release Capsules; Propranolol Hydrochloride and Hydrochlorothiazide Tablets; Propranolol Hydrochloride Extended-release Capsules; Propranolol Hydrochloride Injection; Propranolol Hydrochloride Tablets.

Proprietary Preparations (details are given in Part 3)
Arg.: Inderal; Pirimetan; Propalong†; Propaneitor; Propayerst†; ***Austral.:*** Deralin; Inderal; ***Austria:*** Inderal; Proprahexal; ***Belg.:*** Inderal; ***Braz.:*** Antitensin; Cardiopranol†; Cardix; Hipernolol; Inderal; Neo Propranol†; Polol; Pradinolol; Pranolal; Propacor; Propalol†; Propanox†; Proparil†; Propramed; Propranol†; Propranolil†; Propranolum†; Rebaten; Sanpronol; Uni Propralol; ***Canad.:*** Inderal; Novo-Pranol; ***Chile:*** Coriodal; ***Denm.:*** Inderal†; Propal; ***Fin.:*** Inderal†; Propral; Ranoprin; ***Fr.:*** Adrexan†; Avlocardyl; Hemipralon†; ***Ger.:*** Beta-Tablinen; Dociton; Efektolol†; Elbrol; Obsidan; Propabloc†; Prophylux; propra; Propra-ratiopharm; Propranur; ***Gr.:*** Inderal; ***Hong Kong:*** Becardin†; Hopranolol†; Inderal; Inpanol; Palon†; Prolol†; Propa†; ***Hung.:*** Huma-Pronol; ***India:*** Betabloc; Betaspan; Ciplar; Corbeta; Inderal; Propal; ***Indon.:*** Farmadral; Inderal; ***Irl.:*** Half Inderal; Inderal; Tiperal†; ***Israel:*** Deralin; Inderal; Prolol; Slow Deralin; ***Ital.:*** Inderal; ***Malaysia:*** Inderal; Indon†; Propanol†; ***Mex.:*** Acifol†; Inderalici; Pranoral†; Prochor†; Propalem; Propalgin†; Sintaser; ***Norw.:*** Inderal; Pranolol; ***NZ:*** Angilol; Cardinol; Inderal; ***Philipp.:*** Duranol; Inderal; Phanerol; ***Port.:*** Corpendol†; Inderal; ***Rus.:*** Анаприлин (Anaprilin); Obsidan (Обзидан); ***S.Afr.:*** Cardiblok; Inderal; Prodorol; Pur-Bloka; ***Singapore:*** Inderal; Inpanol; ***Spain:*** Sumial; ***Swed.:*** Inderal; ***Switz.:*** Inderal; ***Thai.:*** Alperol; Atensin†; Betalol; Betapress; Cardenol; Emforal; Inderal; Normpress; Palon; Perlol; Pralol; Prolol; Syntonol; ***Turk.:*** Dideral; ***UAE:*** Cardilol; ***UK:*** Angilol; Bedranol; Beta-Prograne; Half Beta-Prograne; Half Inderal; Inderal; Slo-Pro; Syprol; ***USA:*** Inderal; InnoPran; ***Venez.:*** Algoren; Docitral; Galenol†; Indal†; Inderal; Parinex†.

Multi-ingredient: ***Arg.:*** Propayerst Plus†; ***Austria:*** Inderetic†; ***Belg.:*** Inderetic†; ***Braz.:*** Polol-H; Tenadren; ***Ger.:*** Beta-Turfa; Diutensat comp†; Docidrazin†; Dociretic; Dociteren; Nitro-Obsidan†; Obsilazin N†; Pertenso N; Propra comp; Triamteren tri-comp; ***India:*** Beptazine; Beptazine-H; Ciplar-H; Corbetazine; Zopax Plus; ***Neth.:*** Inderetic; ***S.Afr.:*** Inderetic†; ***Spain:*** Betadipresan Diu†; Betadipresan†; ***Switz.:*** Inderetic†; ***UK:*** Inderetic†; Inderex†; ***USA:*** Inderide†.

