

PRODUCT INFORMATION

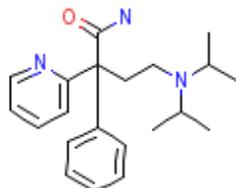
RYTHMODAN

NAME OF THE MEDICINE

Non-proprietary Name

Disopyramide

Chemical Structure



Chemical Formula: $C_{21}H_{29}N_3O$

CAS Number

3737-09-5

DESCRIPTION

Disopyramide (base) is 4-di-isopropylamino-2-phenyl-2-(2-pyridyl) butyramide. RYTHMODAN is a racemic mixture of the d- and l- isomers of disopyramide.

Disopyramide base (MW = 339.5) is a stable white powder, which is insoluble in water but soluble in dilute acid and organic solvents.

Rythmodan 100mg and 150mg[#] capsules contain 100mg and 150mg of disopyramide respectively and the following excipients: gelatin, magnesium stearate, maize starch, pregelatinised maize starch, purified talc and titanium dioxide. Rythmodan 100mg capsules also contain iron oxide yellow and indigo carmine.

PHARMACOLOGY

Site and mode of action

Disopyramide is a Class 1A antiarrhythmic agent. It is a sodium channel blocker with membrane stabilising effect. It reduces automaticity in cardiac Purkinje fibres by depressing the slope of phase 4 diastolic depolarisation; slows conduction velocity in atria, A-V node, Purkinje fibres, and ventricular muscle by decreasing the rate of rise of phase 0 depolarisation in these fibres; prolongs action potential duration and refractory period in atria, Purkinje fibres and ventricular muscle; depresses excitability of both atrial and ventricular muscle by its direct effect on the myocardium.

Electrophysiology

Disopyramide prolongs the effective refractory period of the atria and the ventricles. The effective refractory period of the atrioventricular node is either slightly shortened or unchanged. The relative refractory period of the His-Purkinje system is prolonged. Atrioventricular nodal conduction time is unchanged by disopyramide. Conduction through the His-Purkinje system is unchanged or slightly delayed.

Pharmacodynamics

Haemodynamics

The haemodynamic effects vary according to the condition of the patient and the dose administered. The main changes induced by disopyramide are as follows: heart rate unchanged or slightly increased; cardiac output decreased by about 10 %; peripheral resistance increased; slight, transient fall in blood pressure which is compensated for by increased peripheral resistance; left ventricular end diastolic pressure unchanged or increased; negative inotropic effect which can be marked in patients with depressed left ventricular function. Thus disopyramide produces a slight and transient myocardial depressant effect on the heart. This is more pronounced after intravenous administration than after oral administration.

Anticholinergic activity

Disopyramide possesses anticholinergic properties and has been shown to be up to 10 % as potent as atropine in in vitro tests. The oral form has little or no effect on resting sinus rate. The anticholinergic side effects may affect the gastrointestinal and/or urogenital systems (see PRECAUTIONS and ADVERSE EFFECTS). These effects may be transitory or disappear upon reduction of dose.

Pharmacokinetics

Absorption

After administration, disopyramide is rapidly and almost completely absorbed from the gut. In hospitalised patients, approximately one hour after a single oral dose of 100 mg disopyramide, a mean peak plasma concentration of 1 µg/mL was reached. Plasma concentrations ranging from 2.3 to 3.4 µg/mL have been predicted following an initial oral dose of 300 mg, a second dose of 100 or 200 mg at 6 hours and a maintenance dose of 100 mg every 6 hours. Predicted mean steady-state levels with an oral dose of 100 mg four times daily varied between 1.9 and 7.2 µg/mL.

Distribution

The half-life of distribution is 15 minutes and the volume of distribution is about 80 L. Disopyramide shows no selective accumulation in specific tissues and is distributed predominantly in the peripheral compartment of an open two-compartment body model (9 L in the first and 80 L in the second in healthy subjects).

