SITAGLIP-M®

सिटाग्लिप-एम्

(Sitagliptin + Metformin)

DESCRIPTION:

SITAGLIP-M (Sitagliptin + Metformin HCl) contains two oral antihyperglycemic agents with complementary mechanism of action to improve glycemic control with type 2 diabetes. Sitagliptin is an orally-active, potent, and highly selective inhibitor of the dipeptidyl peptidase 4 (DPP-4) enzymes.

QUALITATIVE & QUANTITATIVE COMPOSITION:

SITAGLIP-M (Sitagliptin + Metformin HCl) is available for oral administration as:

SITAGLIP-M 550 Tablets: Each film-coated tablet contains Sitagliptin Phosphate Monohydrate equivalent to Sitagliptin 50mg & Metformin HCl 500mg

SITAGLIP-M 900 Tablets: Each film-coated tablet contains Sitagliptin Phosphate Monohydrate equivalent to Sitagliptin 50mg & Metformin HCl 850mg

SITAGLIP-M 1050 Tablets: Each film-coated tablet contains Sitagliptin Phosphate Monohydrate equivalent to Sitagliptin 50mg & Metformin HCl 1000mg

CLINICAL PHARMACOLOGY:

Mechanism of Action

Sitagliptin:

It is a DPP-4 inhibitor, which is believed to exert its actions in patients with type 2 diabetes by slowing the inactivation of incretin hormones, including glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP). The incretins are part of an endogenous system involved in the physiologic regulation of glucose homeostasis. When blood glucose concentrations are normal or elevated, GLP-1 and GIP increase insulin synthesis and release from pancreatic beta cells by intracellular signaling pathways involving cyclic AMP. GLP-1 also lowers glucagon secretion from pancreatic alpha cells, leading to reduced hepatic glucose production. By increasing and prolonging active incretin levels, Sitagliptin increases insulin release and decreases glucagon levels in the circulation in a glucose dependent manner.

Metformin HCl:

It is a biguanide with antihyperglycemic effects, lowering both basal and postprandial plasma glucose. It does not stimulate insulin secretion and therefore does not produce hypoglycemia.

Metformin HCl may act via three mechanisms;

- By reduction of hepatic glucose production by inhibiting gluconeogenesis and glycogenolysis.
- In muscle, by modestly increasing insulin sensitivity, improving peripheral glucose uptake and utilization
- By delaying intestinal glucose absorption.

Pharmacokinetics:

Absorption:

Sitagliptin: Following oral administration of a 100mg dose, Sitagliptin absorbs rapidly with Peak plasma concentration (median Tmax) occurring 1 to 4 hours post-dose, mean plasma AUC of Sitagliptin is 8.52 µMhr, with Cmax 950nM. The absolute bioavailability of Sitagliptin is approximately 87%. Plasma AUC of Sitagliptin increased in a dose-proportional manner.

Metformin HCl: After an oral dose of Metformin HCl, Tmax is reached in 2.5hrs. The absolute bioavailability of a single dose 500mg dose is reported to be about 50% to 60% given under fasting condition. Single oral doses of Metformin HCl tablets 500mg to 1500mg, that there is a lack of dose proportionality with increasing doses, which is due to decreased absorption rather than an alteration in elimination. Food decreases the extent and slightly delays the absorption of Metformin, as shown by approximately a 40% lower mean peak plasma concentration (Cmax), a 25% lower area under the plasma concentration versus time curve (AUC). The pharmacokinetics of Metformin HCl absorption is non-linear.

Distribution:

Sitagliptin: The mean volume of distribution at steady state following a single 100mg intravenous dose of Sitagliptin is approximately 198 liters. The fraction of Sitagliptin reversibly bound to plasma proteins is low (38%).

Metformin HCl: Metformin is negligibly bound to plasma proteins, in contrast to sulfonylureas, which are more than 90% protein bound. Metformin partitions into erythrocytes, most likely as a function of time. At usual clinical doses and dosing schedules of Metformin HCl tablets, steady-state plasma concentrations of Metformin are reached within 24-48 hours and are generally <1 mcg/mL. Maximum Metformin HCl plasma levels do not exceed 5mcg/mL, even at maximum doses.