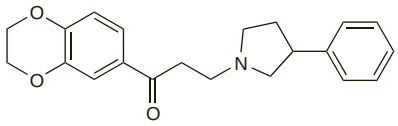
Proroxan *(pINN)*

Proroxano; Proroxanum. 1-(2,3-Dihydro-1,4-benzodioxin-6-yl)-3-(3-phenyl-1-pyrrolidinyl)-1-propanone.

Пророксан

$C_{21}H_{23}NO_3$ = 337.4.

CAS — 33743-96-3 (proroxan).



Proroxan Hydrochloride *(USAN, pINNM)*

AY-24269; Hidrocloruro de proroxano; Proroxan, Chlorhydrate de; Proroxani Hydrochloridum.

Пророксана Гидрохлорид

$C_{21}H_{23}NO_3HCl$ = 373.9.

CAS — 33025-33-1.

Profile

Proroxan has been used as an antihypertensive and in the treatment of Ménière's disease, motion sickness, and allergic dermatitis.

Proscillaridin *(BAN, USAN, rINN)*

2936; A-32686; Proscilaridina; Proscillaridiini; Proscillaridin A; Proscillaridine; Proscillaridinum; PSC-801. 14-Hydroxy-3β-(α-L-rhamnopyranosyloxy)-14β-bufa-4,20,22-trienolide.

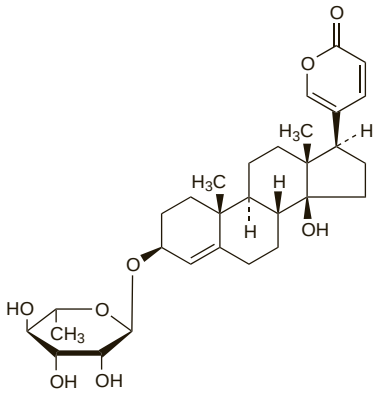
Просцилларидин

$C_{30}H_{42}O_8$ = 530.6.

CAS — 466-06-8.

ATC — C01AB01.

ATC Vet — QC01AB01.



Profile

Proscillaridin is a cardiac glycoside obtained from *Drimia maritima* (Liliaceae). It is a positive inotrope with general properties similar to those of digoxin (p.1259). It is reported to have a rapid onset and a short duration of action.

Proscillaridin is used in the treatment of heart failure (p.1165). It is given orally in usual initial and maintenance doses of 1 to 1.5 mg daily; maintenance doses may range from 0.75 to 2 mg daily as required.

Preparations

Proprietary Preparations (details are given in Part 3)
Ger.: Talusin; ***Pol.:*** Talusin.

Quinapril Hydrochloride

(BANM, USAN, rINNM)

CI-906 (quinapril); Hidrocloruro de quinapril; Kinapril Hidroklorür; Quinapril, chlorhydrate de; Quinaprili hydrochloridum. (3*S*)-2-{*N*-[(*S*)-1-Ethoxycarbonyl-3-phenylpropyl]-L-alanyl}-1,2,3,4-tetrahydro-isoquinoline-3-carboxylic acid hydrochloride.

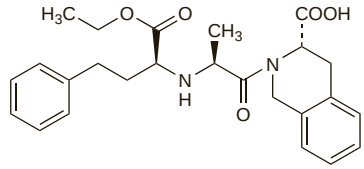
Хинаприла Гидрохлорид

$C_{25}H_{30}N_2O_5$,HCl = 475.0.

CAS — 85441-61-8 (quinapril); 82586-55-8 (quinapril hydrochloride).

ATC — C09AA06.

ATC Vet — QC09AA06.



(quinapril)

Pharmacopoeias. In *US*.

USP 31 (Quinapril Hydrochloride). A white to off-white powder, with a pink cast at times. Freely soluble in aqueous solvents.

Suspension. Extemporaneous formulations of quinapril 1 mg/mL made by adding crushed Accupril tablets (*Pfizer, US*) to the following vehicles were found to be stable for 6 weeks when stored at 5°:

- *Kphos* 15% (*Beach, US*), *Bicitra* 15% (*Draxis Pharma, US*), *OraSweet* 70% (*Paddock, US*)
- *Kphos* 15%, *Bicitra* 15%, *OraSweet SF* 70%
- *Kphos* 15%, *Bicitra* 15%, simple syrup 70%

The suspension containing *OraSweet SF* was considered to be the formulation of choice.[1]

1. Freed AL, *et al.* The development and stability assessment of extemporaneous pediatric formulations of Accupril. *Int J Pharm* 2005;**304:** 135–44.

