was no evidence that Egyptian patients metabolised the drug differently to produce a pyrogenic metabolite, and the effect had not been seen in other areas where a similar high-dose regimen was used.[1]

1. Foster R. A review of clinical experience with oxamniquine. *Trans R Soc Trop Med Hyg* 1987; **81:** 55–9.

Effects on the nervous system. In 37 patients with *Schistosoma mansoni* infection treated successfully with oxamniquine,[1] dizziness and drowsiness were most common, but the most significant adverse effect was the development of EEG abnormalities in 6 of 34 patients whose pre-treatment EEG was normal. Of the 3 patients with pre-existing EEG abnormalities, 1 suffered a tonic-clonic seizure during therapy as previously reported,[2] 1 did not suffer seizures, and the third received phenytoin prophylaxis during oxamniquine therapy. It was considered prudent to give antiepileptics before starting oxamniquine in patients with a history of seizure disorder. After completion of this study, a patient with no history of seizures suffered a tonic-clonic seizure 2 hours after each of the second and third doses of oxamniquine.

The main neuropsychiatric adverse effects seen in 180 Brazilian patients with *Schistosoma mansoni* infection treated with single oral doses of oxamniquine were: drowsiness (50.6%), dizziness (41.1%), headache (16.1%), temporary amnesia (2.2%), behavioural disturbances (1.7%), chills (1.1%), and seizures (1.1%).[3] An EEG was performed before and after treatment in 20 patients; there were alterations in 3 but they were not associated with neuropsychiatric changes.

1. Krajden S, *et al*. Safety and toxicity of oxamniquine in the treatment of Schistosoma mansoni infections, with particular reference to electroencephalographic abnormalities. *Am J Trop Med Hyg* 1983; **32:** 1344–6.
2. Keystone JS. Seizures and electroencephalograph changes associated with oxamniquine therapy. *Am J Trop Med Hyg* 1978; **27:** 360–2.
3. de Carvalho SA, *et al*. Neurotoxicidade do oxamniquine no tratamento da infeção humana pelo Schistosoma mansoni. *Rev Inst Med Trop Sao Paulo* 1985; **27:** 132–42.

Precautions

Oxamniquine should be used with caution in patients with epilepsy or a history of convulsive disorders. Patients should be warned that oxamniquine can cause dizziness or drowsiness and if affected they should not drive or operate machinery.

Pharmacokinetics

Oxamniquine is readily absorbed after oral doses. Peak plasma concentrations are achieved 1 to 3 hours after a dose and the plasma half-life is 1 to 2.5 hours.

It is extensively metabolised to inactive metabolites, principally the 6-carboxy derivative, which are excreted in the urine. About 70% of a dose of oxamniquine is excreted as the 6-carboxy metabolite within 12 hours of a dose; traces of the 2-carboxy metabolite have also been detected in the urine.

Uses and Administration

Oxamniquine is an anthelmintic used in the treatment of schistosomiasis caused by *Schistosoma mansoni*, but not by other *Schistosoma* spp. It causes worms to shift from the mesenteric veins to the liver where the male worms are retained; the female worms return to the mesentery, but can no longer release eggs. Resistance may occur.

Oxamniquine is given orally, preferably after food. Dosage depends on the geographical origin of the infection and total doses range from 15 mg/kg as a single dose to 60 mg/kg given over 2 to 3 days. A single dose should not exceed 20 mg/kg.

Schistosomiasis. Oxamniquine is an alternative to praziquantel for the treatment of schistosomiasis (p.138) due to *Schistosoma mansoni*, although resistance has occurred, particularly in South America,[1] and it is somewhat less effective than praziquantel.[2]

The dose ranges between a single dose of 15 mg/kg and 60 mg/kg given over 2 or 3 days.[1,3] Doses in the low range have been used effectively in South America, the Caribbean, and West Africa while patients in Egypt, South Africa, and Zimbabwe require doses at the top end of the range; intermediate doses may be effective in other parts of Africa.[3]

After the appropriate therapeutic dose of oxamniquine, cure rates of at least 60%, and often more than 90%, can be expected. Egg excretion in those not cured will be reduced by over 80%, and usually by over 90%, one year after treatment.[3]

1. WHO. The control of schistosomiasis: second report of the WHO expert committee. *WHO Tech Rep Ser 830* 1993. Available at: http://libdoc.who.int/trs/WHO_TRS_830.pdf (accessed 16/07/08)
2. Ferrari ML, *et al*. Efficacy of oxamniquine and praziquantel in the treatment of Schistosoma mansoni infection: a controlled trial. *Bull WHO* 2003; **81:** 190–6.
3. WHO. The control of schistosomiasis: report of a WHO expert committee. *WHO Tech Rep Ser 728* 1985. Available at: http://libdoc.who.int/trs/WHO_TRS_728.pdf (accessed 16/07/08)

Preparations

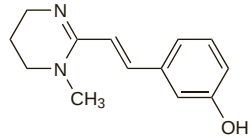
Proprietary Preparations (details are given in Part 3)
Braz.: Mansil; ***Gr.:*** Vansil†.

Oxantel Embonate *(BANM, rINNM)*

CP-14445-16; Embonato de oxantel; Oxantel, Embonate d'; Oxantel Pamoate *(USAN)*; Oxanteli Embonas. (*E*)-3-[2-(1,4,5,6-Tetrahydro-1-methylpyrimidin-2-yl)vinyl]phenol 4,4′-methylenebis(3-hydroxy-2-naphthoate).

Оксантела Эмбонат

$C_{13}H_{16}N_2O,C_{23}H_{16}O_6$ = 604.6.
CAS — 36531-26-7 (oxantel); 68813-55-8 (oxantel embonate); 42408-84-4 (oxantel embonate).
ATC — P02CC02.



