MONOGRAPH FOR HEALTH PROFESSIONALS

CLOPIDOGREL

Clopidogrel Tablets USP

75 mg Clopidogrel, as clopidogrel bisulphate

PRESCRIPTION ONLY MEDICATION

Platelet Aggregation Inhibitor

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HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	Nonmedicinal Ingredients
Oral	tablet 75 mg	Lactose, Starch Maize, Magnesium Stearate, Mannitol Crystalline, Cremphor, Hydroxy Propyl Methyl Cellulose, Polyvinyl Pyrrolidone PVP, Collodial Silica Anhydrous, Sodium Starch Glycolate, Titanium Dioxide, Ethyl Alcohol, Propylene Glycol, Isopropyl Alcohol, Lake Dye and Purified Water.

INDICATIONS AND CLINICAL USE

MI, Stroke or Established Peripheral Arterial Disease

- CLOPIDOGREL (clopidogrel bisulfate) is indicated for the secondary prevention of atherothrombotic events (myocardial infarction, stroke and vascular death) in patients with atherosclerosis documented by stroke, myocardial infarction, or established peripheral arterial disease.

Acute Coronary Syndrome

- CLOPIDOGREL (clopidogrel bisulfate), in combination with acetylsalicylic acid (ASA), is indicated for the early and long-term secondary prevention of atherothrombotic events (myocardial infarction, ischemic stroke, cardiovascular death and/or refractory ischemia) in patients with acute coronary syndromes - without ST segment elevation (ie. unstable angina or non-Q-wave myocardial infarction). These benefits of clopidogrel bisulfate have been shown only when these patients were concomitantly treated with ASA in addition to other standard therapies. These benefits were also seen in patients who were managed medically and those who were managed with percutaneous coronary intervention (with or without stent) or CABG (coronary artery bypass graft).

Pediatrics (< 18 years of age):

The safety and efficacy of clopidogrel bisulfate in pediatric patients have not been established (see WARNINGS AND PRECAUTIONS, **Special Populations, Pediatrics (<18 years of age))**.

CONTRAINDICATIONS

CLOPIDOGREL (clopidogrel bisulfate) is contraindicated in:

- Patients who are hypersensitive to this drug or to any ingredient in the formulation or component of the container. For a complete listing, see the Dosage Forms, Composition and Packaging section of the product monograph.

- Patients with active bleeding such as peptic ulcer and intracranial hemorrhage (ICH).
- Patients with significant liver impairment or cholestatic jaundice.
- Patients who are using repaglinide (see DRUG INTERACTIONS)

WARNINGS AND PRECAUTIONS

Cross-reactivity among thienopyridines

Patients should be evaluated for history of hypersensitivity to another thienopyridine (such as ticlopidine, prasugrel) since cross-reactivity among thienopyridines has been reported (see ADVERSE REACTIONS). Thienopyridines may cause mild to severe allergic reactions such as rash, angioedema, or haematological reactions such as thrombocytopaenia and neutropaenia. Patients who had developed a previous allergic reaction and/or haematological reaction to one thienopyridine may have an increased risk of developing the same or another reaction to another thienopyridine. Monitoring for cross-reactivity is advised.

Bleeding and haematological disorders

As with other antiplatelet agents, when considering prescribing CLOPIDOGREL (clopidogrel bisulfate), physicians should inquire whether the patient has a history of bleeding. Clopidogrel bisulfate should be used with caution in patients who may be at risk of increased bleeding from recent trauma, surgery or other pathological condition(s), and in patients receiving treatment with acetylsalicylic acid, heparin, glycoprotein IIb/IIIa inhibitors, non-steroidal anti-inflammatory drugs (NSAIDs), or selective serotonin reuptake inhibitors (SSRIs).

Because of the increased risk of bleeding, the concomitant administration of warfarin with clopidogrel bisulfate should be undertaken with caution (see DRUG INTERACTIONS).

Due to the risk of bleeding and haematological undesirable effects, blood cell count determination and/or other appropriate testing should be promptly considered whenever such suspected clinical symptoms arise during the course of treatment (see ADVERSE REACTIONS).

In patients with recent transient ischaemic attack (TIA) or stroke and who are at high risk of recurrent ischemic events, the combination of ASA and clopidogrel bisulfate has not been shown to be more effective than clopidogrel bisulfate alone, but the combination has been shown to increase major bleeding (see DRUG INTERACTIONS).

Platelet transfusion may be used to reverse the pharmacological effects of CLOPIDOGREL when quick reversal is required.

Thrombotic thrombocytopenic purpura (TTP) has been reported rarely following the use of clopidogrel bisulfate, but it can occur anytime during the first year of exposure. Few cases have been reported after more than one year of exposure. TTP is a potentially fatal condition requiring prompt treatment with plasmapheresis. It is characterized by thrombocytopenia, microangiopathic hemolytic anemia, neurological findings, renal dysfunction, and fever.

Acquired haemophilia has been reported following use of clopidogrel, manifesting as a marked increase in bleeding or bruising. In cases of confirmed isolated activated partial thromboplastin time (aPTT) prolongation with or without bleeding, acquired haemophilia should be considered. Patients with a confirmed diagnosis of acquired haemophilia should be managed and treated by specialists, and clopidogrel should be discontinued.

Use of CLOPIDOGREL combined with low-dose ASA in patients with Atrial Fibrillation, who are considered unsuitable for anticoagulation therapy
The use of this dual antiplatelet therapy in patients with AF has been shown to reduce the incidence of cardiovascular events (fatal and non-fatal stroke, non-CNS systemic embolism, vascular death), but to significantly increase the incidence of major bleeding, severe bleeding and intracranial hemorrhage, and to increase the incidence of fatal bleedings, versus ASA therapy alone. Before initiating AF patients on this dual antiplatelet therapy, the patient's bleeding risk should be carefully considered.

Cytochrome P450 2C19 (CYP2C19)

Clopidogrel bisulfate is a pro-drug, which requires metabolism by the hepatic cytochrome CYP2C19 to form the active thiol metabolite. The function of this enzyme can be compromised, either through direct drug inhibition or dysfunctional genetic variants that lower enzyme activity, thus the effectiveness of clopidogrel bisulfate could diminish correspondingly.

Pharmacogenetics – CYP2C19 Poor Metabolisers:

In patients who are CYP2C19 poor metabolisers, CLOPIDOGREL at recommended doses forms less of the active metabolite of clopidogrel and has a smaller effect on platelet function. Poor metabolisers with acute coronary syndrome or undergoing percutaneous coronary intervention treated with CLOPIDOGREL at recommended doses may exhibit higher cardiovascular event rates than do patients with normal CYP2C19 function. Consider alternative treatment or treatment strategies in patients identified as CYP2C19 poor metabolisers (see PHARMACOLOGICAL INFORMATION).

Use with Proton Pump Inhibitors (PPI):

Omeprazole, a moderate CYP2C19 inhibitor, reduces the pharmacological activity of CLOPIDOGREL. Avoid use of strong or moderate CYP2C19 inhibitors with CLOPIDOGREL. Consider using another acid-reducing agent with less CYP2C19 inhibitory activity, or alternative treatment strategies. Pantoprazole, a weak CYP2C19 inhibitor, had less effect on the pharmacological activity of CLOPIDOGREL than omeprazole (see DRUG INTERACTIONS and PHARMACOLOGICAL INFORMATION).

Gastrointestinal

Active GI Lesions

CLOPIDOGREL (clopidogrel bisulfate) prolongs bleeding time. Although clopidogrel bisulfate has shown a lower incidence of gastrointestinal bleeding compared to ASA in a large controlled clinical trial (CAPRIE), clopidogrel bisulfate should not be used in patients who have lesions with a propensity to bleed. In CURE, the incidence of major GI bleeding was 1.3% versus 0.7% (clopidogrel bisulfate +ASA versus placebo +ASA, respectively).

In patients taking CLOPIDOGREL, drugs that might induce GI lesions should be used with caution.

Hepatic/Biliary/Pancreatic

Experience is limited in patients with moderate hepatic impairment who may have bleeding diatheses. As with any patient exhibiting hepatic impairment, liver function should be carefully monitored and clopidogrel bisulfate should be used with caution.

Peri-operative Considerations

If a patient is to undergo elective surgery, consideration should be given to discontinue CLOPIDOGREL 5 to 7 days prior to surgery to allow for a reversal of its effect.