Mechanism of Excretion:

Sitagliptin: Sitagliptin is primarily eliminated unchanged in urine (approximately 79%), and metabolism is a minor pathway. Following administration of an oral [14C] Sitagliptin dose, approximately 100% of the administered radioactivity eliminate in feces (13%) or urine (87%) within one week of dosing. The apparent terminal t1/2 following a 100mg oral dose of Sitagliptin is approximately 12.4 hours and renal clearance is approximately 350mL/min.

Metformin HCl: Metformin HCl is excreted unchanged in the urine and does not undergo hepatic metabolism (no metabolites have been identified in humans) or biliary excretion. Renal clearance is approximately 3.5 times greater than creatinine clearance, which indicates that tubular secretion is the major route of Metformin HCl elimination. Following oral administration, approximately 90% of the absorbed drug is eliminated via the renal route within the first 24hours, with a plasma elimination half-life of approximately 6.2hours. In blood, the elimination half life is approximately 17.6 hours, suggesting that the erythrocyte mass may be a compartment of distribution.

Special Populations:

Renal Insufficiency:

Sitagliptin: Patients with mild renal insufficiency did not have a clinically meaningful increase in the plasma concentration of Sitagliptin. The plasma AUC of Sitagliptin increases approximately 2-fold in patients with moderate renal insufficiency and an approximately 4-fold in patients with severe renal insufficiency and in patients with ESRD on hemodialysis.

Metformin HCl: In patients with decreased renal function (based on measured creatinine clearance), the plasma and blood half-life of Metformin HCl is prolonged and the renal clearance is decreased in proportion to the decrease in creatinine clearance.

Hepatic Insufficiency:

Sitagliptin: There is no clinical experience in patients with severe hepatic insufficiency (Child-Pugh score> 9). However, because Sitagliptin is primarily renally eliminated, severe hepatic insufficiency is not expected to affect the pharmacokinetics of Sitagliptin.

Metformin HCl: No pharmacokinetic studies of Metformin HCl have been conducted in patients with hepatic insufficiency.

Elderly:

Sitagliptin: Elderly subjects (65 to 80 years) had approximately 19% higher plasma concentrations of Sitagliptin compared to younger subjects.

Metformin HCl: Incase of elderly patients renal function of Metformin HCl is impaired, resulting in decreased total plasma clearance, prolonged t 1/2, and increased Cmax. So, it is recommended not to initiate Sitagliptin + Metformin HCl in geriatric patient ≥ 80years without monitoring renal function.

Pediatric:

No studies with Sitagliptin + Metformin HCl have been performed in pediatric population.

THERAPEUTIC INDICATIONS:

SITAGLIP-M (Sitagliptin + Metformin HCl) is indicated as:

- Initial therapy in patients with type 2 diabetes mellitus to improve glycemic control when diet and exercise do not provide adequate glycemic control.
- As an adjunct to diet and exercise to improve glycemic control in patients with type 2 diabetes mellitus inadequately controlled on Metformin HCl or Sitagliptin alone or in patients already being treated with the combination of Sitagliptin and Metformin HCl.
- In triple combination with a sulphonylurea as an adjunct to diet and exercise in patients with type 2 diabetes mellitus inadequately controlled on their maximal tolerated dose of Metformin HCl and a sulphonylurea.
- In triple combination with a peroxisome proliferator-activated receptor gamma (PPARγ) agonist (Thiazolidinediones) as an adjunct to diet and exercise in patients inadequately controlled on their maximal tolerated dose of Metformin HCl and a PPARγ agonist.
- In patients with type 2 diabetes mellitus as an adjunct to diet and exercise to improve glycemic control in combination with insulin.

DOSAGE AND ADMINISTRATION:

The dosage of SITAGLIP-M (Sitagliptin + Metformin HCl) should be individualized on the basis of patient's current regimen, effectiveness and tolerability while not exceeding the maximum recommended daily dose of 100mg Sitagliptin.

It should be given twice daily with meals, with gradual dose escalation, to reduce the gastrointestinal (GI) side effects associated with Metformin HCl.

As initial therapy: For patients with type 2 diabetes mellitus, whose hyperglycemia is inadequately controlled with diet and exercise alone, the recommended starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) is 50mg of Sitagliptin + 500mg of Metformin HCl twice daily. Patients may be titrated up to 50mg Sitagliptin + 1000mg of Metformin HCl twice daily.

For patients inadequately controlled on Metformin Monotherapy: The usual starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) should provide Sitagliptin dosed as 50mg twice daily (100mg total daily dose), plus Metformin HCl dose already being taken.