Adverse Effects, Treatment, and Precautions

As for ACE inhibitors, p.1193.

Breast feeding. After of a single dose of quinapril 20 mg in 6 women, quinapril was detected in the breast milk in a milk to plasma ratio of 0.12; no quinaprilat was detected.[1] It was estimated that the dose received by the infant would only be about 1.6% of the maternal dose.

1. Begg EJ, *et al.* Quinapril and its metabolite quinaprilat in human milk. *Br J Clin Pharmacol* 2001; **51:** 478–81.

Interactions

As for ACE inhibitors, p.1196.

Antibacterials. Quinapril has been reported to reduce the absorption of *tetracyclines* due to the presence of magnesium carbonate in the tablet formulation.

Pharmacokinetics

Quinapril acts as a prodrug of the diacid quinaprilat, its active metabolite. About 60% of an oral dose of quinapril is absorbed. Quinapril is metabolised mainly in the liver to quinaprilat and inactive metabolites. Peak plasma concentrations of quinaprilat are achieved within 2 hours of an oral dose of quinapril. Quinaprilat is about 97% bound to plasma proteins. After an oral dose, quinapril is excreted in the urine and faeces, as quinaprilat, other metabolites, and unchanged drug, with the urinary route predominating; up to 96% of an intravenous dose of quinaprilat is excreted in the urine.

The effective half-life for accumulation of quinaprilat is about 3 hours after multiple doses of quinapril; a long terminal phase half-life of 25 hours may represent strong binding of quinaprilat to angiotensin-converting enzyme.

The pharmacokinetics of both quinapril and quinaprilat are affected by renal and hepatic impairment. Dialysis has little effect on the excretion of quinapril or quinaprilat.

Small amounts of quinapril are distributed into breast milk.

◊ References.

1. Begg EJ, *et al.* The pharmacokinetics and pharmacodynamics of quinapril and quinaprilat in renal impairment. *Br J Clin Pharmacol* 1990; **30:** 213–20.
2. Halstenson CE, *et al.* The pharmacokinetics of quinapril and its active metabolite, quinaprilat, in patients with various degrees of renal function. *J Clin Pharmacol* 1992; **32:** 344–50.
3. Wolter K, Fritschka E. Pharmacokinetics and pharmacodynamics of quinaprilat after low dose quinapril in patients with terminal renal failure. *Eur J Clin Pharmacol* 1993; **44** (suppl 1): S53–6.
4. Begg EJ, *et al.* The pharmacokinetics of quinapril and quinaprilat in patients with congestive heart failure. *Br J Clin Pharmacol* 1994; **37:** 302–4.
5. Squire IB, *et al.* Haemodynamic response and pharmacokinetics after the first dose of quinapril in patients with congestive heart failure. *Br J Clin Pharmacol* 1994; **38:** 117–23.
6. Breslin E, *et al.* A pharmacodynamic and pharmacokinetic comparison of intravenous quinaprilat and oral quinapril. *J Clin Pharmacol* 1996; **36:** 414–21.

Uses and Administration

Quinapril is an ACE inhibitor (p.1193). It is used in the treatment of hypertension (p.1171) and heart failure (p.1165).

Quinapril is converted in the body to its active metabolite quinaprilat. The haemodynamic effects are seen within 1 hour of a single oral dose and the maximum effect occurs after about 2 to 4 hours, although the full effect may not develop for 1 to 2 weeks during chronic use. The haemodynamic action persists for about 24 hours, allowing once-daily dosing. Quinapril is given orally as the hydrochloride, but doses are expressed in terms of the base. Quinapril hydrochloride 10.8 mg is equivalent to about 10.0 mg of quinapril.

In the treatment of **hypertension** the initial dose is 10 mg of quinapril once daily. Since there may be a precipitous fall in blood pressure in some patients when starting therapy with an ACE inhibitor, the first dose should preferably be given at bedtime. An initial dose of 2.5 mg daily is recommended in the elderly, in patients with renal impairment, or in those taking a *diuretic*; if possible, the diuretic should be withdrawn 2 or 3 days before quinapril is started and resumed later if necessary.