Renal

Therapeutic experience with clopidogrel is limited in patients with severe and moderate renal impairment. Therefore CLOPIDOGREL should be used with caution in these patients.

Sensitivity to lactose

CLOPIDOGREL contains lactose. Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicine (see CONTRAINDICATIONS).

Special Populations

Pregnant Women: There are no adequate and well-controlled studies in pregnant women.

Reproduction studies have been performed in rats at doses ≤500 mg/kg per day and in rabbits at doses ≤300 mg/kg per day and have revealed no evidence of impaired fertility or harm to the fetus due to clopidogrel. Because animal reproduction studies are not always predictive of a human response, CLOPIDOGREL should be used during pregnancy only if the potential benefits outweigh the potential risks to the fetus.

Nursing Women: When given to lactating rats, clopidogrel caused a slight delay in the development of the offspring. Studies in rats have also shown that clopidogrel and/or its metabolites are excreted in milk. It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to a nursing woman.

Pediatrics (< 18 years of age): The safety and effectiveness of clopidogrel bisulfate in pediatric patients have not been established. Therefore, CLOPIDOGREL is not recommended in this patient population. In a randomized, placebo-controlled trial (CLARINET) involving 906 neonates and infants with cyanotic congenital heart disease palliated with a systemic-to-pulmonary arterial shunt, clopidogrel did not demonstrate a clinical benefit.

Driving a vehicle or performing other hazardous tasks

No impairment of driving or psychometric performance was observed following clopidogrel administration.

ADVERSE REACTIONS

Adverse Drug Reaction Overview

The safety profile of clopidogrel has been evaluated in clinical trials in more than 44,000 patients including over 1,200 patients treated for ≥1 year and further assessed during post-marketing experience.

Of the patients who participated in the CAPRIE, CURE and CLARITY double-blind international clinical trials, approximately 50% were elderly patients (> 65 years) and 15% were ≥75 years. In the ACTIVE A trial, 75% of patients treated with clopidogrel bisulfate were ≥65 years of age, and 41% were ≥75 years. In COMMIT study, approximately 58% of the patients treated with clopidogrel bisulfate were ≥60 years, 26% of whom were ≥70 years.

The most frequent adverse drug reactions (≥1%) with clopidogrel bisulfate (with or without associated ASA) in controlled clinical trials were hemorrhage and bleeding disorders including purpura, any rash**,** dyspepsia, abdominal pain and diarrhea.

The most serious adverse drug reactions from controlled clinical trials rarely reported (<1%) were bleeding and clotting disorders including gastrointestinal hemorrhage, hemorrhagic ulcer and hemothorax.

Blood disorders: agranulocytosis/ granulocytopenia, aplastic anemia, neutropenia and thrombocytopenia.

Gastrointestinal system disorders: Duodenal, gastric or peptic ulcer, gastritis.

Skin disorders: Any rash and bullous eruption.

DRUG INTERACTIONS

Overview

Drugs associated with bleeding risk
There is an increased risk of bleeding due to the potential additive effect. The concomitant administration of drugs associated with bleeding risk should be undertaken with caution.

CYP2C19 inhibitors

Clopidogrel bisulfate is metabolized to its active metabolite mostly by CYP2C19. Concomitant use of drugs that inhibit the activity of this enzyme results in reduced plasma concentrations of the active metabolite of clopidogrel bisulfate and a reduction in platelet inhibition. See Table 7 for drugs that inhibit CYP2C19 [see Warnings and Precautions].

Proton Pump Inhibitors (PPI): In a crossover clinical study, clopidogrel bisulfate (300 mg loading dose followed by 75 mg/day) alone and with omeprazole (80 mg at the same time as clopidogrel bisulfate) were administered for 5 days. As shown in Table 6 below, with concomitant dosing of omeprazole, exposure (C_{max} and AUC) to the clopidogrel bisulfate active metabolite and platelet inhibition were substantially reduced. Similar reductions in exposure to the clopidogrel bisulfate active metabolite and platelet inhibition were observed when clopidogrel bisulfate and omeprazole were administered 12 hours apart (data not shown).

There are no adequate studies of a lower dose of omeprazole or a higher dose of clopidogrel bisulfate in comparison with the approved dose of clopidogrel bisulfate.

A study was conducted using clopidogrel bisulfate (300 mg loading dose followed by 75 mg/day) and a high dose (80 mg/day) of pantoprazole, a weak CYP2C19 inhibitor. The plasma concentrations of the clopidogrel bisulfate active metabolite and the degree of platelet inhibition were less than observed with clopidogrel bisulfate alone but were greater than observed when omeprazole 80 mg was co-administered with 300 mg loading dose followed by 75 mg/day of clopidogrel bisulfate (Table 6).

Table 6 - Comparison of Clopidogrel Bisulfate Active Metabolite Exposure and Platelet Inhibition with and without Proton Pump Inhibitors, Omeprazole and Pantoprazole

	% Change from clopidogrel bisulfate (300 mg/75 mg) alone					
	C_{max} (ng/mL)		AUC		Platelet Inhibition† (%)	
Clopidogrel Bisulfate plus	Day 1	Day 5	Day 1	Day 5**	Day 1	Day 5
Omeprazole* 80 mg	↓46%	↓42%	↓45%	↓40%	↓39%	↓21%
Pantoprazole 80 mg	↓24%	↓28%	↓20%	↓14%	↓15%	↓11%

† Inhibition of platelet aggregation with 5 mcM ADP* Similar results seen when clopidogrel bisulfate and omeprazole were administered 12 hours apart. ** AUC at Day 5 is AUC 0-24

Some nonrandomized observational studies have shown that the combination of clopidogrel bisulfate and PPI was associated with a higher incidence of adverse cardiovascular events, but sub-studies of randomized clinical trials showed no significant association. It is recommended to avoid use of strong or moderate CYP2C19 inhibitors with clopidogrel bisulfate.

Anticoagulant drugs

In view of the possible increased risk of bleeding, anticoagulant drugs should be used with caution as tolerance and safety of simultaneous administration with clopidogrel bisulfate has not been established. Risk factors should be assessed for individual patients before using clopidogrel bisulfate.

Warfarin (CYP2C9 Substrates): At high concentrations *in vitro*, clopidogrel bisulfate has been shown to inhibit CYP2C9. In patients receiving long-term warfarin therapy, the administration of clopidogrel bisulfate 75 mg/day did not modify the pharmacokinetics of S-warfarin (a CYP2C9 substrate) or the INR; however coadministration of clopidogrel bisulfate with warfarin increases the risk of bleeding because of independent effects on hemostasis.

Other concomitant therapy

Clinically significant adverse interactions were not detected in clinical trials with clopidogrel bisulfate where patients received a variety of concomitant medications including ASA, diuretics, beta-blocking agents, angiotensin converting enzyme (ACE) inhibitors, calcium channel blockers, lipid-lowering agents, coronary vasodilators, anti-diabetic agents (including insulin), thrombolytics, unfractionated and/or LMW heparin, glycoprotein IIb/IIIa inhibitors, antiepileptic agents, and hormone replacement therapy (however, see Table 6 regarding ASA and glycoprotein IIb/IIIa inhibitors). A review of the clinical trial data indicates that there is no evidence of an interaction between clopidogrel bisulfate and atorvastatin. In CAPRIE, patients on HMG CoA reductase inhibitors and clopidogrel bisulfate experienced a higher incidence of bleeding events (primarily epistaxis). Patients on HMG CoA reductase inhibitors and ASA experienced a higher incidence of intracranial hemorrhage. There is no known pathophysiological or pharmacological explanation for this observation.

It is unlikely that clopidogrel bisulfate may interfere with the metabolism of drugs such as phenytoin and tolbutamide and the NSAIDs, which are metabolised by cytochrome P450 2C9. Data from the CAPRIE study indicate that phenytoin and tolbutamide can be safely co-administered with clopidogrel bisulfate.

No clinically significant pharmacodynamic interactions were observed when clopidogrel bisulfate was coadministered in clinical studies to investigate drug interaction with atenolol, nifedipine, or both atenolol and nifedipine. The pharmacodynamic activity of clopidogrel bisulfate was slightly enhanced by the coadministration of phenobarbital, however this was not considered to be clinically significant. Pharmacodynamic activity of clopidogrel bisulfate was not significantly influenced by the coadministration of estrogen.

