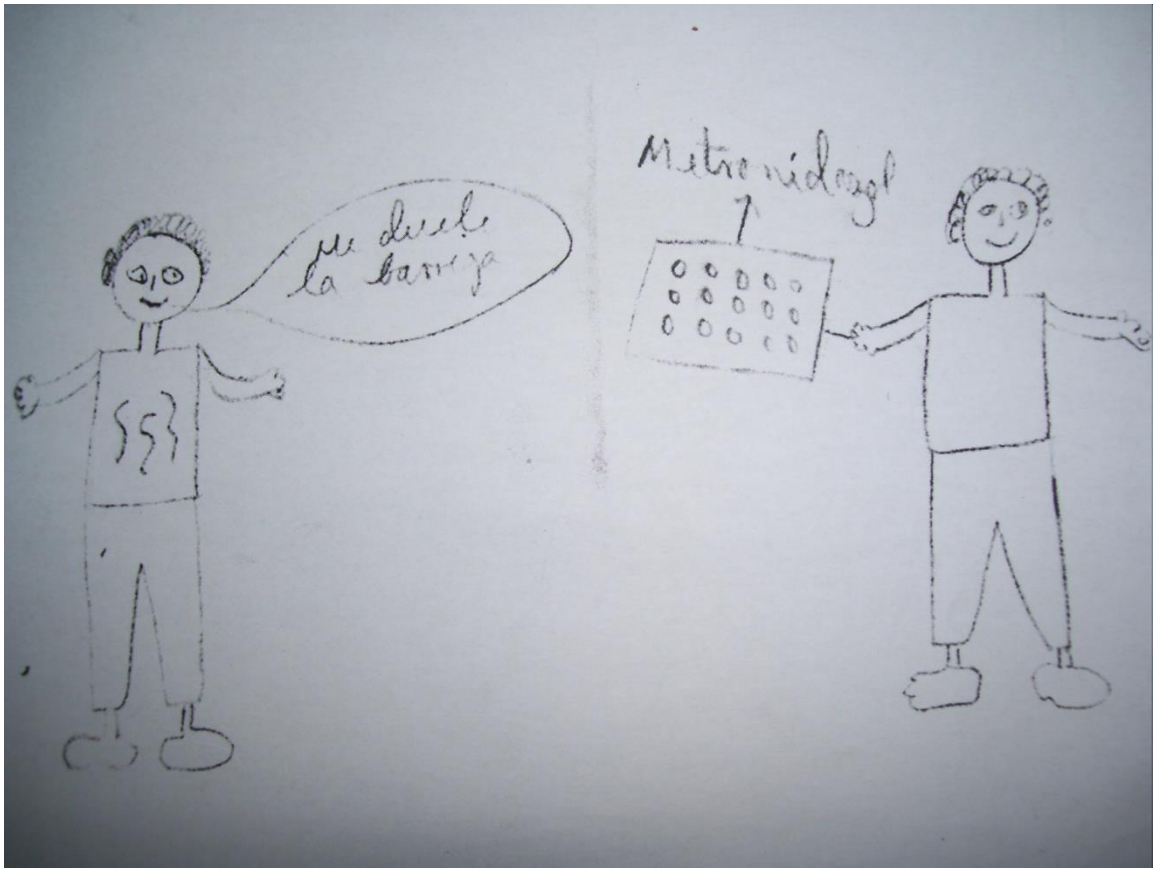
- En cada grupo focal los cuidadores consideraron que la giardiasis era muy difícil de eliminar y que el metronidazol es inefectivo.

Claman por inyecciones o medicamentos amargos, como Propóleos.

- Prefieren drogas que se administren por sondas directamente a la vesícula o el estómago.

Procesos invasivos

Automedicación



Albendazol *vs* Metronidazol

Author, Year (Country)	Study Design	No. of Randomized Participants	Age (yr)	Disease Characteristics	Anti-giardial Drug Regimens (No. of Participants)	Efficacy
Alizadeh, 2006 (Iran) [39]	Open-label*, RCT	120	2–53	Symptomatic	Albendazole, 400 mg/d for 5d (60)	Albendazole (90%)
	Two parallel arms				Metronidazole, 250 mg tid for 5d (60)	Metronidazole (76.7%)
Yereli, 2004 (Turkey) [41]	Open-label, RCT	107	3–15	Symptomatic	Albendazole, 10 mg/kg sid for 5d (52)	Albendazole (90.4%)
	Two parallel arms			Asymptomatic	Metronidazole, 20 mg/kg tid for 7d (57)	Metronidazole (89.1%)
Karabay, 2004 (Turkey) [40]	Open-label, RCT	57	41 ± 12¥	Symptomatic	Albendazole, 400 mg/d for 5d (28)	Albendazole (96.4%)
	Two parallel arms		38 ± 14‡		Metronidazole, 500 mg tid for 5d (29)	Metronidazole (100%)
Rodriguez-García, 1996 [44]	Open-label, RCT	49	3–12	Symptomatic	Albendazole, 200 mg tid for 5 d (27)	Albendazole (77%)
	Two parallel arms			Asymptomatic	Metronidazole, 30 mg/kg tid for 5 d (22)	Metronidazole (72.7%)
Misra, 1995 (India) [29]	Open-label, RCT	34	2–12	Symptomatic	Albendazole, 400 mg/d for 5d (18)	Albendazole (100%)
	Two parallel arms				Metronidazole, 7.5 mg/kg tid for 5d (16)	Metronidazole (100%)
Romero-Cabello, 1995 (Mexico) [42]	Open-label, RCT	100	4–11	Symptomatic	Albendazole, 400 mg/d for 5d (50)	Albendazole (94%)
	Two parallel arms			Asymptomatic	Metronidazole, 7.5 mg/kg tid for 5d (50)	Metronidazole (98%)
Dutta, 1994 (India) [45]	Open-label&, RCT	150	2–10	N.S.#	Albendazole, 400 mg as a single dose (75)	Albendazole (97%)
	Multicenter, Two parallel arms				Metronidazole, 22.5 mg/kg tid for 5d (75)	Metronidazole (97%)
Hall, 1993a (Bangladesh) [43]	Open-label§, RCT	283	5–10	N.S.€	Albendazole, 400 mg sid for 3d (116)	Albendazole (87.8%)
	Three parallel arms in each trial				Metronidazole, 125 mg tid for 5d (115)	Metronidazole (98.7%)
Hall, 1993b (Bangladesh) [43]	Open-label§, RCT	283	5–10	N.S.€	Albendazole, 400 mg sid for 5d (115)	Albendazole (94.1%)
	Three parallel arms in each trial				Metronidazole, 125 mg tid for 5d (115)	Metronidazole (100%)