The usual maintenance dose is 20 to 40 mg daily, as a single dose or divided into 2 doses, although up to 80 mg daily has been given.

In the management of **heart failure**, severe first-dose hypotension on introduction of an ACE inhibitor is common in patients on loop diuretics, but their temporary withdrawal may cause rebound pulmonary oedema. Thus treatment should begin with a low dose under close medical supervision. Quinapril is given in an initial dose of 2.5 mg daily. Usual maintenance doses range from 10 to 20 mg daily, as a single dose or divided into 2 doses; up to 40 mg daily has been given.

Quinaprilat may be given intravenously in patients unable to take quinapril orally; doses range from 1.25 to 10 mg twice daily.

◊ Reviews.

1. Wadworth AN, Brogden RN. Quinapril: a review of its pharmacological properties, and therapeutic efficacy in cardiovascular disorders. *Drugs* 1991; **41:** 378–99.
2. Plosker GL, Sorkin EM. Quinapril: a reappraisal of its pharmacology and therapeutic efficacy in cardiovascular disorders. *Drugs* 1994; **48:** 227–52.
3. Culy CR, Jarvis B. Quinapril: a further update of its pharmacology and therapeutic use in cardiovascular disorders. *Drugs* 2002; **62:** 339–85.

Preparations

USP 31: Quinapril Tablets.

Proprietary Preparations (details are given in Part 3)
Arg.: Accupril; ***Austral.:*** Accupril; Acquin; Asig; Filpril; ***Austria:*** Accupro; ***Belg.:*** Accupril; ***Braz.:*** Accupril; ***Canad.:*** Accupril; ***Chile:*** Accupril; ***Cz.:***

Accupro; **Denm.:** Accupro; **Fin.:** Accupro; **Fr.:** Acuitel; Korec; **Ger.:** Accupro; QuinaLich; **Gr.:** Accupron; **Hong Kong:** Accupril; **Hung.:** Accupro; Acumerck; **Indon.:** Accupril; **Irl.:** Accupro; Quinapro; **Ital.:** Accuprin; Acequin; Quinazil; **Jpn:** Conan; **Malaysia:** Accupril†; **Mex.:** Acupril; **Neth.:** Acupril; **NZ:** Accupril; **Philipp.:** Accupril; **Pol.:** Accupro; Acurenal; AprilGen; **Port.:** Acupril; Vasocor†; **Rus.:** Accupro (Аккупро); **S.Afr.:** Accupril; Quinaspen; **Singapore:** Accupril†; **Spain:** Acuprel; Acuretic; Ectren; Lidaltrin; **Swed.:** Accupro; **Switz.:** Accupro; **Thai.:** Accupril; **Turk.:** Acuitel; **UK:** Accupro; Quinil; **USA:** Accupril; **Venez.:** Accupril; Quinalar; Solpres.

Multi-ingredient: **Arg.:** Accuretic; **Austral.:** Accuretic; **Austria:** Accuzide; **Belg.:** Accuretic; Co-Quinapril; **Canad.:** Accuretic; **Chile:** Accuretic; **Cz.:** Accuzide; Stadapress; **Fin.:** Accupro Comp; **Fr.:** Acuilix; Koretic; **Ger.:** Accuzide; QuinaLich comp; Quinaplus; Quinapril comp; **Gr.:** Accuretic; Quimea; **Hung.:** Accuzide; **Irl.:** Accuretic; **Ital.:** Accuretic; Acequide; Quinazide; **Neth.:** Acuzide; **NZ:** Accuretic; **Philipp.:** Accuzide; **Pol.:** Accuzide; **Port.:** Acuretic; **S.Afr.:** Accuretic; **Spain:** Bicetil; Lidaltrin Diu; **Swed.:** Accupro Comp; **Switz.:** Accuretic; **Turk.:** Accuzide; **UK:** Accuretic; **USA:** Accuretic; Quinaretic; **Venez.:** Accuretic; Quinaretic.