***CYP2C8 substrate drugs*:** Clopidogrel has been shown to increase repaglinide exposure in healthy volunteers (see Table 7, below). In vitro studies have shown the increase in repaglinide exposure is due to strong inhibition of CYP2C8 by the glucuronide metabolite of clopidogrel. Concomitant use of clopidogrel with repaglinide is contraindicated (see

CONTRAINDICATIONS). Due to the risk of increased plasma concentrations, concomitant administration of clopidogrel and other drugs primarily cleared by CYP2C8 metabolism (e.g. paclitaxel) should be undertaken with caution.

Drug-Drug Interactions

The drugs listed in this Table are based on either drug interaction case reports or studies, or potential interactions due to the expected magnitude and seriousness of the interaction (i.e., those identified as contraindicated).

Table 7 - Established or Potential Drug-Drug Interactions

Agent	Ref	Effect	Clinical comment
ASA	CT	Potentiated effect of ASA on collagen-induced platelet aggregation.	ASA (2 X 500 mg once) did not modify clopidogrel-mediated inhibition of ADP-induced platelet aggregation. Potential increased risk of gastrointestinal bleeding with concomitant administration of ASA. Clopidogrel bisulfate (75 mg) and ASA (75-325 mg) have been administered together for up to 1 year. As a pharmacodynamic interaction between clopidogrel and ASA is possible, concomitant use should be undertaken with cautions. In patients with recent TIA or stroke who are at high risk of recurrent ischemic events, the combination of ASA and clopidogrel bisulfate has not been shown to be more effective than clopidogrel bisulfate alone, but the combination has been shown to increase major bleeding.
Glycoprotein IIb/IIIa inhibitors	T		As a pharmacodynamic interaction is possible, concomitant use should be undertaken with caution.

Agent	Ref	Effect	Clinical comment
Inhibitors of CYP2C19 (e.g. omeprazole)	CT	Reduced drug levels of the active metabolite of clopidogrel	Since clopidogrel is metabolized to its active metabolite mostly by CYP2C19, use of drugs that inhibit the activity of this enzyme would be expected to result in reduced drug levels of the active metabolite of clopidogrel. The clinical relevance of this interaction is uncertain. The use of strong or moderate CYP2C19 inhibitors should be discouraged in patients taking clopidogrel. If a proton pump inhibitor is to be used concomitantly with clopidogrel, consider using one with less CYP2C19 inhibitory activity, such as pantoprazole. Inhibitors of CYP2C19 include but are not limited to omeprazole, esomeprazole, lansoprazole, cimetidine, ticlopidine, fluvoxamine, fluoxetine, moclobemide, felbamate, chloramphenicol, ketoconazole.
Injectable Anticoagulants (Heparin)	CT	No effect	Clopidogrel at steady state did not modify effect of heparin on coagulation in healthy volunteers. Coadministration of heparin had no effect on platelet aggregation inhibition induced by clopidogrel bisulfate. As a pharmacodynamic interaction between clopidogrel and heparin is possible, concomitant use should be undertaken with cautions.
NSAIDS	T	↑ occult gastrointestinal blood loss (with naproxen coadministation)	Potential increased risk of gastrointestinal bleeding with concomitant administration of NSAIDS. NSAIDS and clopidogrel should be coadministered with cautions.
Oral Anticoagulants (Warfarin)	T		Because of the increased risk of bleeding, the concomitant administration of warfarin with clopidogrel should be undertaken with caution (See Warnings and Precautions).
Repaglinide (a substrate of CYP2C8)	CT	A single dose of 0.25 mg repaglinide, administered 1 hr following a loading dose of 300 mg clopidogrel, and then 1 hr after a dose of 75 mg clopidogrel at steady-state, resulted in ↑ in repaglinide AUC of 5.1-fold and 3.9-fold, respectively.	Concomitant administration of clopidogrel and repaglinide is contraindicated (see CONTRAINDICATIONS).

Agent	Ref	Effect	Clinical comment
Selective Serotonin Reuptake Inhibitors (SSRIs)	CS	Affect platelet activation and increase the risk of bleeding. Also see above, effect on CYP2C19.	The concomitant administration of SSRIs with clopidogrel should be undertaken with caution.
Thrombolytics	CS		The safety of the concomitant administration of clopidogrel, rt-PA and heparin was assessed in patients with recent myocardial infarction. Based on historical data, the incidence of clinically significant bleeding was similar to that observed when rt-PA and heparin are co-administered with acetylsalicylic acid.

Legend: CS = Case Study; CT = Clinical Trial; T = Theoretical

No clinically significant pharmacodynamics interactions were observed when clopidogrel was coadministered with antacids, atenolol, cimetidine, digoxin, estrogens, nifedipine, phenobarbital and theophylline.

Antacids did not modify the extent of clopidogrel absorption.

Food or Herbal Product Interactions

There is no interaction of clopidogrel bisulfate with food since administration of clopidogrel bisulfate with meals did not significantly modify the bioavailability of clopidogrel. Interactions with herbal products have not been established.

Drug-Laboratory Interactions

None known.

DOSAGE AND METHOD OF USE

Recommended Dose and Dosage Adjustment

MI, Stroke or Established Peripheral Arterial Disease
The recommended dose of CLOPIDOGREL is 75 mg once daily long term with or without food.

Acute Coronary Syndrome
For patients with non-ST-segment elevation acute coronary syndrome (unstable angina/non-Q-wave MI), CLOPIDOGREL should be initiated with a 300 mg loading dose and continued long term at 75 mg once a day with ASA (80 mg-325 mg daily) (see CLINICAL INFORMATION). For patients with ST-segment elevation acute myocardial infarction, the recommended dose of

CLOPIDOGREL is 75 mg once daily, administered in combination with ASA, with or without thrombolytics. CLOPIDOGREL may be initiated with or without a loading dose (300 mg was used in CLARITY; see CLINICAL INFORMATION).

No dosage adjustment is necessary for elderly patients or patients with renal impairment (see PHARMACOLOGICAL INFORMATION).

Pharmacogenetics
CYP2C19 poor metaboliser status is associated with diminished antiplatelet response to clopidogrel. Although a higher dose regimen in poor metaboliser healthy subjects increases antiplatelet response, an appropriate dose regimen for this patient population has not been established in clinical outcome trials (see PHARMACOLOGICAL INFORMATION).

Missed Dose
If a dose of CLOPIDOGREL is missed, it should be taken as soon as possible. However, if it is close to the time of the next dose, disregard the missed dose and return to the regular dosing schedule. Do not double doses.

OVERDOSAGE

Overdose following clopidogrel administration may lead to prolonged bleeding time and subsequent bleeding complications. Appropriate therapy should be considered if bleeding is observed or suspected.

A single oral dose of clopidogrel at 1500 or 2000 mg/kg was lethal to mice and rats, and at 3000 mg/kg to baboons.

Treatment:
No antidote to the pharmacological activity of clopidogrel has been found. Platelet transfusion may be used to reverse the pharmacological effects of CLOPIDOGREL when quick reversal is required.

For management of a suspected drug overdose, contact your regional Poison Control Centre.

PHARMACOLOGICAL INFORMATION

Mechanism of Action

The role of platelets in the pathophysiology of atherosclerotic disease and atherothrombotic events has been established. Long-term prophylactic use of antiplatelet drugs has shown consistent benefit in the prevention of ischemic stroke, myocardial infarction, unstable angina, peripheral arterial disease, need for vascular bypass or angioplasty, and vascular death in patients at increased risk of such outcomes, including those with established atherosclerosis or a history

of atherothrombosis. CLOPIDOGREL (clopidogrel bisulfate) is a specific inhibitor of adenosine-diphosphate (ADP)-induced platelet aggregation.

Pharmacodynamics

Clopidogrel is a prodrug, one of whose metabolites is an inhibitor of platelet aggregation. Clopidogrel must be metabolised by CYP450 enzymes to produce the active metabolite that inhibits platelet aggregation. The active metabolite of clopidogrel selectively inhibits the binding of adenosine diphosphate (ADP) to its platelet P2Y12 receptor and the subsequent ADP-mediated activation of the glycoprotein GPIIb/IIIa complex, thereby inhibiting platelet aggregation. Platelet aggregation induced by agonists other than ADP is also inhibited by blocking the amplification of platelet activation by released ADP.