(oxantel)

Profile

Oxantel is an analogue of pyrantel that has been used as the embonate in the treatment of trichuriasis. It is used with pyrantel for various intestinal nematode infections.

Preparations

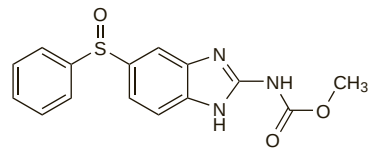
Proprietary Preparations (details are given in Part 3)
Multi-ingredient: ***Indon.:*** Quantrel; ***Philipp.:*** Quantrel; ***Venez.:*** Dualid; Quantrel.

Oxfendazole *(BAN, USAN, rINN)*

Oksfendatsoli; Oxfendazol; Oxfendazolum; RS-8858. Methyl 5-phenylsulphinyl-1*H*-benzimidazol-2-ylcarbamate.

Оксфендазол

$C_{15}H_{13}N_3O_3S$ = 315.3.
CAS — 53716-50-0.
ATC Vet — QP52AC02.



Pharmacopoeias. In *Eur.* (see p.vii) and *US* for veterinary use only.
Ph. Eur. 6.2 (Oxfendazole for Veterinary Use; Oxfendazole BP(Vet) 2008). A white or almost white powder. It shows polymorphism. Practically insoluble in water; slightly soluble in alcohol and in dichloromethane. Protect from light.
USP 31 (Oxfendazole). A white or almost white powder. Practically insoluble in water; slightly soluble in alcohol and in dichloromethane. Protect from light.

Profile

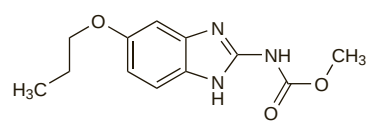
Oxfendazole is a benzimidazole carbamate anthelmintic structurally related to mebendazole (p.148). It is used in veterinary medicine.

Oxibendazole *(BAN, USAN, rINN)*

Oxibendazol; Oxibendazolum; SKF-30310. Methyl 5-propoxy-1*H*-benzimidazol-2-ylcarbamate.

Оксибендазол

$C_{12}H_{15}N_3O_3$ = 249.3.
CAS — 20559-55-1.
ATC Vet — QP52AC07.



Profile

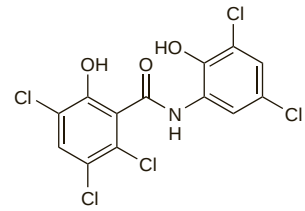
Oxibendazole is a benzimidazole carbamate anthelmintic structurally related to mebendazole (p.148). It is used in veterinary medicine.

Oxyclozanide *(BAN, rINN)*

ICI-46683; Oxiclozanida; Oxyclozanidum. 3,3′,5,5′,6-Pentachloro-2′-hydroxysalicylanilide.

Оксиклозанид

$C_{13}H_6Cl_5NO_3$ = 401.5.
CAS — 2277-92-1.
ATC Vet — QP52AG06.



Pharmacopoeias. In *BP(Vet)*.
BP(Vet) 2008 (Oxyclozanide). A pale cream or cream-coloured powder. Very slightly soluble in water; soluble in alcohol; freely soluble in acetone; slightly soluble in chloroform.

Profile

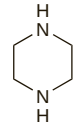
Oxyclozanide is an anthelmintic used in veterinary medicine for the control of fascioliasis in cattle and sheep.

Piperazine

Piperatsiini; Piperazin; Piperazina; Piperazinum.

Пиперазин

$C_4H_{10}N_2$ = 86.14.
CAS — 110-85-0.
ATC — P02CB01.
ATC Vet — QP52AH01.



Pharmacopoeias. In *US*.
USP 31 (Piperazine). White to off-white lumps or flakes having an ammoniacal odour. Soluble in water and in alcohol; insoluble in ether. Store in airtight containers. Protect from light.

Piperazine Adipate

Piperatsiiniadipaatti; Piperaz. Adip.; Piperazina, adipato de; Piperazinadipat; Piperazin-adipát; Pipérazine, adipate de; Piperazini adipas; Piperazino adipatas; Piperazinum Adipicum.

Пиперазина Адипат

$C_4H_{10}N_2,C_6H_{10}O_4$ = 232.3.
CAS — 142-88-1.
ATC — P02CB01.

Pharmacopoeias. In *Eur.* (see p.vii), *Int.*, *Jpn*, and *Viet*.
Ph. Eur. 6.2 (Piperazine Adipate). A white or almost white, crystalline powder. Soluble in water; practically insoluble in alcohol.

Piperazine Citrate

Hydrous Tripiperazine Dicitrate; Piperatsiinisitraatti; Piperazina, citrato de; Piperazincitrat; Piperazin-citrát; Piperazin-citrát hydrát; Pipérazine, citrate de; Piperazini citras; Piperazini Citras Hydricus; Piperazino citratas.

Пиперазина Цитрат

$(C_4H_{10}N_2)_3,2C_6H_8O_7,xH_2O$ = 642.7 (anhydrous substance).
CAS — 144-29-6 (anhydrous piperazine citrate); 41372-10-5 (piperazine citrate hydrate).
ATC — P02CB01.

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Int.*, *US*, and *Viet*.
Ph. Eur. 6.2 (Piperazine Citrate). A white or almost white granular powder. It contains a variable amount of water. Freely soluble in water; practically insoluble in alcohol.
USP 31 (Piperazine Citrate). A white, crystalline powder having not more than a slight odour. Soluble in water; insoluble in alcohol and in ether. pH of a 10% solution in water is about 5.