Abbreviations: N.S., Not Stated; s.i.d., once a day; t.i.d., three times a day; RCT, randomized clinical trial.
¥Albendazole group.
‡Metronidazole group.
#The included patients were probably symptomatic individuals referred to three hospitals in India.
€Initially 768 children were screened in an urban slum in Dhaka from which 678 children were found to be infected with *Giradia*. The infected children were probably asymptomatic cyst-passers.
*The person who performed the stool microscopy was blinded to the treatments regimens.
&The stool sample examiner was blinded to the treatment regimens.
§Stool examination was done blinded to the treatment status of the patient.
doi:10.1371/journal.pntd.0000682.t001

Albendazol *vs* Tinidazol

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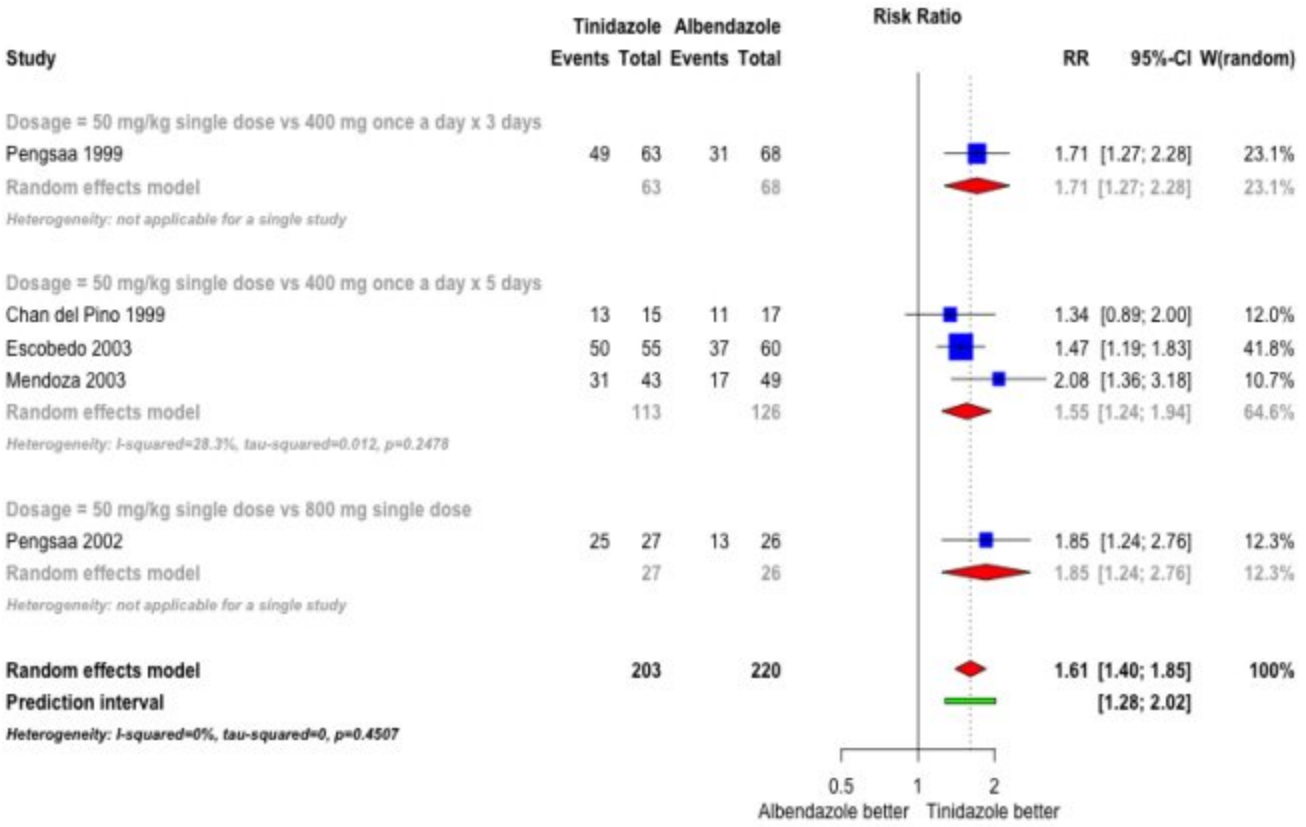
Acta Tropica

journal homepage: www.elsevier.com/locate/actatropica

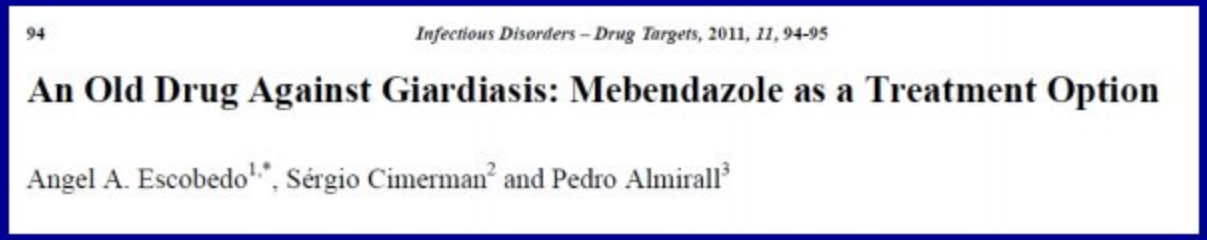
A meta-analysis of the efficacy of albendazole compared with tinidazole as treatments for *Giardia* infections in children

