

GIARDIASIS (*Giardia duodenalis*)

	Drug	Adult dosage	Pediatric dosage
Drug of choice:	Metronidazole ¹	250 mg PO tid x 5-7d	15 mg/kg/d PO in 3 doses x 5-7d
OR	Tinidazole ²	2 g PO once	50 mg/kg PO once (max. 2 g)
OR	Nitazoxanide ³	500 mg PO bid x 3d	1-3yrs: 100 mg PO q12h x 3d 4-11yrs: 200 mg PO q12h x 3d >12yrs: 500 mg PO q12h x 3d
Alternative: ⁴	Paromomycin ^{1,5,6}	25-35 mg/kg/d PO in 3 doses x 5-10d	25-35 mg/kg/d PO in 3 doses x 5-10d
OR	Furazolidone*	100 mg PO qid x 7-10d	6 mg/kg/d PO in 4 doses x 7-10d
OR	Quinacrine ^{7,8*}	100 mg PO tid x 5d	2 mg/kg/d PO in 3 doses x 5d (max 300 mg/d)

* Availability problems. See table below.

- Not FDA-approved for this indication.
- A nitroimidazole similar to metronidazole, tinidazole appears to be as effective as metronidazole and better tolerated (Med Lett Drugs Ther 2004; 46:70). It should be taken with food to minimize GI adverse effects. For children and patients unable to take tablets, a pharmacist can crush the tablets and mix them with cherry syrup (*Humco*, and others). The syrup suspension is good for 7 days at room temperature and must be shaken before use (HB Fung and TL Doan et al, Clin Ther 2005; 27:1859). Ornidazole, a similar drug, is also used outside the US.
- Nitazoxanide may be effective against a variety of protozoan and helminth infections (DA Bobak, Curr Infect Dis Rep 2006; 8:91; E Diaz et al, Am J Trop Med Hyg 2003; 68:384). It was effective against mild to moderate amebiasis, 500 mg bid x 3d, in a recent study (JF Rossignol et al, Trans R Soc Trop Med Hyg 2007 Oct; 101:1025 E pub 2007 July 20). It is FDA-approved only for treatment of diarrhea caused by *Giardia* or *Cryptosporidium* (Med Lett Drugs Ther 2003; 45:29). Nitazoxanide is available in 500-mg tablets and an oral suspension; it should be taken with food.
- Another alternative is albendazole 400 mg/d PO x 5d in adults and 10 mg/kg/d PO x 5d in children (KYereli et al, Clin Microbiol Infect 2004; 10:527; O Karabay et al, World J Gastroenterol 2004; 10:1215). Combination treatment with standard doses of metronidazole and quinacrine x 3wks has been effective for a small number of refractory infections (TE Nash et al, Clin Infect Dis 2001; 33:22). In one study, nitazoxanide was used successfully in high doses to treat a case of *Giardia* resistant to metronidazole and albendazole (P Abboud et al, Clin Infect Dis 2001; 32:1792).
- Paromomycin should be taken with a meal.
- Poorly absorbed; may be useful for treatment of giardiasis in pregnancy.
- Not available commercially. It may be obtained through compounding pharmacies such as Panorama Compounding Pharmacy, 6744 Balboa Blvd, Van Nuys, CA 91406 (800-247-9767) or Medical Center Pharmacy, New Haven, CT (203-688-6816). Other compounding pharmacies may be found through the National Association of Compounding Pharmacies (800-687-7850) or the Professional Compounding Centers of America (800-331-2498, www.pccarx.com).
- Quinacrine should be taken with liquids after a meal.