Metabolism

Disopyramide is metabolised by N-dealkylation. Using radioactive material it was found that 82 % of the drug in plasma was unchanged, 7 % occurred as the mono-N-dealkylated metabolite and the remaining 11 % was unidentified metabolites.

In one study, it was shown that disopyramide had no effect on liver microsomal enzymes.

During chronic administration, the mono-N-dealkylated metabolite reaches plasma concentrations about 30 % of those of disopyramide.

Excretion

50 to 70 % of the drug is excreted unchanged and the remainder is metabolised. Approximately 80 % is excreted in the urine. Biliary secretion accounts for up to 20 % of the drug in man.

The mean half-life of elimination for the capsules is 4.5 to 8.2 hours in healthy volunteers. It is prolonged in patients with renal insufficiency (17 hours) and in patients with haemodynamically symptomatic arrhythmias (even with an intact renal function).

In one study, the apparent half-lives of the alpha and beta phases after intravenous administration were 2 minutes and 4.5 hours.

Protein binding

Both disopyramide and its mono-N-dealkylated metabolite bind to plasma proteins, the extent of the binding being dependent on the plasma concentration. In the therapeutic range, protein binding is 30 - 40 % to α -1-acid glycoprotein. The presence of the metabolite reduces the binding of the parent drug while a high concentration of disopyramide decreases the binding of the metabolite.

Competitive binding studies with quinidine have demonstrated that these two drugs do not compete for the same binding sites on protein molecules. However in vitro studies have shown that disopyramide may displace lignocaine from plasma proteins resulting in an increase of unbound lignocaine by about 20 %.

Correlation of plasma levels with therapeutic effect

Total plasma concentrations of 2 to 4 μ g/mL of disopyramide are needed for efficacy. Effects correlate better with unbound concentrations than with total concentrations. There is significant interindividual variability in the relationship between total concentration and therapeutic effect.

Cardiac patients

After the oral administration of 200 mg of disopyramide to 10 bed-ridden patients with borderline to moderate heart failure, the mean time to peak serum concentration (2.3 hours) and the mean peak serum concentration (4.8 μ g/mL) were higher than in healthy volunteers. After intravenous administration in these same patients, the mean elimination half-life was 9.7 hours (range in healthy volunteers: 4.4 to 7.8 hours). In a second study of the oral administration of disopyramide to 7 patients with heart disease, including left ventricular dysfunction, the mean plasma half-life was slightly prolonged to 7.8 hours.

INDICATIONS

Rythmodan capsules are indicated for the management of documented ventricular arrhythmias, such as sustained ventricular tachycardia, which are judged to be life threatening. Because of its proarrhythmic potential, the use of disopyramide is not recommended for lesser arrhythmias.

Treatment of asymptomatic ventricular premature contractions should be avoided.

In patients with structural heart disease, proarrhythmia and cardiac decompensation are a special risk associated with antiarrhythmic medicines. Special caution should be exercised when prescribing disopyramide for these patients (See PRECAUTIONS).

CONTRAINDICATIONS

Cardiogenic shock

Second or third degree atrio-ventricular block (if no pacemaker is present)

Bundle branch block associated with first degree atrio-ventricular block

Double block (eg. left posterior or anterior hemiblock and right bundle branch block)

Pre-existing long QT

Severe sinus node dysfunction

Cardiac insufficiency unless secondary to cardiac arrhythmia

Concomitant use with other antiarrhythmics, or other medicines liable to provoke ventricular arrhythmias or torsades de pointes (see Interactions with other medicines)

Known hypersensitivity to disopyramide

PRECAUTIONS

Myocardial infarction

Antiarrhythmic medicines belonging to class 1c were included in the Cardiac Arrhythmia Suppression Trial (CAST), a long-term multi-centred randomised double-blind study in patients with asymptomatic non-life-threatening ventricular arrhythmias who had a myocardial infarction

more than six days but less than two years previously. An excess mortality or non-fatal cardiac arrest rate was seen in patients treated with antiarrhythmic medicines belonging to the class 1c, encainide or flecainide (56/730) compared with that seen in patients assigned to matched placebo treated groups (22/725). The average duration of treatment with encainide or flecainide in this study was ten months.