Angel A. Escobedo[a,b,c,*], Javier Ballesteros[d], Eduardo González-Fraile[e], Pedro Almirall[c,f]



Otras drogas

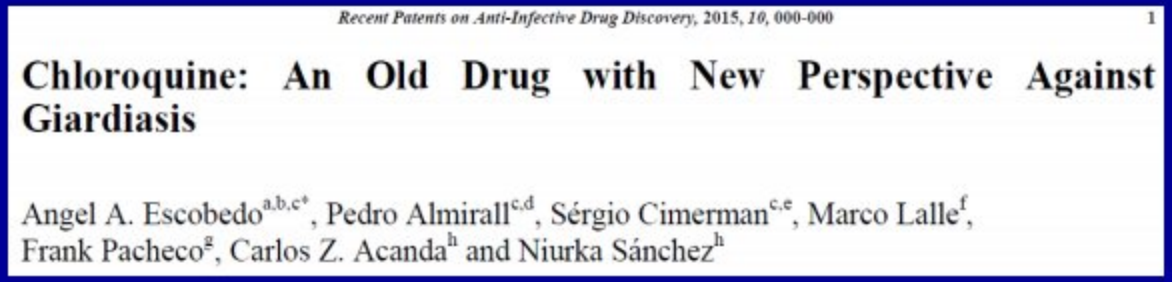
- Quinacrina
- Nitazoxanida
- Furazolidona
- Paromomicina
- Mebendazol
- Cloroquina



94 *Infectious Disorders – Drug Targets*, 2011, *11*, 94-95

An Old Drug Against Giardiasis: Mebendazole as a Treatment Option

Angel A. Escobedo[1,*], Sérgio Cimerman[2] and Pedro Almirall[3]



Recent Patents on Anti-Infective Drug Discovery, 2015, *10*, 000-000 1

Chloroquine: An Old Drug with New Perspective Against Giardiasis

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The Journal of Infectious Diseases

CORRESPONDENCE

Could the Fight Against Treatment Failures in Giardiasis Lead to a Second Childhood for Quinacrine?

To the Editor—We read with great interest the article by Requena-Méndez et al on quinacrine (QC) for patients with persistent *Giardia* infections after treatment with nitroimidazole compounds [1]. Although their study primarily focuses on the estimation of the proportion of nitroimidazole-resistant *Giardia* in the population attending tropical medical units and attempts to describe the risk factors and the assemblages associated with the persistence of giardiasis, this article has another important clinical implication: the successful use of QC in those who experienced treatment failures

deficiency [10]. Psychiatric disturbances represent infrequent but more serious complications that may appear after taking a few doses of the drug or after its discontinuation [5, 7, 10]. These may be due to the action of QC as a cortical stimulant [7–10], although the exact mechanism of its action on the central nervous system is still unclear.

The exact mechanism of QC activity is unclear but may involve different targets, including decreased oxygen consumption due to interference with the enzyme NADH oxidase [5–10]. Its pharmacokinetic characteristics include its intestinal absorption even in patients with severe diarrhea, extended pharmacological half-life, wide distribution in the tissues, and very low excretion,

and chloroquine, are likely to be several years away from widespread use for this indication, necessitating our continued reliance on existing drugs for giardiasis. Quinacrine represents an important treatment option for patients who have a 5-NIs allergy or when therapy with 5-NIs or other drugs is either not well tolerated or unavailable. It may also have a major contemporary role in those patients receiving first-line therapy who experience treatment failures. Another potential niche for QC in the treatment of giardiasis would be as a component of combination therapy, with either metronidazole or albendazole. Combination therapy could lead to lower doses of drugs being used, perhaps decreasing their potential toxicity. We encourage further study of QC, either

Tratamiento (*alternativas*)

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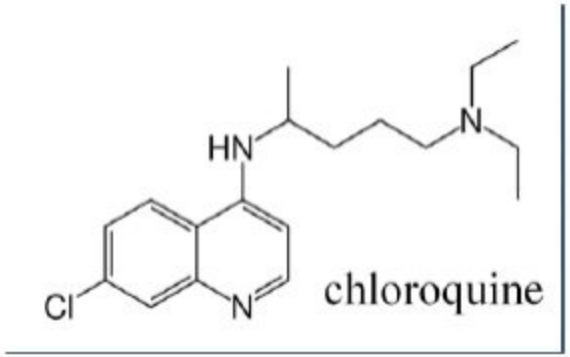
Angel A. Escobedo[a,b,c*], Pedro Almirall[c,d], Sérgio Cimerman[c,e], Marco Lalle[f], Frank Pacheco[g], Carlos Z. Acanda[h] and Niurka Sánchez[h]



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TRATAMIENTO DE LA GIARDIASIS CON ARALEN (Cloroquina)*

(SN-7618)-(W-7618)-7-cloro-4 (4 dietilamino-1-metil-butilamino) quinolina difosfato

POR LOS DOCTORES

JOSE G. BASNUEVO** y FEDERICO SOTOLONGO***

Hace meses, con motivo de haber curado con Aralén o Cloroquina (SN-7618) a dos pacientes portadores de abundantes quistes de *Giardia lamblia*, nosotros publicamos una nota previa señalando estos hechos.(1)

Con el fin de hacer una estadística más amplia y comprobar lo anteriormente expuesto, solicitamos de los compañeros del Hospital Calixto García que tuvieran la bondad de remitirnos sus casos de Giardiasis para tratarlos con la droga antes mencionada.