Quinethazone *(BAN, rINN)* ⊗

Chinethazonum; Kinetatsoni; Kinetazon; Quinetazona; Quinéthazone; Quinethazonum. 7-Chloro-2-ethyl-1,2,3,4-tetrahydro-4-oxoquinazoline-6-sulphonamide.

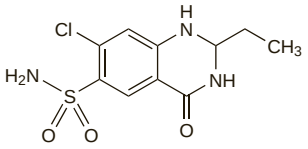
Хинетазон

$C_{10}H_{12}ClN_3O_3S$ = 289.7.

CAS — 73-49-4.

ATC — C03BA02.

ATC Vet — QC03BA02.



Profile

Quinethazone is a diuretic that is related chemically to metolazone and has properties similar to those of the thiazide diuretics (see Hydrochlorothiazide, p.1307). It has been used for oedema, including that associated with heart failure, and for hypertension.

Quinidine *(BAN)*

Chinidinum; Chinidyna; Kinidiini; Kinidin; Kinin; Quinidina. (8*R*,9*S*)-6′-Methoxycinchonan-9-ol; (+)-(α*S*)-α-(6-Methoxy-4-quinolyl)-α-[(2*R*,4*S*,5*R*)-(5-vinylquinuclidin-2-yl)]methanol.

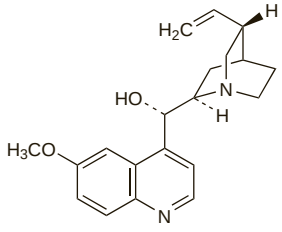
Хинидин

$C_{20}H_{24}N_2O_2$ = 324.4.

CAS — 56-54-2 (anhydrous quinidine); 6317-04-4 (quinidine dihydrate); 72402-50-7 (± quinidine).

ATC — C01BA01.

ATC Vet — QC01BA01.



Description. Quinidine is an isomer of quinine, obtained from the bark of species of *Cinchona* and their hybrids; it may also be obtained from *Remijia pedunculata*, or prepared from quinine.

Quinidine Bisulfate

Quinidina, bisulfato de; Quinidine Bisulphate *(BANM)*.

Хинидина Бисульфат

$C_{20}H_{24}N_2O_2,H_2SO_4$ = 422.5.

CAS — 747-45-5 (anhydrous quinidine bisulfate); 6151-39-9 (quinidine bisulfate tetrahydrate).

ATC — C01BA01.

ATC Vet — QC01BA01.

Pharmacopoeias. In *Br.*

BP 2008 (Quinidine Bisulphate). Colourless, odourless or almost odourless, crystals. It contains not more than 15% of hydroquinidine bisulfate. Freely soluble in water and in alcohol; practically insoluble in ether. A 1% solution in water has a pH of 2.6 to 3.6. Protect from light.

Quinidine Gluconate *(BANM)*

Quinidina, gluconato de; Quinidinium Gluconate.

Хинидина Глюконат

$C_{20}H_{24}N_2O_2,C_6H_{12}O_7$ = 520.6.

CAS — 7054-25-3.

ATC — C01BA01.

ATC Vet — QC01BA01.

Pharmacopoeias. In *US.*

USP 31 (Quinidine Gluconate). A white, odourless powder. It contains not more than 20% of hydroquinidine gluconate. Freely soluble in water; slightly soluble in alcohol. Store at a temperature of 25°, excursions permitted between 15° and 30°. Protect from light.

Adsorption. More than 40% of a dose of quinidine gluconate was lost when the drug was given by intravenous infusion using a PVC infusion bag and tubing.[1]

1. Darbar D, *et al.* Loss of quinidine gluconate injection in a polyvinyl chloride infusion system. *Am J Health-Syst Pharm* 1996; **53:** 655–8.

Quinidine Polygalacturonate

Quinidina, poligalacturonato de. Quinidine poly(D-galacturonate) hydrate.

Хинидина Полигалактуронат

$C_{20}H_{24}N_2O_2,(C_6H_{10}O_7)_x,xH_2O$.

CAS — 27555-34-6 (anhydrous quinidine polygalacturonate); 65484-56-2 (quinidine polygalacturonate hydrate).

ATC — C01BA01.

ATC Vet — QC01BA01.