While there are no comparable mortality trial data for other Class I antiarrhythmic agents post-myocardial infarction or in other clinical settings, meta-analyses of small scale clinical trials of these agents in similar populations suggest a trend towards increased mortality compared to placebo and no evidence of benefit.

All Class I antiarrhythmic agents share the capacity to produce slowing of conduction velocity which can promote tachycardias via re-entry mechanisms.

Therefore, the prophylactic use of Class I antiarrhythmic medicines following myocardial infarction is potentially hazardous. Indeed the use of these agents for other than life-threatening arrhythmias or severe symptoms due to arrhythmias is not recommended.

Antiarrhythmic drugs should not be prescribed for the treatment of patients with asymptomatic ventricular premature contractions, haemodynamically non-significant ventricular premature contractions.

In the event of aggravation of the pre-existing arrhythmia or emergence of a new type of arrhythmia, treatment with disopyramide should be reconsidered.

Heart failure/hypotension

Disopyramide may cause or worsen congestive heart failure or produce severe hypotension as a consequence of its negative inotropic properties. Hypotension has been observed primarily in patients with structural heart disease or inadequately compensated congestive heart failure. Disopyramide should not be used in patients with uncompensated or marginally compensated congestive heart failure or hypotension unless the congestive heart failure or hypotension is secondary to cardiac arrhythmia. If hypotension occurs or congestive heart failure worsens, RYTHMODAN should be discontinued and, if necessary, restarted at a lower dosage only after adequate cardiac compensation has been established.

Structural heart disease

Proarrhythmia and cardiac decompensation are a special risk associated with antiarrhythmic drugs. Special caution should be exercised. In patients with structural heart disease, the negative inotropic effects of disopyramide may be of concern; treatment should be given under strict supervision and cardiac function monitored. RYTHMODAN should not be administered to patients with structural heart disease and associated congestive heart failure unless the patient is adequately treated. Patients with myocarditis or other cardiomyopathy may develop significant hypotension in response to the usual dosage of disopyramide, probably due to cardiodepressant mechanisms. Therefore, a loading dose of disopyramide should not be given to such patients and initial dosage and subsequent dosage adjustments should be made under close supervision.

Anticholinergic activity

Because of its anticholinergic properties, disopyramide should not be used in patients with urinary retention unless adequate overriding measures are taken; these consist of catheter drainage or operative relief.

Urinary retention may occur in patients of either sex as a consequence of disopyramide administration, but males with benign prostatic hypertrophy or prostatic adenoma are at particular risk.

Disopyramide should not be used in patients with glaucoma.

In patients with a family history of glaucoma, intraocular pressure should be measured before initiating disopyramide therapy and controlled as necessary during treatment.

There is a risk of paralytic ileus occurring, especially in the elderly, and when disopyramide is taken with other anticholinergic medications or in situations where there is an increase in plasma levels of disopyramide, (see PRECAUTIONS, INTERACTIONS and OVERDOSAGE sections).

Disopyramide should be used with special care in patients with myasthenia gravis since its anticholinergic properties could precipitate a myasthenic crisis in such patients.

There is a risk of cognitive disorders in elderly patients that require medical attention. For other atropine-like effects, refer to the Adverse Effects section.

Heart block

If an atrio-ventricular block or a double block occurs, treatment should be discontinued.

QRS widening

QRS complex duration should be monitored. If significant widening (greater than 20 %) of the QRS complex occurs, the medicine should be discontinued.

QT prolongation

QT interval should be monitored. Prolongation of the QT interval (corrected) and worsening of the arrhythmia may occur. Patients who have evidenced prolongation of the QT interval in response to quinidine may be at particular risk. If a QT prolongation of greater than 20 % is observed, the medicine should be discontinued.