Because the active metabolite is formed by CYP450 enzymes, some of which are polymorphic or subject to inhibition by other drugs, not all patients will have adequate platelet inhibition.

Clopidogrel does not inhibit phosphodiesterase activity. Acetylsalicylic acid (ASA) inhibits the cyclooxygenase enzyme pathway preventing the production of prostaglandin and thus, the synthesis of thromboxane A2 which induces platelet aggregation. Clopidogrel acts on the ADP receptor and ASA acts on a separate receptor thereby inhibiting different pathways of platelet activation and aggregation. Therefore, there is potential for synergy between the two agents.

Clopidogrel acts by modifying irreversibly the platelet ADP receptor. Consequently, platelets exposed to clopidogrel are affected for the remainder of their lifespan (approximately 7-10 days) and recovery of normal platelet function occurs at a rate consistent with platelet turnover. Single administration is not sufficient to reach a desired therapeutic effect. Statistically significant and dose-dependent inhibition of platelet aggregation was noted 2 hours after single oral doses of clopidogrel. Repeated doses of 75 mg per day produced inhibition of ADP-induced platelet aggregation from the first day. Steady state was reached between Day 3 and Day 7. At steady state, with a dose of 75 mg per day, the average inhibition level observed was between 40% and 60%. The aggregation level and bleeding time gradually returned to baseline values within 5-7 days after treatment was discontinued. The precise correlation between inhibition of platelet aggregation, prolongation of bleeding time and prevention of atherothrombotic events has not been established. The effect of a loading dose has been clinically evaluated in the CURE study (Clopidogrel in Unstable Angina to Prevent Recurrent Ischemic Events). The benefits of clopidogrel with concomitant ASA were apparent within 24 hours after randomization in the CURE trial.

Pharmacokinetics

The main pharmacokinetic parameters for clopidogrel are presented in the table below.

	C_{max}	$t_{1/2}$ (h)	AUC $_{0-\infty}$
Single Dose Mean	2.2 – 2.5 ng/mL	6 h	2.7 ng.h/L

Absorption:
After single and repeated oral doses of 75 mg/day, clopidogrel is rapidly absorbed. Mean peak plasma levels of unchanged clopidogrel (approximately 2.2-2.5 ng/mL after a single 75-mg oral dose) occurred approximately 45 minutes after dosing.

Absorption is at least 50%, based on urinary excretion of clopidogrel metabolites.

Administration of clopidogrel bisulfate with meals did not significantly modify the bioavailability of clopidogrel as assessed by the pharmacokinetics of the main circulating metabolite.

Distribution: Clopidogrel and the main circulating (inactive) metabolite bind reversibly *in vitro* to human plasma proteins (98% and 94%, respectively). The binding is non saturable *in vitro* up to a concentration of 100 mcg/mL.

Metabolism: Clopidogrel is extensively metabolized by the liver. *In vitro* and *in vivo*, clopidogrel is metabolised according to two main metabolic pathways: one mediated by esterases and leading to hydrolysis into its inactive carboxylic acid derivative (85% of circulating metabolites), and one mediated by multiple cytochromes P450. Clopidogrel is first metabolised to a 2-oxo-clopidogrel intermediate metabolite. Subsequent metabolism of the 2-oxo-clopidogrel intermediate metabolite results in formation of the active metabolite, a thiol derivative of clopidogrel. The active metabolite is formed mostly by CYP2C19 with contributions from several other CYP enzymes, including CYP1A2, CYP2B6 and CYP3A4. The active thiol metabolite which has been isolated *in vitro*, binds rapidly and irreversibly to platelet receptors, thus inhibiting platelet aggregation.

The C_{max} of the active metabolite is twice as high following a single 300-mg clopidogrel loading dose as it is after four days of 75-mg maintenance dose. C_{max} occurs approximately 30 to 60 minutes after dosing.

Excretion: Following an oral dose of ^{14}C-labeled clopidogrel in humans, approximately 50% was excreted in the urine and approximately 46% in the feces in the 5 days after dosing. After a single, oral dose of 75 mg, clopidogrel has a half-life of approximately 6 hours. The elimination half-life of the main circulating (inactive) metabolite was 8 hours after single and repeated administration. Covalent binding to platelets accounted for 2% of the radiolabel with a half-life of 11 days.

USE IN SPECIAL POPULATIONS

Geriatrics: In elderly (≥75 years) volunteers compared to young healthy subjects, there were no differences in platelet aggregation and bleeding time (see DOSAGE AND METHOD OF USE). No dosage adjustment is needed for the elderly.

Sex: In a small study comparing men and women (N=10 males and 10 females), less inhibition of ADP-induced platelet aggregation was observed in women. In the CAPRIE study (Clopidogrel versus ASA in Patients at Risk of Ischemic Events; for details see below), the incidence of clinical outcome events was similar in men and women.

Pediatric patients: No information available

Renal Insufficiency: After repeat doses of 75 mg per day in subjects with moderate and severe renal impairment (creatinine clearance from 30 to 60 mL/min and from 5 to 15 mL/min, respectively), a 25% inhibition of ADP-induced platelet aggregation was observed. Although this effect was lower than that typically observed in healthy subjects, the prolongation in bleeding time was similar to healthy volunteers.

Since no differences in C_{max} for both clopidogrel and the main circulating metabolite were observed, a compensatory phenomenon i.e. biliary excretion, which has been observed in animals, may explain the lower values of AUC observed in subjects with severe chronic renal failure.

Ethnicity: The prevalence of CYP2C19 alleles that result in intermediate and poor CYP2C19 metabolism differs according to ethnicity (see PHARMACOLOGICAL INFORMATION). From literature, limited data in Asian populations are available to assess the clinical implication of genotyping of this CYP on clinical outcome events.

Hepatic impairment: After repeated doses of clopidogrel 75 mg/day for 10 days in patients with Class A or B hepatic cirrhosis (mild to moderate hepatic impairment), slightly higher main active circulating metabolite of clopidogrel was observed compared to healthy subjects. However, inhibition of ADP-induced platelet aggregation and mean bleeding time prolongation was similar in the two groups.

CLINICAL INFORMATION

Study demographics and trial design

The safety and efficacy of clopidogrel bisulfate in preventing atherothrombotic events has been evaluated in five large double-blind trials involving more than 88,000 patients:

The CAPRIE study (Clopidogrel vs. ASA in Patients at Risk of Ischemic Events), a comparison of clopidogrel bisulfate to ASA.

The CURE study (Clopidogrel in Unstable Angina to Prevent Recurrent Ischemic Events).

The CLARITY-TIMI 28 (Clopidogrel as Adjunctive Reperfusion Therapy – Thrombolysis in Myocardial Infarction) and the COMMIT studies comparing clopidogrel bisulfate to placebo, both given in combination with aspirin and other standard therapy.

MYOCARDIAL INFARCTION (MI), STROKE OR ESTABLISHED PERIPHERAL ARTERIAL DISEASE

CAPRIE

The CAPRIE trial was a 19,185 patient, 304 centres, international, randomized, double-blind, parallel-group study comparing clopidogrel bisulfate (75 mg daily) to ASA (325 mg daily).

Patients ranged in age from 21 to 94 years (mean 62 years). The study was composed of 72.4% men and 27.6% women and included patients with established atherosclerosis or history of atherothrombosis as manifested by myocardial infarction, ischemic stroke or peripheral arterial disease.

Patients received randomized treatment for up to 3 years (mean treatment period 1.6 years) and were followed to 3 years or study termination, irrespective of whether study drug had been discontinued (mean follow-up 1.9 years).

Table 9 - Summary of patient demographics for CAPRIE trial in patients at risk of ischemic events

Study #	Trial design	Dosage, route of administration and duration	Study subjects (n=number)	Mean age (Range)	Gender
CAPRIE	international,	Dosage: clopidogrel	n=19,185	62 years	72.4%

	randomized, double-blind, parallel-group study comparing clopidogrel bisulfate to ASA	bisulfate (75 mg daily) or ASA (325 mg daily); Administration: oral; Duration: up to 3 years	(Clopidogrel Bisulfate: n = 9599; ASA: n=9586)	(21-94 years)	male 27.6% female

Study results
The primary outcome of the trial was a composite outcome which included new ischemic stroke (fatal or non-fatal), new myocardial infarction (fatal or non-fatal), or other vascular death. Deaths not easily attributable to nonvascular causes were all classified as vascular.

