Systemic toxicity. Ten of 66 patients (29 males and 37 females) who received one drop of 2% cyclopentolate in each eye developed mild to moderate systemic toxicity; 9 of the 10 were female.[1] Toxic signs included physical weakness, nausea, lightheadedness, changes in emotional attitude, unprovoked weeping, and loss of equilibrium; tachycardia was always present but changes in blood pressure were insignificant. Spontaneous recovery occurred within 1 hour to several days.

As with atropine, it has been recommended that cyclopentolate eye drops should not be used during the first 3 months of life because of the possible association with development of amblyopia. Systemic toxicity has also been reported in neonates given ocular cyclopentolate.[2]

A 4-year-old boy with cerebral palsy and paraplegia suffered tonic-clonic seizures, facial flushing, and tachycardia 70 minutes after one drop of a 1% cyclopentolate solution was instilled into each eye to dilate his pupils.[3] The child had no history of convulsions and had received 1% cyclopentolate eye drops on 2 previous occasions without incident. In a more recent case,[4] a 23-month-old boy experienced a tonic-clonic seizure lasting 30 minutes after the use of cyclopentolate 1% and phenylephrine 10% eye drops. One drop of each was instilled into both eyes every 5 minutes for 3 doses; the seizure occurred 45 minutes after the last dose. The child was found to have low pseudocholinesterase activity, an enzyme likely to be involved in the metabolism of cyclopentolate.

1. Awan KJ. Adverse systemic reactions of topical cyclopentolate hydrochloride. *Ann Ophthalmol* 1976; **8:** 695–8.
2. Bauer CR, *et al*. Systemic cyclopentolate (Cyclogyl) toxicity in the newborn infant. *J Pediatr* 1973; **92:** 501–5.
3. Fitzgerald DA, *et al*. Seizures associated with 1% cyclopentolate eyedrops. *J Paediatr Child Health* 1990; **26:** 106–7.
4. Demayo AP, Reidenberg MM. Grand mal seizure in a child 30 minutes after Cyclogyl (cyclopentolate hydrochloride) and 10% Neo-Synephrine (phenylephrine hydrochloride) eye drops were instilled. Abstract: *Pediatrics* 2004; **113:** 1390–1. Full version: http://pediatrics.aappublications.org/cgi/reprint/113/5/e499 (accessed 24/11/05)

Interactions

As for antimuscarinics in general (see Atropine Sulfate, p.1220).

Uses and Administration

Cyclopentolate hydrochloride is a tertiary amine antimuscarinic with actions similar to those of atropine (p.1219). It is used to produce mydriasis and cycloplegia (p.1874) for ophthalmic diagnostic procedures and also in the treatment of uveitis and iritis (p.1515). It acts more quickly than atropine and has a shorter duration of action; the maximum mydriatic effect is produced 30 to 60 minutes after instillation, and may persist for up to 24 hours or longer in some patients; the maximum cycloplegic effect is produced within 25 to 75 minutes and accommodation recovers within 6 to 24 hours.

For diagnostic procedures, instillation of a 0.5% ophthalmic solution of cyclopentolate hydrochloride, repeated after about 5 to 15 minutes, is usually sufficient for adults. Higher strengths have been used. For children a 1% solution is instilled similarly, although some recommend that strengths greater than 0.5% should not be used in infants and that cyclopentolate should not be used at all during the first 3 months of life.

In the treatment of uveitis and iritis, a 0.5% ophthalmic solution of cyclopentolate hydrochloride is instilled into the eye up to four times daily.

Deeply pigmented eyes are more resistant to pupillary dilatation and may require the use of a 1% solution.

Preparations

BP 2008: Cyclopentolate Eye Drops;
USP 31: Cyclopentolate Hydrochloride Ophthalmic Solution.

Proprietary Preparations (details are given in Part 3)

Arg.: Ciclopenal; ***Austral.:*** Cyclogyl; ***Belg.:*** Cyclogyl; Cyclopentol†; ***Braz.:*** Ciclolato; Ciclopleglico; ***Canad.:*** Cyclogyl; Diopentolate†; ***Chile:*** Cyclogyl; ***Cz.:*** Cyclogyl†; ***Denm.:*** Cyclogyl; ***Fin.:*** Oftan Sykloº†; ***Fr.:*** Skiacol; ***Ger.:*** Zykolat-EDO; ***Gr.:*** Cyclogyl; ***Hong Kong:*** Cyclogyl; ***Hung.:*** Humapent; ***India:*** Bell Pentolate; Cyclate; Cyclogyl; ***Irl.:*** Mydrilate; ***Ital.:*** Ciclolux; ***Malaysia:*** Colircusi Cicloplejico; Cyclogyl; ***Mex.:*** Refractyl; ***Neth.:*** Cyclogyl; Cyclomydri†; ***NZ:*** Cyclogyl; ***Port.:*** Cicloplegicedol; Midriodavi; ***S.Afr.:*** Cyclogyl; ***Singapore:*** Cyclogyl; ***Spain:*** Cicloplejico; ***Swed.:*** Cyclogyl; ***Switz.:*** Cyclogyl; ***Thai.:*** Cyclogyl; ***Turk.:*** Siklomid; Siklopleji; ***UK:*** Mydrilate; ***USA:*** Ak-Pentolate; Cyclogyl; Ocu-Pentolate; Pentolair; ***Venez.:*** Cicloftal†; Cyclogyl.