Hypoglycaemia

Significant lowering of blood glucose values has been reported during disopyramide administration. The physician should be alert to this possibility, especially in aged or malnourished patients, diabetics, and patients with renal insufficiency. In these patients hypoglycaemia can be severe and as such, blood glucose levels should be monitored.

Hypokalaemia

Serum potassium must be monitored. Potassium abnormalities may induce arrhythmias. Antiarrhythmic medicines may be ineffective in patients with hypokalaemia. Undesirable cardiac effects of antiarrhythmics may be provoked by hyper- or hypo-kalaemia.

Before and during treatment with disopyramide, potassium imbalance should be looked for and corrected, particularly in case of treatment with potassium lowering diuretics or laxatives.

Renal impairment

As more than 50 % of disopyramide is excreted in the urine unchanged, dosage should be reduced in patients with impaired renal function (see DOSAGE and ADMINISTRATION). The electrocardiogram should be carefully monitored for prolongation of PR and QT intervals, evidence of QRS widening or other signs of overdosage (see OVERDOSAGE).

Hepatic impairment

As hepatic impairment causes an increase in the plasma half-life of disopyramide, dosage should be reduced by 25%. The electrocardiogram should be carefully monitored for signs of overdosage (see OVERDOSAGE).

Ability to Operate or Drive Machinery

Some adverse reactions may impair the patient's ability to concentrate and react, and hence the ability to drive or operate machinery.

Use in Pregnancy

Category B2

Animal studies have not demonstrated any teratogenic effect and have revealed only minimal evidence of impaired fertility and a slightly lower weight in treated rats at the time of weaning. However, no controlled studies of disopyramide have been performed in pregnant women and experience with RYTHMODAN during pregnancy is limited. Disopyramide has been reported to stimulate contractions of the pregnant uterus and also passes into foetal circulation. Therefore,

use of RYTHMODAN in women of childbearing potential requires that the benefits of therapy be weighed against its possible hazards to the mother and foetus.

Labour and delivery

It is not known whether use of disopyramide during labour or delivery has immediate or delayed adverse effects on the foetus, whether it prolongs the duration of labour, or increases the possibility of forceps delivery or other obstetrical intervention.

Use in Lactation

Disopyramide passes into breast milk. If use of the medicine is deemed essential, an alternative method of infant feeding should be instituted.

Paediatric use

RYTHMODAN is not approved for paediatric use.

Interactions with other medicines

Combinations of antiarrhythmic medicines are not well researched and their effect may be unpredictable. Thus, antiarrhythmic combination should be avoided except under certain circumstances, e.g. beta-blockers for angina pectoris; digoxin with a beta-blocker and verapamil for the control of atrial fibrillation, when defined as effective for an individual by specialised procedure.

Contraindicated associations:

Disopyramide should not be co-administered with the following medicines:

- Other antiarrhythmics (Vaughan Williams classification):
 - Class I: most medicines, including phenytoin
 - Class II: beta-blocking medicines
 - Class III: amiodarone, bretylium, sotalol, ibutilide
 - Class IV: verapamil, diltiazem, lidoflazine, bepridil, prenylamine
- Medicines associated with the risk of torsades de pointe, such as:
 - Tricyclic or tetracyclic antidepressants
 - Parenterally-administered erythromycin
 - Vincamine
 - Sultopride

Not recommended:

The co-administration of disopyramide with some other medicines associated with a potential for torsades de pointe is not recommended. Such medicines include:

- Astemizole
- Cisapride
- Pentamidine
- Pimozide
- Sparfloxacin
- Terfenadine

Phosphodiesterase type 5 inhibitors

There is evidence that phosphodiesterase type 5 inhibitors may potentially lead to QT prolongation. Concomitant administration of phosphodiesterase 5 inhibitors with disopyramide may potentially enhance this QT prolongation effect and is not recommended.