For patients inadequately controlled on Sitagliptin Monotherapy: The usual starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) is 50mg Sitagliptin + 500mg Metformin HCl twice daily. Patients may be titrated up to 50mg Sitagliptin +1000mg Metformin HCl twice daily.

For patient switching from Sitagliptin co-administered with Metformin HCl: For patients switching from co-administration of Sitagliptin and Metformin HCl, SITAGLIP-M (Sitagliptin + Metformin HCl) may be initiated at the dose of Sitagliptin and Metformin HCl already being taken.

For patients inadequately controlled on dual combination therapy with any two of following three antihyperglycemic agents; Sitagliptin, Metformin HCl or PPARγ agonist (Thiazolidinediones): The usual starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) should provide Sitagliptin dosed as 50mg twice daily (100mg total daily dose). In determining the starting dose of Metformin HCl component, the patients level of glycemic control and current dose (if any) of Metformin HCl should be considered.

For patients inadequately controlled on dual combination therapy with any two of following three antihyperglycemic agents; Sitagliptin, Metformin HCl or sulphonylurea: The usual starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) should provide Sitagliptin dosed as 50mg twice daily (100mg total daily dose). In determining the starting

dose of Metformin HCl component, the patients level of glycemic control and current dose (if any) of Metformin HCl should be considered.

For patients inadequately controlled on dual combination therapy with any two of following three antihyperglycemic agents; Sitagliptin, Metformin HCl or insulin: The usual starting dose of SITAGLIP-M (Sitagliptin + Metformin HCl) should provide Sitagliptin dosed as 50mg twice daily (100mg total daily dose). In determining the starting dose of Metformin HCl component, the patients level of glycemic control and current dose (if any) of Metformin HCl should be considered.

ADVERSE REACTIONS:

Sitagliptin with Metformin HCl:

Common: Nausea.

Uncommon: Somnolence, Diarrhea, Upper Abdominal Pain and Blood Glucose decreased.

Sitagliptin with Metformin HCl and Sulphonylurea:

Very common: Hypoglycemia

Common: Constipation

Sitagliptin with Metformin HCl and a PPARγ agonist:

Common: Hypoglycemia, Headache, Diarrhea, Vomiting and Peripheral Edema.

Sitagliptin with Metformin HCl and insulin:

Very common: Hypoglycemia.

Uncommon: Headache and Dry mouth.

CONTRAINDICATIONS:

The combination of Sitagliptin and Metformin HCl is contraindicated in:

- Patients with type 1 diabetes.
- Renal disease or renal dysfunction, e.g., as suggested by serum creatinine levels ≥1.5mg/dL (males) ≥ 1.4mg/dL (females), or abnormal creatinine clearance, which may also result from conditions such as cardiovascular collapse (shock), acute myocardial infarction , and septicemia.
- Patients with known hypersensitivity to Sitagliptin, Metformin HCl or any other component of the product.
- Acute or chronic metabolic acidosis, including ketoacidosis, with or without coma.
- Children below 18 years of age.

Pregnancy:

The safety of Sitagliptin + Metformin HCl in pregnant women is not known. So like other anti-hyperglycemic agents, it is not recommended for use in pregnancy.

Nursing Mother:

It is not known whether Sitagliptin is excreted in human milk. Because many drugs are excreted in human milk, Sitagliptin + Metformin HCl should not be administered during nursing.

PRECAUTIONS:

Monitoring of renal function: Sitagliptin + Metformin HCl are known to be substantially excreted by the kidney. Metformin HCl-related lactic acidosis increases with the degree of insufficiency of renal function, therefore, serum creatinine concentrations should be determined regularly.

Impaired hepatic function: Since impaired hepatic function has been associated with some cases of lactic acidosis, Sitagliptin + Metformin HCl should generally be avoided in patients with clinical or laboratory evidence of hepatic disease.

Hypoglycemia:

Patient receiving Sitagliptin + Metformin HCl in combination with a sulphonylurea or with insulin may be at risk for hypoglycemia. Therefore, a reduction in the dose of the sulphonylurea or insulin may be necessary.

Sitagliptin: Pancreatitis

After initiation of Sitagliptin, patients should be observed carefully for signs and symptoms of pancreatitis. If pancreatitis is suspected, Sitagliptin should promptly be discontinued and appropriate management should be initiated.