Multi-ingredient: ***Israel:*** Cyclopentolate†; ***Malaysia:*** Cyclomydril; ***Rus.:*** Cyclomed (Цикломед); ***S.Afr.:*** Cyclomydril; ***Singapore:*** Cyclomydril; ***USA:*** Cyclomydril.

Demecarium Bromide *(BAN, rINN)*

BC-48; Bromuro de demecario; Demecarii Bromidum; Démécarium, Bromure de; Demekariumbromid; Demekariumbromidi. *N,N′*-Decamethylenebis(*N,N,N*-trimethyl-3-methylcarbamoyloxyanilinium) dibromide.

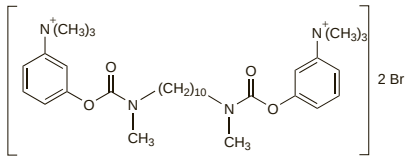
Демекария Бромид

$C_{32}H_{52}Br_2N_4O_4$ = 716.6.

CAS — 16505-84-3 (demecarium); 56-94-0 (demecarium bromide).

ATC — S01EB04.

ATC Vet — QS01EB04.



Pharmacopoeias. In *US*.

USP 31 (Demecarium Bromide). A white or slightly yellow, slightly hygroscopic, crystalline powder. Freely soluble in water and in alcohol; sparingly soluble in acetone; soluble in ether. pH of a 1% solution in water is between 5.0 and 7.0. Store in airtight containers. Protect from light.

Profile

Demecarium is a quaternary ammonium compound that is a reversible inhibitor of cholinesterase with a long duration of action similar to that of ecothiopate iodide (p.1881). It has been used as a 0.125 or 0.25% ophthalmic solution in the treatment of open-angle glaucoma and in the diagnosis and management of accommodative convergent strabismus.

Preparations

USP 31: Demecarium Bromide Ophthalmic Solution.

Proprietary Preparations (details are given in Part 3)
USA: Humorsol†.

Diclofenamide *(BAN, rINN)* ⊗

Dichlorphenamide; Diclofenamida; Diclofénamide; Diclofenamidum; Diklofenamid; Diklofenamidi. 4,5-Dichlorobenzene-1,3-disulphonamide.

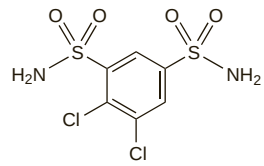
Диклофенамид

$C_6H_6Cl_2N_2O_4S_2$ = 305.2.

CAS — 120-97-8.

ATC — S01EC02.

ATC Vet — QS01EC02.



Pharmacopoeias. In *Chin., Jpn*, and *US*.

Profile

Diclofenamide is an inhibitor of carbonic anhydrase with properties similar to those of acetazolamide (p.1875). When given orally its effect begins within 1 hour and lasts for 6 to 12 hours.

Diclofenamide is used to reduce intra-ocular pressure in glaucoma (p.1873). The usual initial oral dose is 100 to 200 mg, then 100 mg every 12 hours until the desired response is obtained, followed by a maintenance dose of 25 to 50 mg one to three times daily. Diclofenamide sodium has been given by injection.

Preparations

USP 31: Dichlorphenamide Tablets.

Proprietary Preparations (details are given in Part 3)
Belg.: Oratrol†; ***Cz.:*** Oratrol†; ***Gr.:*** Oratrol†; ***Ital.:*** Antidrasi; Fenamide; Glaumid†; ***Spain:*** Glauconide; ***USA:*** Daranide†.

Dorzolamide Hydrochloride

(BANM, USAN, rINNM) ⊗

Dorzolamid Hidroklorür; Dorzolamide, chlorhydrate de; Dorzolamidi hydrochloridum; Hidrocloruro de dorzolamida; L-671152 (dorzolamide); MK-507; MK-0507. (4*S*,6*S*)-4-(Ethylamino)-5,6-dihydro-6-methyl-4*H*-thieno[2,3-*b*]thiopyran-2-sulphonamide 7,7-dioxide hydrochloride.

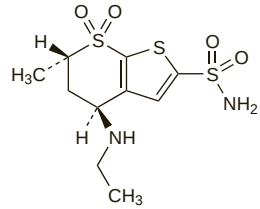
Дорзоламида Гидрохлорид

$C_{10}H_{16}N_2O_4S_3$,HCl = 360.9.

CAS — 120279-96-1 (dorzolamide); 130693-82-2 (dorzolamide hydrochloride).

ATC — S01EC03.

ATC Vet — QS01EC03.



(dorzolamide)

Pharmacopoeias. In *Eur.* (see p.vii) and *US*.