As shown in the Table 10, clopidogrel bisulfate was associated with a statistically significant reduction in the primary composite outcome (absolute risk reduction 0.86% and relative risk reduction 8.7%, p=0.045) and a lower incidence of IS and MI. The event curves continued to diverge over the 3 year follow-up period.

Table 10 - Summary of the numbers of events of the primary outcome (composite and individual components) of the CAPRIE study (intent-to-treat analysis)

	Outcome Events of the Primary Analysis			
Patients	**Clopidogrel Bisulfate N = 9599**	**ASA N = 9586**	**p**	**Relative Risk Reduction (95% CI)**
Primary Composite Outcome	939 (9.78%)	1020 (10.64%)	0.045	8.7% (0.2, 16.4)
MI (fatal or not)	275 (2.86%)	333 (3.47%)		
Other vascular death	226 (2.35%)	226 (2.36%)		
IS (fatal or not)	438 (4.56%)	461 (4.81%)		

IS = ischemic stroke; MI = myocardial infarction

ACUTE CORONARY SYNDROME

CURE:

The CURE study included 12,562 patients with an acute coronary syndrome, defined as unstable angina or non Q-wave myocardial infarction without significant ST segment elevation and presenting within 24 hours of onset of the most recent episode of chest pain or symptoms consistent with ischemia.

Patients were required to have either ECG changes compatible with new ischemia (without significant ST segment elevation) or elevated cardiac enzymes or Troponin I or T to at least twice the upper limit of normal. Patients with contraindication to antithrombotic or antiplatelet therapy, at high risk for bleeding, severe heart failure, on oral anticoagulants, and those with recent revascularization or those having received IV glycoprotein IIb/IIIa inhibitors in the previous 3 days were excluded. During the trial, patients were allowed to receive other standard cardiovascular therapies such as heparin, glycoprotein IIb/IIIa inhibitors, lipid-lowering drugs, calcium channel blockers, nitrates, beta blockers, ACE-inhibitors, percutaneous coronary intervention (with or without stent) or CABG, as needed.

Patients were randomized to clopidogrel bisulfate (300 mg loading dose followed by 75 mg/day) plus ASA (75-325 mg once daily; median 150 mg, mean 160 mg), or placebo plus ASA (75-325 mg once daily; median 150 mg, mean 160 mg). Patients were treated for 3 to 12 months (median 10.8 months; mean 9 months; 4806 patients were followed for entire 12 months). The baseline characteristics, medical history, electrocardiographic changes, and drug therapy were similar for both treatment groups.

Table 11 - Summary of patient demographics for CURE trial in patients with acute coronary syndrome

Study #	Trial design	Dosage, route of administration and duration	Study subjects (n= number)	Mean age (Range)	Sex
CURE	international, randomized, double-blind, parallel-group study comparing clopidogrel bisulfate + ASA to placebo + ASA	Dosage: clopidogrel bisulfate (loading dose – 300 mg then 75 mg daily) or placebo in addition to ASA (75-325 mg daily); Administration: oral; Duration: 3-12 months	n=12,562 (Clopidogrel Bisulfate: n=6259; ASA: n=6303)	64.2 years (52.9-75.5)	62% male; 38% female

The number of patients experiencing the primary outcome, a composite of cardiovascular (CV) death, non-fatal myocardial infarction (MI) and stroke was 582 (9.30%) in the clopidogrel bisulfate-treated group and 719 (11.41%) in the placebo-treated group; an absolute risk reduction of 2.11%, and a relative risk reduction of 20% (p=0.00009) for the clopidogrel bisulfate-treated group (see Table 12).

The number of patients experiencing the co-primary outcome (CV death, non-fatal MI, stroke or refractory ischemia) was 1035 (16.54%) in the clopidogrel bisulfate-treated group and 1187 (18.83%) in the placebo-treated group; an absolute risk reduction of 2.29% and a relative risk reduction of 14% (p=0.0005) for the clopidogrel bisulfate-treated group.

Events for each component of the composite outcome (CV death, non-fatal myocardial infarction, stroke, refractory ischemia) occurred less frequently with clopidogrel bisulfate than in the placebo group but the differences did not reach statistical significance except for non-fatal MI. The results are summarized in Table 12.

Table 12 - Incidence of the main study outcomes in the CURE study

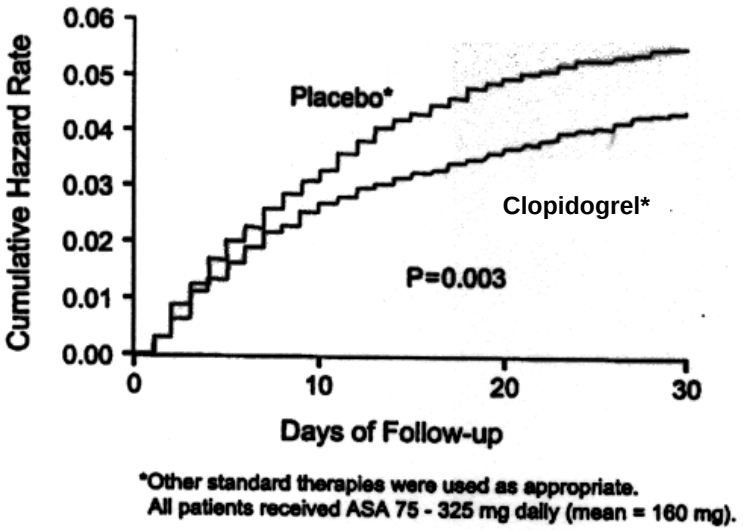
Outcome	Clopidogrel Bisulfate + ASA* (n=6259)	Placebo + ASA* (n=6303)	Absolute Risk Reduction %	Relative Risk (95% CI)
Primary outcome (Cardiovascular death, non-fatal MI, Stroke)	582 (9.30%)	719 (11.41%)	2.11%	0.80 (0.72, 0.90) p = 0.00009

Outcome	Clopidogrel Bisulfate + ASA* (n=6259)	Placebo + ASA* (n=6303)	Absolute Risk Reduction %	Relative Risk (95% CI)
Co-primary outcome (Cardiovascular death, non-fatal MI, Stroke, Refractory Ischemia)	1035 (16.54%)	1187 (18.83%)	2.29%	0.86 (0.79, 0.94) p = 0.00052
All Individual Outcome Events:†				
CV death	318 (5.08%)	345 (5.47%)	0.39%	0.93 (0.79, 1.08)
non-fatal MI**	324 (5.18%)	419 (6.65%)	1.47%	0.77 (0.67, 0.89)
Q-wave	116 (1.9%)	193 (3.1%)	1.20%	0.60 (0.48, 0.76)
Non-Q-wave	216 (3.5%)	242 (3.8%)	0.30%	0.89 (0.74, 1.07)
Stroke	75 (1.20%)	87 (1.38%)	0.18%	0.86 (0.63, 1.18)
Refractory ischemia‡	544 (8.69%)	587 (9.31%)	0.62%	0.93 (0.82, 1.04)
During initial hospitalization	85 (1.4%)	126 (2.0%)	0.60%	0.68 (0.52, 0.90)
After discharge	459 (7.6%)	461 (7.6%)	0%	0.99 (0.87, 1.13)

* Other standard therapies were used as appropriate. All patients received acetylsalicylic acid (ASA) 75-325 mg daily (mean = 160 mg)
** Some patients had both a Q-wave and a non-Q-wave MI.
† The individual components do not represent a breakdown of the primary and co-primary outcomes, but rather the total number of subjects experiencing an event during the course of the study.
‡ Only the first ischemic event was counted for each patient.
CV death: excludes clear non-CV deaths;
MI: two of three usual criteria (chest pain, ECG or enzyme/cardiac marker changes);
Stroke: neurological deficit ≥24 hours (CT/MRI encouraged)
Refractory ischemia (in-hospital): recurrent chest pain lasting more than 5 minutes with new ischemic ECG changes while patient on optimal medical therapy and leading to additional interventions ranging from thrombolytic therapy to coronary revascularization.
Refractory ischemia (after discharge): re-hospitalization lasting at least 24 hours for unstable angina with ischemic ECG changes.