El Hospital Calixto García (Hospital Universitario), tiene siempre encamados más de 1,000 enfermos y a su consulta externa concurren diariamente cientos de enfermos ambulantes, procedentes de todos los pueblos de la Isla. Actualmente este Hospital goza de una magnífica organización, y los enfermos están perfectamente clasificados y bien atendidos. Algunos de sus servicios o departamentos están tan bien organizados, que pueden cotejarse ventajosamente, con los mejores en su clase. Gracias a esta organización, nos ha sido posible reunir en corto tiempo, cierto número de enfermos portadores de abundantes trofozoitos o quistes de *Giardia lamblia*.

La Giardiasis es bastante frecuente en Cuba, especialmente en las clases más humildes y en los campesinos, habiéndose notado en estos últimos años un gran incremento de esta parasitosis, tanto en los adultos como en los niños, especialmente en estos últimos, por debajo de los 10 años de edad.

Las estadísticas realizadas arrojan el siguiente porcentaje:

6.98% sobre 8,143 exámenes. Kouri-Basnuevo y colaboradores. 1938.(2)

6.58% sobre 200 exámenes en niños campesinos. Fernández Suárez. 1945.(2)

* Trabajo presentado al Primer Congreso Médico Social Pan Americano. Diciembre 2-8, 1946. Habana, Cuba. (Sección de Historia, Parasitología y Medicina Tropical.)

** Profesor Auxiliar de la Cátedra de Parasitología y Enfermedades Tropicales de la Universidad de La Habana.

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Hasta el año 1937 no se conocía una medicación específica contra la Giardiasis o Lamblíasis y casi todos los productos antiparasitarios habían sido utilizados sin éxito en el tratamiento de esta protozoosis. Galli-Valerio (1937) fué el primero en reportar que la Quinacrina era una medicación específica contra la *Giardia lamblia*, después Martín (1937),(3) Bacigalupo (1938),(4) Kouri-Basnuevo y colaboradores (1938),(5) Falla y colaboradores (1938),(6) y otros,(7) publicaron trabajos haciendo constar la acción específica de la Quinacrina, Atebrina o Lamblicida sobre la *Giardia lamblia*.

Kouri-Basnuevo y Sotolongo (1938) usaron además de la Atebrina o Lamblicida, la Gonacrina o Acriflavina (Clorhidrato neutro de 3-6 diamino-10-metil acridina) obteniendo un 25% de curaciones.

Brumpt, en 1937 (citado por Streng en Sur's, 1945),(8) usó la Quinacrina al 1% en ratones infectados experimentalmente con Lamblias, obteniendo un 80% de curaciones.

Hasta este momento, parece que la Atebrina, Ayasul, Quinacrina o Lamblicida es la mejor de todas las medicaciones contra la *Giardia lamblia*, nosotros la hemos utilizado en adultos y en niños con un magnífico resultado a la dosis siguiente:

NIÑOS: De dos a cinco años: *0.05 Gm. al día, hasta un total de 0.50 Gm.*

De cinco a diez años: *0.10 Gm. al día, hasta un total de 0.70 Gm.*

Después de los diez años, igual dosis que los adultos.

ADULTOS: 0.20 Gm. al día, hasta tomar 1 Gm.

De Muro (1939) y Grott (1939) (citados por Craig y Faust 1945),(9) reportan que el Acranil, que es también un derivado de la Acridina, es más efectivo que la Atebrina contra la *Giardia lamblia* y menos tóxico.

Cada tableta de Acranil contiene 0.5 Gm, y se administra de la siguiente manera:

NIÑOS: Con menos de 2 años, media tableta o una tableta al día.

Después de los 10 años, 3 tabletas al día.

ADULTOS: 3 tabletas al día.

Corrientemente es suficiente cuatro o cinco días de tratamiento para obtener la curación.

Con motivo de haberse publicado en "The Journal of the American Medical Association"(10) un trabajo intitulado "Activity of Antimalarial agent Chloroquine (SN-7618)", nosotros pensamos usar este nuevo antimalárico en los casos de Giardiasis, con ese fin comenzamos a hacer gestiones para obtener alguna cantidad de ese medicamento.

Algún tiempo después, obtuvimos de la "Winthrop Products Inc.", de New York (Dr. Ros y Sr. Hart) 1,000 tabletas de Aralén (W-7618) 7-cloro-4 (dietilamino-1-metilbutilamino) quinolina difosfato.

En nuestro primer informe nosotros reportamos dos casos de Giardiasis tratados y aparentemente curados con Aralén.

En este segundo informe nos referimos a 15 casos tratados y aparentemente curados también con Aralén.

La casi totalidad de estos enfermos permanecen encamados en este Hospital y han sido controlados desde el punto de vista parasitario por el Laboratorio Clínico de la Cátedra de Parasitología y Enfermedades Tropicales que radica aquí, y de la cual es Profesor Titular el Dr. Pedro Kouri, y Profesor Auxiliar, Jefe de Laboratorio, el doctor José G. Basnuevo.

* * *

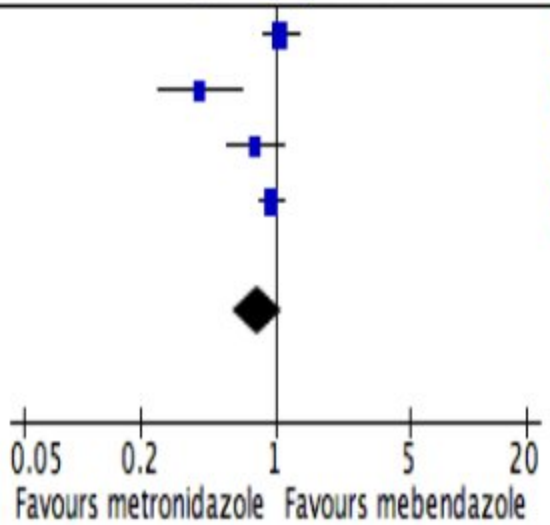
A continuación presentamos un cuadro resumen de los 15 casos tratados:

Mebendazol *versus* metronidazol

Study or Subgroup	Mebendazole Events	Total	Metronidazole Events	Total	Weight	Risk Ratio M-H, Random, 95% CI	Risk of Bias A B C D E F
Al-Waili 1992	21	23	18	21	28.4%	1.07 [0.86, 1.32]	+ ? - + + +
Bulut 1996a	12	34	13	15	17.2%	0.41 [0.25, 0.67]	+ - - + - +
Kalayci 1995a	11	15	14	15	23.4%	0.79 [0.56, 1.10]	? - - + + +
Sadjjadi 2001	43	50	45	50	31.0%	0.96 [0.83, 1.10]	+ - - + + +
Total (95% CI)		**122**		**101**	**100.0%**	**0.81 [0.61, 1.09]**	
Total events	87		90				

Heterogeneity: $Tau^2 = 0.07$; $Chi^2 = 15.43$, df = 3 (P = 0.001); $I^2 = 81\%$

Test for overall effect: Z = 1.38 (P = 0.17)



Risk of bias legend

(A) Random sequence generation (selection bias)

(B) Allocation concealment (selection bias)

(C) Blinding of participants and personnel (performance bias)

(D) Blinding of outcome assessment (detection bias)

(E) Incomplete outcome data (attrition bias)

(F) Selective reporting (reporting bias)

¿Qué hacer si no se alcanza el éxito?

Se considera falla cuando se requiere un cambio de régimen o se decide detener el tratamiento al observar falta de respuesta acompañada (o no) de un retardo en la solución o mejoría clínica.

Causas potenciales

- Inadecuados niveles de la droga (ej., incumplimiento del tratamiento)
- Reinfección
- Resistencia
- Causas desconocidas

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Review

Sexual transmission of giardiasis: A neglected route of spread?

Angel A. Escobedo[a,*], Pedro Almirall[b], Maydel Alfonso[c], Sérgio Cimerman[d], Leonor Chacín-Bonilla[e]

Prevalence of *Giardia lamblia* infection in MSM.

Reference	Population; study site	Prevalence	Comments
William et al. (1978)	89 MSM; STD clinic, New York City, USA	11%	High frequency of non-pathogenic and pathogenic intestinal protozoan infections; *E. histolytica*[a] (20%)
Kean et al. (1979)	126 MSM; New York City, USA	18.3%	High frequency (48.4%) of intestinal protozoan infections; *E. histolytica*[a] (31.7%)
McMillan (1980)	118 MSM; STD clinic, Glasgow, UK	1.6%	*E. histolytica*[a] (3.3%)
Keystone et al. (1980)	200 MSM; Toronto, Canada	13%	Only 3% of 100 heterosexuals had giardiasis. Cleansing of the anus before anal sex was linked to a significantly lower prevalence of intestinal parasitic infection
Phillips et al. (1981)	163 men; STD clinic, New York City, USA	21.5% and 6.2% in homosexuals and bisexuals, respectively	Homosexuality and oral–anal sex were the most important risk factors for *E. histolytica*[a] and *G. lamblia* infections
Sargeaunt et al. (1983)	470 MSM; London and Edinburgh, UK	3.6%	High frequency of commensal amoebae; *E. histolytica*[a] (11%)
Ortega et al. (1984)	150 MSM; San Francisco, USA	5%	High frequency (47%) of potentially pathogenic intestinal protozoa; *E. histolytica*[a] (36%)
Markell et al. (1984)	105 MSM; Health fair, San Francisco, USA	4.8%	High frequency (59.1%) of non-pathogenic and pathogenic intestinal protozoan infections; *E. histolytica*[a] (26.7%)
Håkansson et al. (1984)	133 MSM; STD clinic, Göteborg, Sweden	30% with *G. lamblia*, *E. histolytica*,[a] or both	High frequency (57%) of intestinal parasites. None of the heterosexuals had pathogenic protozoa
Bienzle et al. (1984)	200 MSM; Berlin, Germany	9.1%	High frequency of non-pathogenic species of amoebae (54.5%); *E. histolytica*[a] (22.8%)
Levinson et al. (1986)	101 MSM; STD clinic and private practices, Portland, OR, USA	3%	High frequency (61%) of non-pathogenic intestinal protozoan infections; *E. histolytica*[a] (27%)
Allason-Jones et al. (1986)	225 MSM; STD clinic, London, UK	3%	*E. histolytica*[a] (20%)
Sorvillo et al. (1986)	140 MSM; Los Angeles, USA	15.7%	Asymptomatic individuals; high frequency of intestinal protozoa; *E. histolytica*[a] (27.1%)
Peters et al. (1986)	274 MSM; Chicago, USA	8%	High frequency (48.5%) of intestinal protozoan infections; *E. histolytica*[a] (26%)
Christophersen et al. (1988)	365 men (36% MSM); STD clinic, Copenhagen, Denmark	13.8%	*E. histolytica*[a] (31.9%). None of the heterosexuals had pathogenic protozoa. Protozoal infections were correlated to anilingus
Weinke et al. (1990)	320 MSM; Berlin, Germany	1.9%	*E. histolytica*[a] (16.3%)
Esfandiari et al. (1997)	AIDS clinic, Los Angeles, USA	17.7%	There was a high degree of clustering for *Giardia*. The odds ratio for sexual orientation was 14.2 (MSM vs. heterosexuals) $P<0.001$
Pakianathan et al. (1999)	175 MSM; STD clinic, Edinburgh, UK	3%	High frequency (57%) of intestinal protozoan infections
Stark et al. (2007)	1246 MSM (628 HIV+ MSM, 618 HIV− MSM); Sydney, Australia	3% in HIV+ MSM, 4.5% in HIV− MSM	High rates of infection (52.2%) with intestinal protozoan infections
Di Benedetto et al. (2012)	74 MSM; western Sicily, Italy	16.4%	HIV (8.1%), HHV8 (16.2%), and *Treponema pallidum* (21.6%). *Cryptosporidium* spp., although searched, was not found

NA= not applicable.