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MANUFACTURERS OF DRUGS USED TO TREAT PARASITIC INFECTIONS

albendazole – <i>Albenza</i> (GlaxoSmithKline) – albendazole	§ <i>Flisint</i> (Sanofi-Aventis, France) – fumagillin
<i>Alinia</i> (Romark) – nitazoxanide	fluconazole – <i>Diflucan</i> (Pfizer), others
<i>AmBisome</i> (Gilead) – amphotericin B, liposomal	flucytosine – <i>Ancobon</i> (Valeant)
amphotericin B – <i>Fungizone</i> (Apothecon), others	§ <i>fumagillin</i> – <i>Flisint</i> (Sanofi-Aventis, France)
amphotericin B, liposomal – <i>AmBisome</i> (Gilead)	• <i>Fungizone</i> (Apothecon) – amphotericin
<i>Ancobon</i> (Valeant) – flucytosine	§ <i>Furamide</i> (Boots, United Kingdom) – diloxanide furoate
§ <i>Antiminth</i> (Pfizer) – pyrantel pamoate	§ <i>furazolidone</i> – <i>Furozone</i> (Roberts)
• <i>Aralen</i> (Sanofi) – chloroquine HCl and chloroquine phosphate	§ <i>Furozone</i> (Roberts) – furazolidone
§ artemether – <i>Arteman</i> (Arenco, Belgium)	† <i>Germanin</i> (Bayer, Germany) – suramin sodium
§ artemether/lumefantrine – <i>Coartem</i> , <i>Riamet</i> (Novartis)	§ <i>Glucantime</i> (Aventis, France) – meglumine antimonate
§ <i>Artenam</i> (Arenco, Belgium) – artemether	† <i>Hetrazan</i> – diethylcarbamazine citrate (DEC)
§ artesunate – (Guilin No. 1 Factory, People's Republic of China)	<i>Humatin</i> (Monarch) – paromomycin
atovaquone – <i>Mepron</i> (GlaxoSmithKline)	§ <i>Impavido</i> (Zentaris, Germany) – miltefosine
atovaquone/proguanil – <i>Malarone</i> (GlaxoSmithKline)	iodoquinol – <i>Yodoxin</i> (Glenwood), others
azithromycin – <i>Zithromax</i> (Pfizer), others	itraconazole – <i>Sporanox</i> (Janssen-Ortho), others
• <i>Bactrim</i> (Roche) – TMP/Sulfa	ivermectin – <i>Stromectol</i> (Merck)
§ benznidazole – <i>Rochagan</i> (Brazil)	ketoconazole – <i>Nizoral</i> (Janssen), others
• <i>Biaxin</i> (Abbott) – clarithromycin	† <i>Lampit</i> (Bayer, Germany) – nifurtimox
§ <i>Biltricide</i> (Bayer) – praziquantel	<i>Lariam</i> (Roche) – mefloquine
† bithionol – <i>Bitin</i> (Tanabe, Japan)	§ <i>Leshcutan</i> (Teva, Israel) – topical paromomycin
† <i>Bitin</i> (Tanabe, Japan) – bithionol	levamisole – <i>Ergamisol</i> (Janssen)
§ <i>Brolene</i> (Aventis, Canada) – propamidine isethionate	lumefantrine/artemether – <i>Coartem</i> , <i>Riamet</i> (Novartis)
chloroquine HCl and chloroquine phosphate – <i>Aralen</i> (Sanofi), others	<i>Malarone</i> (GlaxoSmithKline) – atovaquone/proguanil
clarithromycin – <i>Biaxin</i> (Abbott), others	malathion – <i>Ovide</i> (Medicis)
• <i>Cleocin</i> (Pfizer) – clindamycin	mebendazole – <i>Vermox</i> (McNeil), others
clindamycin – <i>Cleocin</i> (Pfizer), others	mefloquine – <i>Lariam</i> (Roche)
<i>Coartem</i> (Novartis) – artemether/lumefantrine	§ meglumine antimonate – <i>Glucantime</i> (Aventis, France)
crotamiton – <i>Eurax</i> (Westwood-Squibb)	† melarsoprol – <i>Mel-B</i>
dapsone – (Jacobus)	† <i>Mel-B</i> – melarsoprol
§ <i>Daraprim</i> (GlaxoSmithKline) – pyrimethamine USP	<i>Mepron</i> (GlaxoSmithKline) – atovaquone
† diethylcarbamazine citrate (DEC) – <i>Hetrazan</i>	metronidazole – <i>Flagyl</i> (Pfizer), others
• <i>Diflucan</i> (Pfizer) – fluconazole	§ <i>miconazole</i> – <i>Monistat i.v.</i>
§ diloxanide furoate – <i>Furamide</i> (Boots, United Kingdom)	§ <i>miltefosine</i> – <i>Impavido</i> (Zentaris, Germany)
doxycycline – <i>Vibramycin</i> (Pfizer), others	§ <i>Monistat i.v.</i> – miconazole
eflornithine (Difluoromethylornithine, DFMO) – <i>Ornidyl</i> (Aventis)	<i>NebuPent</i> (Fujisawa) – pentamidine isethionate
§ <i>Egaten</i> (Novartis) – triclabendazole	§ <i>niclosamide</i> – <i>Yomesan</i> (Bayer, Germany)
<i>Elimite</i> (Allergan) – permethrin	† <i>nifurtimox</i> – <i>Lampit</i> (Bayer, Germany)
<i>Ergamisol</i> (Janssen) – levamisole	nitazoxanide – <i>Alinia</i> (Romark)
<i>Eurax</i> (Westwood-Squibb) – crotamiton	<i>Nix</i> (GlaxoSmithKline) – permethrin
• <i>Flagyl</i> (Pfizer) – metronidazole	• <i>Nizoral</i> (Janssen) – ketoconazole