There is some evidence that disopyramide is metabolised by hepatic CYP3A. Although human studies are not available, concomitant administration of significant inhibitors of this isozyme (e.g. certain macrolide or azole antifungal antibiotics) may therefore increase the serum levels of disopyramide. On the other hand, inducers of CYP3A (e.g. rifampicin, certain anticonvulsants)

may reduce disopyramide and increase MN-disopyramide serum levels. Since the magnitude of such potential effects is not foreseeable, such medicine combinations are not recommended. Stimulant laxatives are not recommended (see PRECAUTIONS - hypokalaemia).

Precautions for use:

Care is advised when the following medicines are used concomitantly with disopyramide:

- Hypokalemia-inducing medicines (see PRECAUTIONS - hypokalaemia) such as diuretics, amphotericin B, tetracosactide, gluco- and mineralo-corticoids.

To be considered:

Atropine and other anticholinergic medicines, including phenothiazines, may potentiate the atropine-like effects of disopyramide (see PRECAUTIONS and ADVERSE EFFECTS).

When prescribing a drug metabolised by CYP3A [such as theophylline, HIV protease inhibitors (e.g. ritonavir, indinavir, saquinavir), cyclosporin A, warfarin], it should be kept in mind that disopyramide is probably also a substrate of this isozyme and thus competitive inhibition of metabolism might occur, possibly increasing serum levels of these drugs.

Other interactions include the following:

- Roxithromycin: An in-vitro study has shown that roxithromycin can displace protein bound disopyramide; such an effect in vivo could result in increased serum levels of disopyramide.

If treatment with any of these medicines is necessary, cardiac function and therapeutic drug levels must be strictly monitored.

ADVERSE EFFECTS

Disopyramide may worsen or provoke ventricular arrhythmias (ventricular tachycardia, ventricular fibrillation and torsades de pointes). This pro-arrhythmic effect is more likely to occur in the presence of hypokalaemia and/or the associated use of other antiarrhythmic medicines and /or severe structural heart disease and /or prolongation of QT interval.

Hypotension, QT interval prolongation, widening QRS, atrioventricular block, bundle branch block, bradycardia, sinus block, nodal rhythm dissociation and cardiac arrest have been reported. An occasional paradoxical ventricular tachycardia, evolving sometimes to fibrillation, has been observed.

Episodes of severe cardiac failure, collapse or cardiogenic shock states have been observed, particularly in patients with severe structural heart disease. The resulting low cardiac output can cause hypotension, renal and/or acute hepatic insufficiency mimicking acute hepatocellular hepatitis.

The most common adverse effects which are dose dependent are associated with the anti-cholinergic properties of the medicine. These may be transitory, but may be persistent and can be severe. Urinary retention is the most serious anticholinergic effect.

The following adverse effects are reported in more than 10 % of patients:

Anticholinergic: dry mouth, acute urinary retention, especially in prostatism and constipation
Gastrointestinal: nausea, indigestion, vomiting, diarrhoea, flatulence, bad taste in the mouth, anorexia

The following adverse effects are reported in 1 to 10 % of patients:

Anticholinergic: blurred vision, dry eyes/nose/throat, urinary hesitation and frequency
Cardiovascular: hypotension with or without CHF, increased CHF, cardiac conduction disturbances, proarrhythmic effects, oedema, dyspnoea, cyanosis, chest pain
Dermatologic: skin reactions including pruritis, urticaria, morbilliform eruption, rash, photosensitisation.
General: dizziness, vertigo, drowsiness, profuse sweating
Other: raised SGOT levels

Isolated reports of anaphylactic-type reactions (e.g. urticaria, angioedema) possibly culminating in shock (reported in association with the I.V. injection)

The following adverse effects are reported in less than 1 % of patients:

Dysuria, headache, feeling of warmth, pallor, peripheral paraesthesia, fatigue, malaise, insomnia, confusion, transitory psychosis, elevated BUN, elevated creatinine, decreased haemoglobin/haematocrit, hypoglycaemia which can be severe (see PRECAUTIONS), neutropenia, idiosyncratic reaction.

In a few instances, cholestatic jaundice has been reported. A definite causal relationship has not been established, however one case has been reported as probably related.