[a] Studies with morphologic identification of *E. histolytica* also include the nonpathogenic species, *E. dispar*.

Resistencia

- La resistencia clínica de *Giardia* al metronidazol ha sido mostrada y ocurre resistencia cruzada al tinidazol.
- Organismos resistentes a la furazolidona desarrollados *in vitro* se adaptan más rápido a la resistencia a la quinacrina.
- La resistencia al albendazol se ha desarrollado más rápidamente en organismos resistentes a la furazolidona.

¿Qué hacer?

- Proponer un curso más largo de tratamiento con la misma droga.
- Cambiar a otra droga.
- Combinar drogas con diferentes mecanismos de acción.

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Combination therapy in the management of giardiasis: What laboratory and clinical studies tell us, so far

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Mecanismos de acción

- Drogas dependientes del sistema redox:
  - 5-nitroimidazoles
  - furazolidona
  - nitazoxanida
- Drogas dependientes de la síntesis de proteínas o ADN:
  - quinacrina
  - paromomicina
- Drogas dependientes del citoesqueleto
  - albendazol
  - mebendazol

Am. J. Trop. Med. Hyg., 83(1), 2010, pp. 171–173
doi:10.4269/ajtmh.2010.09-0742

Short Report: Short Course Combination Therapy for Giardiasis after Nitroimidazole Failure

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Giardiasis after nitroimidazole failure: patient characteristics, combination therapy schemes, and outcome

Patient	Age/sex Type of patient Origin	Underlying disease	Previous drugs*	Combination treatment scheme†	Outcome Follow-up‡ (duration)
1	28/M Immigrant Syria	None	MTZ: 5 (21 g) TDZ: 1 (2 g) PRM: 2 (15 g)	MTZ × 10 d + ABZ × 10 d + PRM × 10 d	Clinical improvement Negative stool test 2 months
2	38/M Immigrant Cuba	None	TDZ: 1 (2 g)	MTZ × 7d + PRM × 10d	Clinical improvement No stool test Lost to follow up
3	25/M Immigrant Nigeria	None	MTZ: 1 (10.5 g)	MTZ × 10 d + PRM × 10 d	Clinical improvement Negative stool test 1 year
4	6/M Adopted Colombia	None	MTZ: 2 (7.5 g)	TDZ × 3 d + PRM × 7 d	Clinical improvement No stool test 1 year
5	3/M Adopted Equatorial Guinea	None	MTZ: 4 (ND) ABZ: 1 (ND)	TDZ × 7 d + QNC × 7 d	Clinical improvement Negative stool test 2 years
6	36/F Traveler Latin American countries	Ig A deficiency	MTZ: 1 (10.5 g) ABZ: 1 (8 g) PRM: 1 (7.5 g)	TDZ × 7 d + ABZ × 10 d + PRM × 10d + iv IgA	Clinical improvement Negative stool test 2 years
7	40/M Traveler Sub-Saharan countries	None	MTZ: 3 (31.5 g) MBZ: 1 (1 g) PRM: 1 (7.5 g)	MTZ × 10 d + QNC × 10 d	Clinical improvement Negative stool test 6 months
8	3/M Traveler Cuba	IgA deficiency	MTZ: 2 (21 g)	TDZ × 1 d + ABZ × 7 d + PRM × 7 d + iv IgA	Clinical improvement Negative stool test 1 month
9	59/M Spain	None	MTZ: 2 (21 g) MBZ: 1 (1.4 g)	TDZ × 7d + QNC × 7 d	Clinical improvement Negative stool test 1 year
10	60/M Spain	Lung cancer	MTZ: 2 (20 g)	TDZ × 5 d + PRM × 7 d	Clinical improvement Negative stool test 1 month

*Previous anti-giardial drugs, number of full courses (total dose received).
†Drug doses: MTZ = metronidazole 500 mg every 8 hours (15 mg/kg/d in 3 doses in children); ABZ = albendazole 400 mg every 12 hours; PRM = paromomycin 500–750 mg every 8 hours (30 mg/kg/d in 3 doses in children); TDZ = tinidazole 2 g once (50 mg/kg/d once in children); QNC = quinacrine 100 mg every 8 hours for 7 days (6 mg/kg/d in 3 doses max 300 mg/d in children; iv IgA = intravenous immunoglobulin A.
‡Three stool samples for ova and parasites after concentration techniques.
M = male; F = female; ND = no data; MBZ = mebendazole.

Treatment of Patients with Refractory Giardiasis

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Clinical Infectious Diseases 2001;33:22–8

Table 1. Histories of patients with refractory giardiasis.

Patient	Underlying disease	Duration of giardiasis	Unsuccessful treatment	Successful treatment	Duration of follow-up
1	None	1.5 years	Mtz, T, T/Dox	Q/Mtz	2 years
2	Common variable hypogammaglobulinemia	6 months	Mtz	Q/Mtz	10 months
3	AIDS	4 years[a]	Mtz, T, Pm, A, Dox	Pm/F, T/Q, B/Pm	20 months
4	AIDS	15 months	Mtz, F, Pm, A	Q/Mtz	2 months
5	Complex immunodeficiency	1.5 years	Mtz	Q/Mtz	2 months
6	None[b]	8 months	Mtz, F	Q/Mtz	2 months

NOTE. A, albendazole; B, bacitracin; Dox, doxycycline; F, furazolidone; mo. month; Mtz, metronidazole; Pm, paromomycin; Q, quinacrine; T, tinidazole.

[a] Infection recurred during the 4-year period.

[b] Subsequently received a diagnosis of and died of cancer.