(continued)

- § oxamniquine – *Vansil* (Pfizer)
- § *Paludrine* (AstraZeneca, United Kingdom) – proguanil paromomycin – *Humatin* (Monarch); *Leshcutan* (Teva, Israel; topical formulation not available in US)
- Pentam 300 (Fujisawa) – pentamidine isethionate pentamidine isethionate – *Pentam 300* (Fujisawa), *NebuPent* (Fujisawa)
- † *Pentostam* (GlaxoSmithKline, United Kingdom) – sodium stibogluconate permethrin – *Nix* (GlaxoSmithKline), *Elimite* (Allergan)
- § praziquantel – *Biltricide* (Bayer)
primaquine phosphate USP
- § proguanil – *Paludrine* (AstraZeneca, United Kingdom)
proguanil/atovaquone – *Malarone* (GlaxoSmithKline)
- § propamidine isethionate – *Brolene* (Aventis, Canada)
- § pyrantel pamoate – *Antiminth* (Pfizer)
pyrethrins and piperonyl butoxide – *RID* (Pfizer), others
- § pyrimethamine USP – *Daraprim* (GlaxoSmithKline)
Qualaquin – quinine sulfate (Mutual Pharmaceutical Co/AR Scientific)
quinacrine
- * quinidine gluconate (Eli Lilly)
- § quinine dihydrochloride
quinine sulfate – *Qualaquin* (Mutual Pharmaceutical Co/AR Scientific)
- Riamet* (Novartis) – artemether/lumefantrine
- *RID* (Pfizer) – pyrethrins and piperonyl butoxide
- *Rifadin* (Aventis) – rifampin
rifampin – *Rifadin* (Aventis), others
- § *Rochagan* (Brazil) – benznidazole
- * *Rovamycine* (Aventis) – spiramycin
- † sodium stibogluconate – *Pentostam* (GlaxoSmithKline, United Kingdom)
- * spiramycin – *Rovamycine* (Aventis)
- *Sporanox* (Janssen-Ortho) – itraconazole
Stromectol (Merck) – ivermectin
sulfadiazine – (Eon)
- † suramin sodium – *Germanin* (Bayer, Germany)
- § *Tiberal* (Roche, France) – ornidazole
Tindamax (Mission) – tinidazole
tinidazole – *Tindamax* (Mission)
- TMP/Sulfa – *Bactrim* (Roche), others
- § triclabendazole – *Egaten* (Novartis)
- § *Vansil* (Pfizer) – oxamniquine
- *Vermox* (McNeil) – mebendazole
- *Vibramycin* (Pfizer) – doxycycline
- *Yodoxin* (Glenwood) – iodoquinol
- § *Yomesan* (Bayer, Germany) – niclosamide
- *Zithromax* (Pfizer) – azithromycin

* Available in the US only from the manufacturer.

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† Available from the CDC Drug Service, Centers for Disease Control and Prevention, Atlanta, Georgia 30333; 404-639-3670 (evenings, weekends, or holidays: 770-488-7100).

• Also available generically.

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