A high plasma concentration has been associated with impotence.

With intravenous administration, the occurrence of side effects, especially profuse sweating, was often associated with too rapid administration of the medicine.

Other adverse effects which have been reported include psychiatric disorders, cognitive disorders, agranulocytosis, ocular disturbances of accommodation and diplopia; and epigastralgia.

DOSAGE AND ADMINISTRATION

The daily dose of Rythmodan capsules must be administered as no less than 3 equal divided doses.

Adults with Normal Hepatic and Renal Function

The recommended dosage in adults with normal hepatic and renal functions is 300 to 800 mg daily.

Treatment should be initiated at 400 - 600 mg per day. The effective maintenance dose is then reached by progressively reducing the starting dose by no more than 100 mg per day to reach a final maintenance dose of 300 - 400 mg per day.

When treating arrhythmia by electroconversion, it is advisable to start RYTHMODAN one to two days prior to the applied electric shock. During this period, sinus rhythm may be achieved.

Control of arrhythmia in some patients may be obtained within eight hours of oral administration.

Adults with Renal impairment

For patients with severe renal insufficiency (creatinine clearance < 40 mL/minute), the recommended dosage regimen is a 200 mg loading dose followed by a 100 mg maintenance dose given approximately every half-life ($t_{1/2}$). ECG and plasma concentrations should be monitored.

The following table shows the relationship between creatinine clearance, half-life and the maintenance dosing interval:

Dosage in Renal Impairment

Creatinine clearance (mL/min)	1 - 5	5 - 15	15 - 40
Disopyramide $t_{1/2}$ (hours)	37 - 26	26 - 15	15 - 7
Approximate maintenance dosing interval (hours)	30	20	10

Adults with Hepatic impairment

Dosage should be reduced by 25 % in patients with hepatic impairment. The ECG and plasma concentrations should be monitored and used to adjust the regimen if necessary.

OVERDOSAGE

Symptoms

Toxic plasma levels are reflected by ECG abnormalities such as (a) marked prolongation of QT interval premonitory of other arrhythmias, in particular torsades de pointes, which can result in repeated syncope; (b) widening of the QRS complex; and (c) variable degrees of atrio-ventricular block.

The clinical signs of overdose may include paralytic ileus, bilateral mydriasis (suggestive); syncope, hypotension or shock; cardiac arrest due to intra-ventricular block or asystole; respiratory symptoms; and coma (with bilateral mydriasis) in cases of massive intoxication.

Treatment

Except for neostigmine or physostigmine which may be used for treating anticholinergic effects, there is no specific antidote. Treatment of acute overdose should be carried out in an Intensive Care Unit under continuous cardiac monitoring.

Symptomatic therapeutic measures may include:

- administration of a cathartic followed by activated charcoal by mouth or stomach tube;
- IV administration of isoprenaline and/or other vasopressors and/or positive inotropic agents;
- if needed, infusion of lactate and/or magnesium, electro-systolic assistance, electroconversion, insertion of an intra-aortic balloon for counterpulsation, and mechanically assisted ventilation;
- haemodialysis, haemofiltration or haemoperfusion with activated charcoal.

Altering the urinary pH does not affect the plasma half-life or the amount of disopyramide excreted in the urine.

Contact the Poisons Information Centre for advice on management of overdosage.

PRESENTATIONS AND STORAGE CONDITIONS

100 mg capsules: Green & beige, marked RY RL; 100 capsules per blister pack.

150 mg capsules[#]: White, marked RY 150 in black; 100 capsules per blister pack.

Store below 30°C

[#]Not marketed

NAME AND ADDRESS OF THE SPONSOR

sanofi-aventis australia pty ltd
12-24 Talavera Road
Macquarie Park NSW 2113

POISON SCHEDULE OF THE MEDICINE

Prescription Only Medicine (S4)

DATE OF APPROVAL

Date of TGA Approval: 07 Nov 1995

Date of most recent amendment: 1 August 2017