Quinidine Sulfate

Chinidin sulfát dihydrát; Chinidini sulfas; Chinidino sulfatas; Chinidinsulfate; Chinidinum Sulfuricum; Chinidyny siarczan; Kinidiinisulfaatti; Kinidin Sülfat; Kinidinsulfat; Kinidin-szulfát; Quinidina, sulfato de; Quinidine, sulfate de; Quinidine Sulphate *(BANM)*; Quinidini Sulfas; Quinidini Sulfas Dihydricus.

Хинидина Сульфат

$(C_{20}H_{24}N_2O_2)_2,H_2SO_4,2H_2O$ = 782.9.

CAS — 50-54-4 (anhydrous quinidine sulfate); 6591-63-5 (quinidine sulfate dihydrate).

ATC — C01BA01.

ATC Vet — QC01BA01.

Pharmacopoeias. In *Chin.*, *Eur.* (see p.vii), *Int.*, *Jpn*, and *US.*

Ph. Eur. 6.2 (Quinidine Sulphate). White or almost white, crystalline powder, or silky, colourless needles. It contains not more than 15% of hydroquinidine sulfate. Slightly soluble in water; soluble in boiling water and in alcohol; practically insoluble in acetone. A 1% solution in water has a pH of 6.0 to 6.8. Protect from light.

USP 31 (Quinidine Sulfate). Fine, needle-like, white crystals, frequently cohering in masses, or a fine, white powder. It is odourless and darkens on exposure to light. It contains not more than 20% of hydroquinidine sulfate. Its solutions are neutral or alkaline to litmus. Soluble 1 in 100 of water, 1 in 10 of alcohol, and 1 in 15 of chloroform; insoluble in ether. Protect from light.

Stability. Quinidine sulfate was reported[1] to be stable for up to 60 days in several extemporaneously prepared oral liquid formulations.

1. Allen LV, Erickson MA. Stability of bethanechol chloride, pyrazinamide, quinidine sulfate, rifampin, and tetracycline hydrochloride in extemporaneously compounded oral liquids. *Am J Health-Syst Pharm* 1998; **55:** 1804–9.

Adverse Effects and Treatment

Quinidine and its salts have both cardiac and non-cardiac adverse effects. Gastrointestinal irritation is common, with nausea, vomiting, and diarrhoea.

Hypersensitivity similar to that occurring with quinine may also occur and a test dose has been recommended (see Uses and Administration, below). Reactions include respiratory difficulties, urticaria, pruritus, skin rashes, purpura, thrombocytopenia and other blood dyscrasias, and, rarely, fever and anaphylaxis. Granulomatous hepatitis and a lupus-like syndrome have been reported.

Quinidine may give rise to cinchonism (see Quinine, p.612) with tinnitus, impaired hearing, visual disturbances, headache, confusion, vertigo, vomiting, and abdominal pain; it is usually associated with large doses, but may occur in idiosyncratic subjects given small doses.

Quinidine may induce hypotension, particularly in overdosage or if intravenous infusions are given too rapidly. It prolongs the QT interval and may precipitate ventricular arrhythmias, including torsade de pointes.

In quinidine overdosage, the cardiac symptoms of intoxication predominate. Quinidine is cumulative in action and inappropriately high plasma concentrations may induce ECG changes, heart block, asystole, ventricular tachycardia, ventricular fibrillation, syncope, seizures, coma, and sometimes death. Treatment of adverse effects and overdosage is symptomatic and supportive. Activated charcoal may be considered if the patient presents within 1 hour of ingestion.

◊ Reviews.

1. Kim SY, Benowitz NL. Poisoning due to class IA antiarrhythmic drugs quinidine, procainamide and disopyramide. *Drug Safety* 1990; **5:** 393–420.