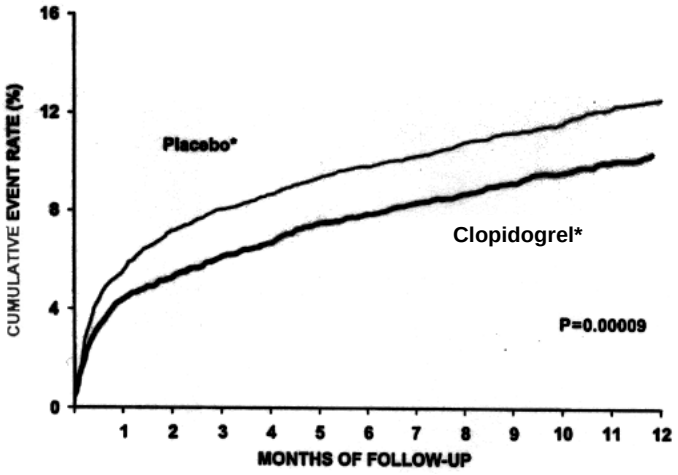
The event curves for CV death, non-fatal Ml and stroke separated within the first 24 hours after initiation of therapy (Figure 1) and continued to diverge throughout the study follow-up (up to 12 months) (Figure 2). The rate of the first primary outcome was significantly lower in the clopidogrel group both within the first 30 days after randomization (relative risk, 0.79; 95 percent confidence interval, 0.67 to 0.92) and between days 30 and the end of the study (relative risk, 0.82; 95 percent confidence interval, 0.70 to 0.95).

Figure 1: Cumulative Hazard Rates for First Primary Outcome (death from cardiovascular causes, non-fatal myocardial infarction, or stroke) During the First 30 days after Randomization in the CURE Study.



No. AT RISK					
Placebo	6303	6108	5998	5957	
Clopidogrel	6259	6103	6035	5984	

Figure 2: Cardiovascular Death, Myocardial Infarction or Stroke During 12 months follow-up in the CURE Study



*Other standard therapies were used as appropriate.

All patients received ASA 75 - 325 mg daily (mean = 160 mg).

No. AT RISK					
Placebo	6303	5780	4664	3600	2388
Clopidogrel	6259	5866	4779	3644	2418

The risk reduction of the secondary prospectively chosen outcomes (in-hospital severe ischemia without urgent intervention, need for revascularization and heart failure) were lower in the clopidogrel bisulfate group than in the placebo group and the differences observed were statistically significant.

Table 13 - Secondary In-Hospital Outcomes in the CURE Study

	Clopidogrel Bisulfate + ASA* (N=6259)	**Placebo + ASA* (N=6303)**	**Absolute Risk Reduction %**	**Relative Risk (95% CI)**
Severe ischemia	176 (2.81%)	237 (3.76%)	1.0%	0.74 (0.61, 0.90)
Revascularization procedure	1302 (20.8%)	1431 (22.7%)	1.9%	0.92 (0.69, 0.98)
Heart failure	229 (3.7%)	280 (4.4%)	0.7%	0.82 (0.69, 0.98)

Severe ischemia: chest pain lasting more than 5 minutes with new ischemic ECG changes while patient on optimal medical therapy and leading to additional interventions ranging from thrombolytic therapy to coronary revascularization but no urgent intervention performed

* Other standard therapies were used as appropriate. All patients received ASA 75 - 325 mg daily (mean= 160 mg; median 150 mg)

In general, the results obtained in populations with different characteristics, including patients with low to high risk and on other acute and long-term cardiovascular therapies were consistent with the results of the primary analyses irrespective of other treatments or interventions.

CLARITY

In patients with ST-segment elevation acute myocardial infarction, safety and efficacy of clopidogrel have been evaluated in two randomized, placebo-controlled, double-blind studies, CLARITY and COMMIT.

The randomized, double-blind, placebo-controlled CLARITY trial included 3,491 patients presenting within 12 hours of the onset of a ST elevation myocardial infarction and planned for thrombolytic therapy. Patients were randomized to receive clopidogrel bisulfate (300-mg loading dose, followed by 75 mg/day) or placebo. Patients also received ASA (150 to 325 mg as a loading dose, followed by 75 to 162 mg/day), a fibrinolytic agent and, when appropriate, heparin for 48 hours. The patients were followed for 30 days.

Table 14 - Summary of patient demographics for CLARITY trial in STEMI patients

Study #	Trial Design	Dosage, route of administration and duration	Study subjects (n=number)	Mean age (range)	Gender
CLARITY-TIMI 28	International, randomized, double-blind, placebo-controlled study comparing Clopidogrel Bisulfate + ASA to Placebo + ASA	Dosage : Clopidogrel Bisulfate (loading dose-300 mg then 75 mg daily) or placebo in addition to ASA (150-325 mg on first day, and 75-162 mg daily thereafter to be taken simultaneously with the study drug) Administration: oral Duration: Up to and including day of angiography or Day 8 or by hospital discharge, whichever comes first	n = 3491 Clopidogrel Bisulfate: n= 1752 ASA: n= 1739	57.4 years (18-79 years)	80.3% males 19.7% females

STEMI = ST-elevation myocardial infarction

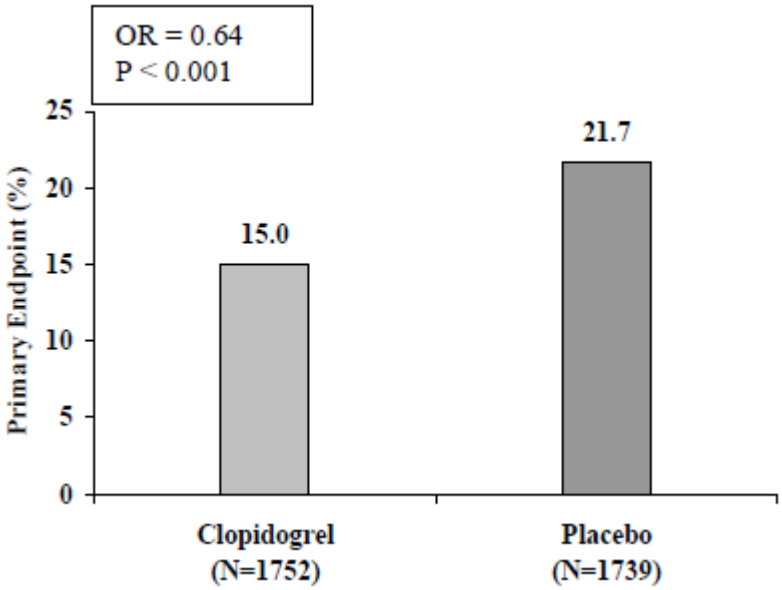
The primary endpoint was the occurrence of the composite of an occluded infarct-related artery (defined as TIMI Flow Grade 0 or 1) on the predischarge angiogram, or death or recurrent myocardial infarction by the time of the start of coronary angiography. For patients who did not undergo angiography, the primary endpoint was death or recurrent myocardial infarction by day 8 or by hospital discharge, if prior to Day 8.

Secondary efficacy assessments were based on the following endpoints analyzed in a hierarchical order [established for interpretation of the 3 secondary endpoints: an early electrocardiographic endpoint (degree of ST segment resolution at 180 minutes after first dose of study drug); a late angiographic endpoint (occluded IRA on predischarge angiogram); and a clinical endpoint [composite outcome of death, recurrent MI, or recurrent myocardial ischemia (severe or leading to revascularization) by the time of start of angiography or Day 8 or hospital discharge, whichever came first].

