

Diethylcarbamazine

Class:

Diethylcarbamazine citrate (N, N-diethyl-4-methyl-1-piperazine carboxamide dihydrogen citrate or DEC) is derived from the anthelmintic agent piperazine.

Antiparasitic Activity:

Diethylcarbamazine is the drug of choice for treatment of lymphatic filariasis, caused by the parasites *Wuchereria bancrofti*, *Brugia malayi*, and of loaiasis caused by the filarial parasite *Loa loa*. A summary of the effects of DEC on geohelminths is shown in Table 1.

Mechanism of Action:

Proposed mechanisms of action include platelet-mediated triggering of the release of excretory antigen from microfilariae, with killing involving free radicals, drug-induced alteration of prostaglandin metabolism in microfilariae and/or in host endothelial cells, leading to immobilization of microfilariae on endothelial surfaces and adherence and killing by host platelets and granulocytes and inhibition of microtubule polymerization.

Mechanism of Resistance:

No mechanism has been suggested

Pharmacokinetics:

Diethylcarbamazine is well absorbed following oral administration with peak plasma concentrations reached within 1-2 hours. The elimination half life ranges from 10-12 hours. If the urine is alkalinized, renal excretion of unchanged drug is prevented and the half life of the drug increases.

Dosage:

While the standard regimen for treatment of Bancroftian filariasis is traditionally 6 mg/kg/day, (generally divided into 3 doses for increased tolerability) for 12 days, to reach a total dose of 72 mg/kg, recent studies have shown that single doses of diethylcarbamazine (DEC) have the same long-term (1-year) effect in decreasing microfilaraemia as the formerly-recommended 12-day regimens of DEC. More importantly, the use of single doses of 2 drugs administered concurrently (optimally albendazole with DEC or ivermectin) is 99% effective in removing microfilariae from the blood for a full year after treatment. It is this level of treatment effectiveness that has made feasible the new efforts to eliminate lymphatic filariasis.

Pregnancy:

No data exist regarding the safety or dose modification of the drug in pregnancy.

Adverse Effects:

Adverse reactions to diethylcarbamazine may be due either to a direct effect of the drug, or occur as a response to the pharmacodynamic effect of the drug on the worm. The latter, frequently referred to as the Mazzotti reaction, is best recognized in individuals with onchocerciasis, but a less severe form may be seen in other filarial infections. Recent work has defined the role of the pro-inflammatory cytokines interleukin-6 (IL-6) and tumour necrosis factor (TNF) in the pathogenesis of this reaction.

Drug Interactions:

No significant drug interactions have been reported with diethylcarbamazine.

Brand names/Manufacturer:

Hetrazan®; Notezine®