Effects on the blood. Quinidine-induced thrombocytopenia is not uncommon and it is one of the best documented causes of drug-dependent thrombocytopenia.[1] It appears to be a hypersensitivity reaction, with quinidine inducing the production of autoantibodies that cause platelet destruction. Highly specific quinidine-dependent antibodies have been detected in patients with thrombocytopenia, and may have a role in diagnosis.[2] The exact mechanism of the reaction is unclear but it is generally thought that binding of quinidine to the platelet surface induces antibody production;[1] alternatively, an antibody-quinidine complex may be formed, which is then deposited on the platelets.[1,3] The antigenic constituent of the platelet membrane may be glycoprotein Ib although other surface glycoproteins have also been implicated.[3,4]

1. van den Bemt PMLA, *et al.* Drug-induced immune thrombocytopenia. *Drug Safety* 2004; **27:** 1243–52.
2. Reid DM, Shulman NR. Drug purpura due to surreptitious quinidine intake. *Ann Intern Med* 1988; **108:** 206–8.
3. Stricker RB, Shuman MA. Quinidine purpura: evidence that glycoprotein V is a target platelet antigen. *Blood* 1986; **67:** 1377–81.
4. Visentin GP, *et al.* Characteristics of quinine- and quinidine-induced antibodies specific for platelet glycoproteins IIb and IIIa. *Blood* 1991; **77:** 2668–76.

Effects on the eyes. Corneal deposits resembling those found in keratopathy developed in a patient who had been taking quinidine for 2 years.[1] Symptoms had improved and both corneas had cleared completely within 2 months of stopping the drug.

A small number of patients have also been identified[2] who developed uveitis during quinidine treatment.

1. Zaidman GW. Quinidine keratopathy. *Am J Ophthalmol* 1984; **97:** 247–9.
2. Fraunfelder FW, Rosenbaum JT. Drug-induced uveitis: incidence, prevention and treatment. *Drug Safety* 1997; **17:** 197–207.

Effects on the joints. Quinidine has been associated with a number of rheumatic disorders.[1] It is a recognised, though uncommon, cause of drug-induced lupus (see below), but there have also been reports[2-4] of reversible, symmetrical polyarthritis developing in patients with no evidence of antinuclear antibodies. Symptoms were generally milder than in drug-induced lupus, and onset was more rapid; recovery occurred within a week of stopping quinidine and in some patients symptoms recurred on rechallenge. Polymyalgia rheumatica-like symptoms have also been reported.[1]

1. Alloway JA, Salata MP. Quinidine-induced rheumatic syndromes. *Semin Arthritis Rheum* 1995; **24:** 315–22.
2. Kertes P, Hunt D. Polyarthritis complicating quinidine treatment. *BMJ* 1982; **284:** 1373–4.
3. Cohen MG, *et al.* Two distinct quinidine-induced rheumatic syndromes. *Ann Intern Med* 1988; **108:** 369–71.
4. Naschitz JE, Yeshurun D. Quinidine and rheumatic syndromes. *Ann Intern Med* 1988; **109:** 248–9.

Effects on the liver. Hypersensitivity reactions involving the liver have been reported in about 2% of patients receiving quinidine.[1,2] The main clinical symptom is fever[1-3] but skin rash,[1-3] purpura,[2] and hepatomegaly[1] may also occur. Liver enzyme values are raised[1-4] and the platelet count may be reduced.[3] The reaction is reversible on withdrawing quinidine with fever resolving in about 48 hours and liver enzymes values returning to normal within about 2 weeks. Liver biopsy often shows granulomatous hepatitis,[1-3] but other inflammatory changes[2] and cholestatic jaundice[4] have been found.

1. Geltner D, *et al.* Quinidine hypersensitivity and liver involvement: a survey of 32 patients. *Gastroenterology* 1976; **70:** 650–2.
2. Knobler H, *et al.* Quinidine-induced hepatitis. *Arch Intern Med* 1986; **146:** 526–8.
3. Bramlet DA, *et al.* Granulomatous hepatitis as a manifestation of quinidine hypersensitivity. *Arch Intern Med* 1980; **140:** 395–7.
4. Hogan DB, *et al.* Unusual hepatotoxic reaction to quinidine. *Can Med Assoc J* 1984; **130:** 973.

Effects on mental state. Gradually progressive cerebral dysfunction characterised by intermittent confusion, agitation, restlessness, personality change, and paranoid features occurred in a 62-year-old man who had taken quinidine for about 15 years.[1] Within 24 hours of stopping quinidine there was a marked improvement and after 5 days he had returned to normal with no