The patient population was mostly Caucasian (89.5%) and included 19.7% women and 29.2% patients ≥ 65 years. A total of 99.7% of patients received fibrinolytics (fibrin specific: 68.7%, non-fibrin specific: 31.1%, 89.5% heparin), 78.7% beta-blockers, 54.7% ACE inhibitors and 63% statins**.**

The number of patients who reached the primary endpoint was 262 (15.0%) in the clopidogrel bisulfate- treated group and 377 (21.7%) in the placebo group, representing an absolute reduction of 6.7% and a 36 % reduction in the odds of the primary endpoint in favor of treatment with clopidogrel bisulfate (95% CI: 0.53, 0.76; $p < 0.001$), as shown in Figure 3 below:

Figure 3: Event Rates for the Primary Composite Endpoint in the CLARITY Study



Based on odds of an occluded infarct-related artery (TFG 0/1), death or MI by angiography for clopidogrel versus placebo (OR: 0.64 [0.53 to 0.76]; p < 0.001)

The benefit of clopidogrel bisulfate on the primary endpoint was consistent across all prespecified subgroups including patients' age and gender, infarct location, and type of fibrinolytic or heparin used**.**

Table 15 - Components of the primary endpoint: occluded IRA on the predischarge angiogram, or death or recurrent MI by the time of start of predischarge angiography, or Day 8 or hospital discharge, whichever came first (ITT population) in the CLARITY Study

	Clopidogrel 300/75 mg[a]	Placebo[a]	Odds Ratio (95% CI)	p value
Occluded IRA				
N	1640	1634	0.59	<0.001
n (%) of patients reporting endpoint	192 (11.7%)	301 (18.4%)	(0.48, 0.72)	
Death				
N	1752	1739	1.17	0.492
n (%) of patients reporting endpoint	45 (2.6%)	38 (2.2%)	(0.75, 1.82)	
Recurrent MI				
N	1752	1739	0.70	0.077
n (%) of patients reporting endpoint	44 (2.5%)	62 (3.6%)	(0.47, 1.04)	

[a]With background ASA and initial fibrinolytic therapy.

The secondary endpoints are listed in the table below:

Table 16 - Secondary efficacy endpoint analyses (ITT population) in the CLARITY Study

Secondary Efficacy Endpoint	**Clopidogrel 300/75 mg[a]**	**Placebo[a]**	**p value**	**Mean Difference**	**95% CI**
Adjusted mean ST segment resolution of an ECG at 180 minutes after the first dose of study drug	N = 1068 53.0	N = 1021 55.1	0.223[b]	-2.11	-5.50,1.28
Secondary Efficacy Endpoint	**Clopidogrel 300/75 mg**	**Placebo**	**p value**	**Odds Ratio**	**95% CI**
Number (%) of patients with occluded IRA on predischarge angiogram	N = 1640 192 (11.7%)	N = 1634 301 18.4%)	<0.001[b]	0.59	0.48,0.72
Number (%) of patients with death, recurrent MI, or recurrent myocardial ischemia (severe or leading to revascularization) by the time of the start of predischarge angiography [c]	N = 1752 145 (8.3%)	N = 1739 162 (9.3%)	0.274[b]	0.88	0.69,1.11

[a]: With background ASA and initial fibrinolytic therapy.
[b]: p-value to be interpreted following the hierarchical procedure described in the CLARITY Study
[c]: For patients who did not undergo angiography, Day 8 or hospital discharge, whichever came first, was used.

COMMIT

The randomized, double-blind, placebo-controlled, 2x2 factorial design COMMIT trial included 45,852 patients presenting within 24 hours of the onset of the symptoms of suspected myocardial infarction with supporting ECG abnormalities (i.e., ST elevation, ST depression or left bundle-branch block). Patients were randomized to receive clopidogrel bisulfate (75 mg/day) or placebo, in combination with ASA (162 mg/day), for 28 days or until hospital discharge whichever came first.

Table 17 - Summary of patient demographics for COMMIT trial in STEMI patients

Study #	**Trial Design**	**Dosage, Route of Administration and Duration**	**Study Subjects (n= number)**	**Mean Age (range)**	**Gender**
CCS-2/ COMMIT	International, randomized, double-blind, placebo-controlled study	Dosage: Clopidogrel Bisulfate (75 mg daily) or placebo in addition to ASA (162 mg daily to be taken simultaneously with	n = 45 852 Clopidogrel Bisulfate: n = 22 961	61.3 years (15-100)	72.2% male 27.8% female

Study #	Trial Design	Dosage, Route of Administration and Duration	Study Subjects (n= number)	Mean Age (range)	Gender
	comparing Clopidogrel Bisulfate + ASA to placebo + ASA, 2 by 2 factorial design	the study drug) Administration: oral Duration: Maximum 4 weeks (in hospital)	ASA: n = 22 891		

STEMI = ST-elevation myocardial infarction

The co-primary endpoints were death from any cause and the first occurrence of re-infarction, stroke or death.

The patient population included 27.8% women, 58.4% patients ≥ 60 years (26% patients ≥ 70 years) and 54.5% patients who received fibrinolytics. As shown in Table 18 and Figures 4 and 5 below, with clopidogrel bisulfate the relative risk of death from any cause was reduced by a statistically significant 7% (p = 0.029) as was the relative risk of the combination of re-infarction, stroke or death (9%, p = 0.002).

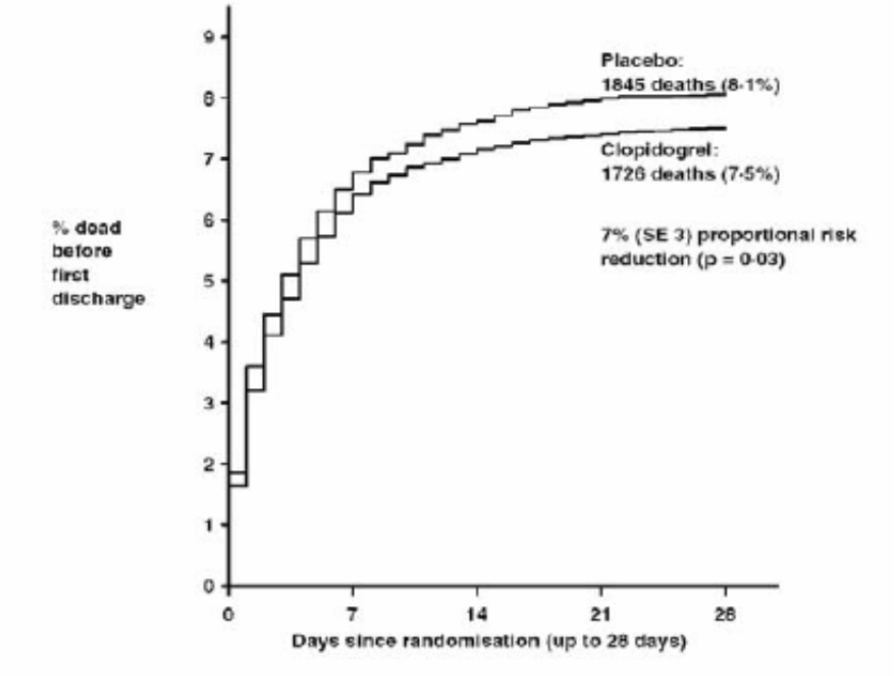
Table 18 - Outcome Events in the COMMIT Analysis

Event	Clopidogrel Bisulfate (+ ASA) (N = 22961)	Placebo (+ASA) (N = 22891)	Odds ratio (95% CI)	p-value
Composite endpoint: Death, MI, or Stroke*	2121 (9.2%)	2310 (10.1%)	0.91 (0.86, 0.97)	0.002
Death	1726 (7.5%)	1845 (8.1%)	0.93 (0.87, 0.99)	0.029
Non-fatal MI**	270 (1.2%)	330 (1.4%)	0.81 (0.69, 0.95)	0.011
Non-fatal Stroke**	127 (0.6%)	142 (0.6%)	0.89 (0.70, 1.13)	0.33

*The difference between the composite endpoint and the sum of death+non-fatal MI+non-fatal stroke indicates that 9 patients (2 clopidogrel and 7 placebo) suffered both a non-fatal stroke and a non-fatal MI.

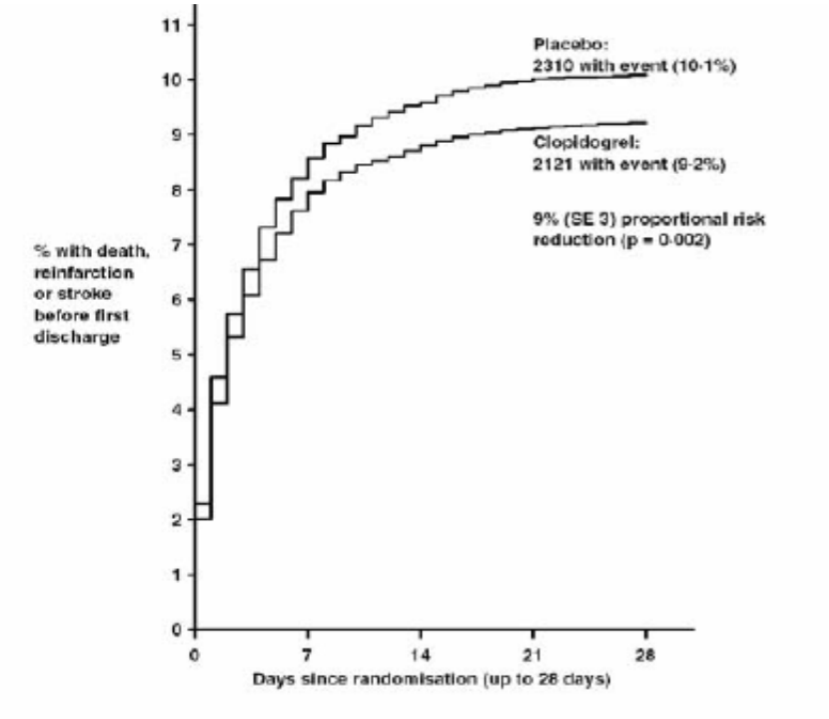
** Non-fatal MI and non-fatal stroke exclude patients who died (of any cause).