Ph. Eur. 6.2 (Dorzolamide Hydrochloride). A white or almost white, crystalline powder. Soluble in water; very slightly soluble in anhydrous alcohol; slightly soluble in methyl alcohol. It exhibits polymorphism.

USP 31 (Dorzolamide Hydrochloride). A white to off-white crystalline powder. Soluble in water. Store at 15° to 30°. Protect from light.

Adverse Effects and Precautions

Local ocular adverse effects may occur with dorzolamide eye drops and include conjunctivitis, keratitis, burning or stinging, eyelid inflammation or irritation, and blurred vision. Dorzolamide may be absorbed systemically, resulting in adverse effects and precautions similar to those of acetazolamide (see p.1875). Other adverse effects reported are headache, bitter taste, epistaxis, fatigue, and nausea.

Interactions

Systemic absorption may occur after topical application of dorzolamide to the eye and there is a theoretical possibility of interactions similar to those reported with acetazolamide (see p.1876).

Uses and Administration

Dorzolamide is a carbonic anhydrase inhibitor with actions similar to those of acetazolamide (p.1876). It is used in the management of open-angle glaucoma, pseudo-exfoliative glaucoma, and ocular hypertension (p.1873), either alone or as an adjunct to a topical beta blocker.

Dorzolamide is given as eye drops containing dorzolamide hydrochloride equivalent to 2% of the base. For monotherapy it is usually given three times daily; a twice-daily regimen is recommended when used with a beta blocker.

◊ References.

1. Martens-Lobenhoffer J, Banditt P. Clinical pharmacokinetics of dorzolamide. *Clin Pharmacokinet* 2002; **41:** 197–205.
2. Lesk MR, *et al*. Effectiveness and safety of dorzolamide-timolol alone or combined with latanoprost in open-angle glaucoma or ocular hypertension. *Ann Pharmacother* 2008; **42:** 498–504.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg.: Biodrop†; Dorlamida; Poenglausil†; Trusopt; ***Austral.:*** Trusopt; ***Austria:*** Trusopt; ***Belg.:*** Trusopt; ***Braz.:*** Ocupress; Trusopt; ***Canad.:*** Trusopt; ***Chile:*** Glaucotensil; Trusopt; ***Cz.:*** Trusopt; ***Denm.:*** Trusopt; ***Fin.:*** Trusopt; ***Fr.:*** Trusopt; ***Ger.:*** Trusopt; ***Gr.:*** Trusopt; ***Hong Kong:*** Trusopt; ***Hung.:*** Trusopt; ***India:*** Dorzox; ***Irl.:*** Trusopt; ***Israel:*** Trusopt; ***Ital.:*** Trusopt; ***Malaysia:*** Trusopt; ***Mex.:*** Trusopt; ***Neth.:*** Trusopt; ***Norw.:*** Trusopt; ***NZ:*** Trusopt; ***Philipp.:*** Trusopt; ***Pol.:*** Trusopt; ***Port.:*** Trusopt; ***Rus.:*** Trusopt (Трусопт); ***S.Afr.:*** Trusopt; ***Singapore:*** Trusopt; ***Spain:*** Trusopt; ***Swed.:*** Trusopt; ***Switz.:*** Trusopt; ***Thai.:*** Trusopt; ***Turk.:*** Trusopt; ***UK:*** Trusopt; ***USA:*** Trusopt; ***Venez.:*** Dorzol; Glaucotensil D; Trusopt.

Multi-ingredient: ***Arg.:*** Cosopt; Dorlamida T; Dorzoflax†; Glaucotensil TD; Timed D; ***Austral.:*** Cosopt; ***Austria:*** Cosopt; Timsopt; ***Belg.:*** Cosopt; ***Braz.:*** Cosopt; ***Canad.:*** Cosopt; ***Chile:*** Cosopt; Dorsof T; Glaucotensil T; Glausolets Plus; Tiof Plus; ***Cz.:*** Cosopt; ***Denm.:*** Cosopt; ***Fin.:*** Cosopt; ***Fr.:*** Cosopt; ***Ger.:*** Cosopt; ***Gr.:*** Cosopt; Tesol†; ***Hong Kong:*** Cosopt; ***Hung.:*** Cosopt; ***Irl.:*** Cosopt; ***Israel:*** Cosopt; ***Ital.:*** Cosopt; ***Malaysia:*** Cosopt; ***Mex.:*** Cosopt; ***Neth.:*** Cosopt; ***Norw.:*** Cosopt; ***NZ:*** Cosopt; ***Philipp.:*** Cosopt; ***Pol.:*** Cosopt; ***Port.:*** Cosopt; Timosopt; ***S.Afr.:*** Cosopt; ***Singapore:*** Cosopt; ***Swed.:*** Cosopt; ***Switz.:*** Cosopt; ***Thai.:*** Cosopt; ***Turk.:*** Cosopt; ***UK:*** Cosopt; ***USA:*** Cosopt; ***Venez.:*** Cosopt; Dobet; Glaucotensil T.