Metformin HCl: Lactic acidosis

It is a very rare, but serious, metabolic complication can occur due to Metformin HCl accumulation. The incidence of lactic acidosis can and should be reduced by also assessing other associated risk factors such as poorly controlled diabetes, ketosis, prolonged fasting, excessive alcohol intake, hepatic insufficiency and any condition associated with hypoxia. If metabolic acidosis is suspected, treatment with the medicinal product should be discontinued and the patient hospitalized immediately.

Administration of iodinated contrast agent:

The intravascular administration of iodinated contrast agents in radiological studies can lead to renal failure which has been associated with lactic acidosis in patients receiving Metformin HCl. Therefore, Sitagliptin + Metformin HCl should be discontinued prior to, or at the time of the test and not reinstituted until 48 hours afterwards, and only after renal function has been re-evaluated and found to be normal.

Drug Interactions:

Sitagliptin:

Digoxin: Sitagliptin has a small effect on plasma digoxin concentrations. No dosage adjustment of digoxin is recommended. However, patients at risk of digoxin toxicity should be monitored for this when Sitagliptin and digoxin are administered concomitantly.

Metformin HCl:

Furosemide: Furosemide increased the Metformin HCl plasma and blood Cmax by 22% and blood AUC by 15%, without any significant change in Metformin HCl renal clearance.

Nifedipine: Co-administration of Nifedipine increased plasma Metformin HCl Cmax and AUC by 20% and 9%, respectively, and increased the amount excreted in the urine. Tmax and half-life were unaffected. Nifedipine appears to enhance the absorption of Metformin HCl. Metformin HCl had minimal effects on Nifedipine.

Cationic drugs: Cationic drugs (e.g., amiloride, digoxin, morphine, procainamide, quinidine, quinine ranitidine, triamterene, trimethoprim, or vancomycin) that are eliminated by renal tubular secretion theoretically have the potential for interaction with Metformin HCl by competing for common renal tubular transport systems. Although such interactions remain theoretical (except for cimetidine), careful patient monitoring and dose adjustment of Sitagliptin + Metformin HCl) and/or the interfering drug is recommended in patients who are taking cationic medications that are excreted via the proximal renal tubular secretory system.

Other: Certain medicines tend to produce hyperglycemia and may lead to loss of glycaemic control. These drugs include the thiazides and other diuretics, corticosteroids, phenothiazines, thyroid products, estrogens, oral contraceptives, phenytoin, nicotinic acid, sympathomimetics, calcium channel blocking drugs, and isoniazid. When such drugs are administered to a patient receiving Sitagliptin + Metformin HCl the patient should be closely observed to maintain adequate glycemic control.

OVERDOSAGE:

Sitagliptin: In the event of an overdose, it is reasonable to employ the usual supportive measures, e.g., remove unabsorbed material from the gastrointestinal tract, and employ clinical monitoring (including obtaining an electrocardiogram) and institute supportive therapy as dictated by the patient's clinical status. Sitagliptin is modestly dialyzable. Prolonged hemodialysis may be considered if clinically appropriate. It is not known if Sitagliptin is dialyzable by peritoneal dialysis.

Metformin HCl: In case of Metformin HCl overdose (greater than 50g), hypoglycemia was reported in approximately 10% of cases but no causal association with Metformin HCl has been established. Metformin HCl is dialyzable with a clearance of up to 170mL/min under good hemodynamic conditions. Therefore, hemodialysis may be useful for removal of accumulated drug from patients in whom Metformin HCl overdosage is suspected.

DOSAGE FORMS & STRENGTHS:

SITAGLIP-M tablets are available as:

- 550 mg FCT (Film Coated Tablets)
  Packaging: 10 Tablets X 10 Blisters
- 900 mg FCT (Film Coated Tablets)
  Packaging: 10 Tablets X 10 Blisters
- 1050 mg FCT (Film Coated Tablets)
  Packaging: 10 Tablets X 10 Blister

ID: PI-MS/SGP/MG-01-APR-2020

Manufactured by:
Deurali-Janta Pharmaceuticals Pvt. Ltd.
679, Budhanilkantha Sadak, Bansbari - 03 | G.P.O. Box: 4239, Kathmandu, Nepal
Tel: +977-01- 4018777 | E-mail: info@deuralijanta.com
Website: www.deuralijanta.com