Figure 4: Cumulative Event Rates for Death in the COMMIT Study *



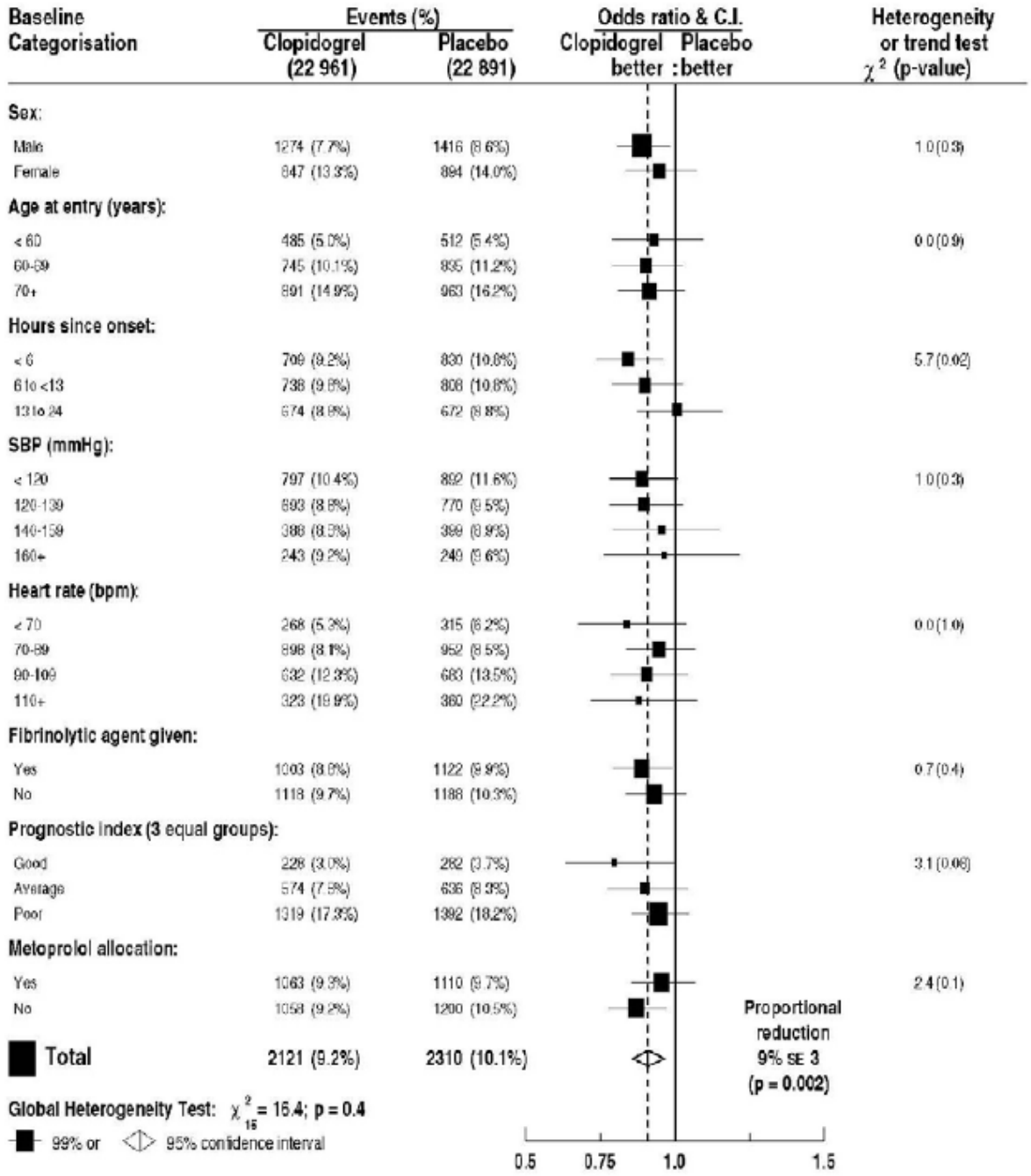
* All treated patients received ASA.

Figure 5: Cumulative Event Rates for the Combined Endpoint Re-Infarction, Stroke or Death in the COMMIT Study *



* All treated patients received ASA.
The benefit associated with clopidogrel bisulfate on the combined endpoint was consistent across age, gender and with or without fibrinolytics as shown in Figure 6, and was observed as early as 24 hours.

Figure 6: Proportional Effects of Adding Clopidogrel Bisulfate to ASA on the Combined Primary Endpoint across Baseline and Concomitant Medication Subgroups for the COMMIT Study



STORAGE TEMPERATURE

Do not store above 30 °C.

SPECIAL HANDLING INSTRUCTIONS

None

CONTENTS, COMPOSITION AND PACKAGING

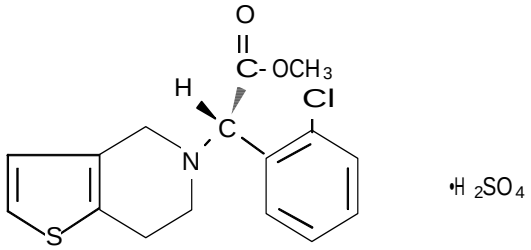
CLOPIDOGREL 75 mg: Each pink, round, biconvex, film-coated tablet contains Clopidogrel bisulphate equivalent to 75 mg Clopidogrel. Available in boxes containing blisters of 10x3.

EXCIPIENTS STATEMENT

In addition to the active ingredient, clopidogrel bisulphate each tablet also contains the non-medicinal ingredients Lactose, Starch Maize, Magnesium Stearate, Mannitol Crystalline, Cremphor, Hydroxy Propyl Methyl Cellulose, Polyvinyl Pyrrolidone PVP, Collodial Silica Anhydrous, Sodium Starch Glycolate, Titanium Dioxide, Ethyl Alcohol, Propylene Glycol, Isopropyl Alcohol, Lake Dye and Purified Water.

PHARMACEUTICAL DRUG INFORMATION

Drug Substance

Proper Name:	Clopidogrel bisulfate (U.S.A.N.)
Chemical Name:	Methyl (*S*)-α-(2-chlorophenyl)-6,7-dihydrothieno[3,2-c]pyridine-5(4*H*)-acetate sulfate (1:1)
Molecular formula:	$C_{16}H_{16}Cl\ NO_2S \bullet H_2SO_4$
Structural Formula:	
Molecular weight:	419.9 g/mol
Physicochemical properties:	Clopidogrel bisulfate is a white to off-white powder.
Solubility:	Clopidogrel bisulfate is practically insoluble in water at neutral pH but freely soluble at pH 1. It also dissolves freely in methanol, sparingly in methylene chloride and is practically insoluble in ethyl ether.
Optical Rotation:	About +56°.
pKa:	pKa = 4.55
Melting Point:	184°C

pH and Effect on UV Absorbance:

At pH2:	UV max. abs. = 271 and 278 nm UV min. abs. = 259 and 275 nm
At pH7:	UV max. abs. = 269 and 276 nm UV min. abs. = 266 and 274 nm
At pH9:	UV max. abs. = 269 and 276 nm UV min. abs. = 266 and 274 nm
Partition co-efficient:	About 3.9 at pH 7.4 in a water/octanol medium

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17. Product Monograph - PLAVIX (clopidogrel bisulfate) 75 mg and 300 mg, Sanofi-Aventis U.S. LLC. Date of Revision: September, 2022.