Successful Treatment of Metronidazole- and Albendazole-Resistant Giardiasis with Nitazoxanide in a Patient with Acquired Immunodeficiency Syndrome

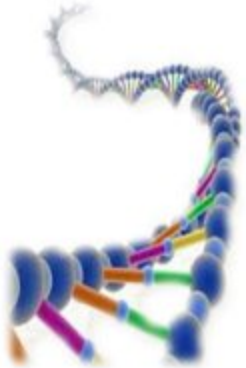
Philippe Abboud,[1] Véronique Lemée,[2] Gilles Gargala,[3] Philippe Brasseur,[2] Jean Jacques Ballet,[3] Françoise François Caron,[1] and Loïc Favennec[2]

Clinical Infectious Diseases 2001;32:1792–4

Table 1. Summary of sequential antigiardial therapy in an HIV-infected patient with giardiasis that was resistant to metronidazole and albendazole.

Date	$CD4^+$ T cell count, cells/μL	Virus load, copies/mL	Diarrhea	*Giardia duodenalis* in stool	Specific treatment
November 1991	ND	ND	Present	Absent	None
January 1992	ND	ND	Present	ND	None
April 1997	28	95,000	Present	Present	Metronidazole, 0.5 g t.i.d. for 5 days
July–August 1997	22	225,000	Present	Present	Metronidazole, 0.5 g t.i.d. for 5 days
October 1997			Present	Present	Metronidazole, 0.5 g t.i.d. for 5 days
November 1997	11	72,500	Present	Present	Metronidazole, 0.5 g t.i.d. for 5 days
November 1997	ND	ND	Present	Present	Metronidazole, 0.5 g t.i.d. for 7 days
December 1997	ND	ND	Present	Present	Secnidazole, 1 dose, 2 g
January 1998	ND	ND	Present	ND	None
March 1998	ND	ND	Present	Present	Albendazole, 400 mg/day for 5 days
April 1998	ND	ND	Present	Present	Metronidazole, 0.5 g t.i.d. for 5 days, and albendazole, 400 mg/day for 5 days
June 1998	3	200,000	Present	Present	None
August 1998	3	650,000	Present	ND	Metronidazole, 0.5 g t.i.d. for 5 days
September 1998	ND	ND	Present	Present	None
October 1998	ND	ND	Present	Present	Nitazoxanide, 500 mg b.i.d. for 10 days
November 1998	1	350,000	Present	Present	Nitazoxanide, 1 g b.i.d. for 15 days
December 1998	ND	ND	Present	Present	None
January 1999	5	925,000	Present	Present	Nitazoxanide, 1.5 g b.i.d. for 30 days
February 1999	ND	ND	Absent	Absent	None
April 1999	2	ND	Absent	Absent	None

Tareas pendientes



- **Contribuyen los diferentes ensambles de *Giardia* en la transmisión, los resultados clínicos y en el tratamiento de la enfermedad?**
- **Qué relación subyace entre la infección por *Giardia* y el síndrome de intestino irritable u otros desórdenes gastro- y extraintestinales?**
- **Por qué algunas infecciones son refractarias al tratamiento?**
- **Cuán común es la resistencia en giardiosis y cuáles son las bases moleculares de la resistencia?**
- **Cuál es el tratamiento mejor, sobre bases científicas en los casos en que existe falla en el tratamiento?**
- **Será necesario ofrecer tratamiento a las personas asintomáticas en nuestro medio, y si es positiva la respuesta, cuándo?**

Clin Gastroenterol Hepatol. 2018 Jan 25. pii: S1542-3565(18)30088-0. doi: 10.1016/j.cgh.2018.01.022. [Epub ahead of print]

Prevalence of Irritable Bowel Syndrome and Chronic Fatigue 10 Years after Giardia Infection.

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Author information

Abstract

BACKGROUND & AIMS: Irritable bowel syndrome (IBS) is a complication that can follow gastrointestinal infection, but it is not clear if patients also develop chronic fatigue. We investigated the prevalence and odds ratio of IBS and chronic fatigue 10 years after an outbreak of Giardia lamblia, compared with a control cohort, and changes in prevalence over time.

METHODS: We performed a prospective follow-up study of 1252 laboratory-confirmed cases of giardiasis (exposed), which developed in Bergen, Norway in 2004. Statistics Norway provided us with information from 2504 unexposed individuals from Bergen, matched by age and sex (controls). Questionnaires were mailed to participants 3, 6, and 10 years after the outbreak. Results from the 3- and 6-year follow-up analyses have been published previously. We report the 10-year data and changes in prevalence among time points, determined by logistic regression using generalized estimating equations.

RESULTS: The prevalence of IBS 10 years after the outbreak was 43% (n=248) among 576 exposed individuals and 14% (n=94) among 685 controls (adjusted odds ratio for development of IBS in exposed individuals, 4.74; 95% CI, 3.61-6.23). At this time point, the prevalence of chronic fatigue was 26% (n=153) among 587 exposed individuals and 11% (n=73) among 692 controls (adjusted odds ratio, 3.01; 95% CI, 2.22-4.08). The prevalence of IBS among exposed persons did not change significantly from 6 years after infection (40%) to 10 years after infection (43%; adjusted odds ratio for the change 1.03; 95% CI, 0.87-1.22). However, the prevalence of chronic fatigue decreased from 31% at 6 years after infection to 26% at 10 years after infection (adjusted odds ratio for the change 0.74; 95% CI, 0.61-0.90).

CONCLUSION: The prevalence of IBS did not change significantly from 6 years after an outbreak of Giardia lamblia infection in Norway to 10 years after. However, the prevalence of chronic fatigue decreased significantly from 6 to 10 years afterward. IBS and chronic

1681 → 2018

Hemos estado trabajando por 337 años en total o relativa desatención

Coloquemos el límite

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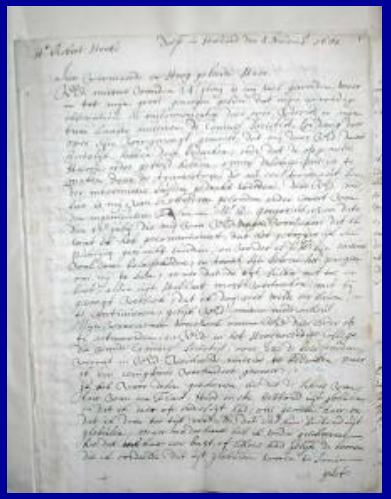
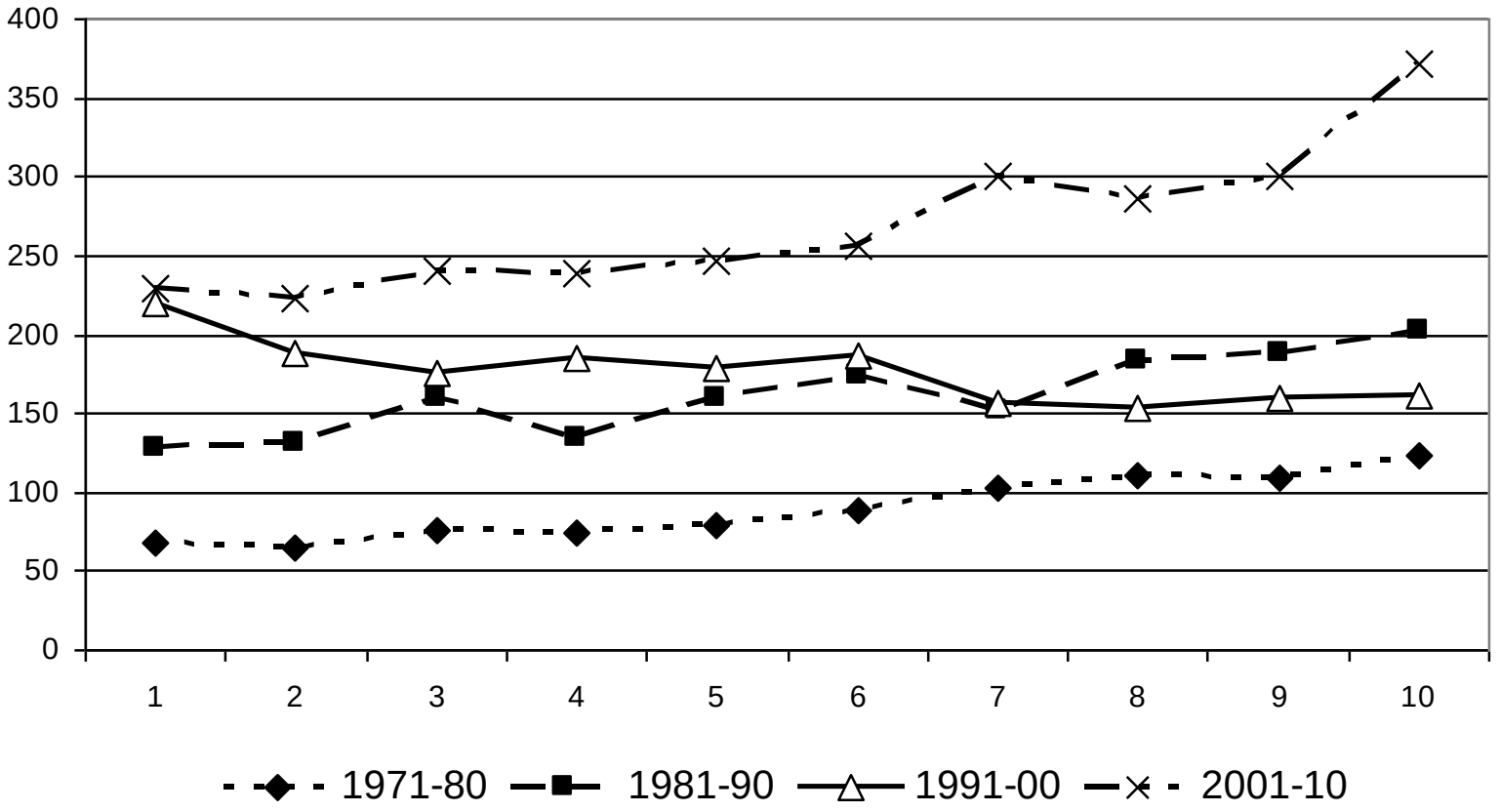


Google

Producción científica por décadas sobre *Giardia* y giardiosis publicadas en PubMed. 1971-2010



Escobedo *et al*. **A bibliometric study of international scientific productivity in giardiasis covering the period 1971–2010 .**
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6th International *Giardia* & *Cryptosporidium* Conference

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HAVANA CITY

Si haces lo que siempre has hecho,

nunca llegarás más allá de donde

siempre has llegado...

Mark Twain


¡Gracias!

Herramientas

Microscopía y inmunofluoresc.

- sensibilidad
- especificidad
- No identifican especie o genotipos, debido a la carencia de variación morfológica.
- Los anticuerpos no diferencian entre quistes de *Giardia* de diferentes especies.

Técnicas moleculares

- + sensibilidad
- especificidad
- Identifican aislamientos a por: especie, ensamble, sub-ensambles y genotipos.
- Identifica fuentes de infección o contaminación (H_2O o alimentos).
- Caracteriza la dinámica de la transmisión de la infección.
- Correlaciona diversidad genética con síntomas en el hospedero.

Caracterización molecular

- Amplificación por RCP

18S rDNA

TPI (Triose Phosphate Isomerase)

ß-giardin

GDH (Glutamate dehydrogenase)

GLORF-C4

EF-1α (Elongación del factor 1alfa)

VSPs (Variable surface protein)

Plataformas

Secuenciación

RFLP

Real-time

Créditos

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