

CIAMPRED 8
Methylprednisolone Tablets BP 8 mg

QUALITATIVE AND QUANTITATIVE COMPOSITION:

Label claim:

Each uncoated tablet contains:
Methylprednisolone BP 8 mg
Excipients q. s.

List of Excipients:

Lactose BP
Maize Starch BP
Microcrystalline Cellulose BP
Croscarmellose Sodium BP
Povidone (PVP K-30) BP
Purified Talc BP
Magnesium Stearate BP
Colloidal Anhydrous Silica BP
Sodium Starch Glycolate BP

INDICATION:

CIAMPRED 8 is indicated for conditions requiring glucocorticoid activity such as-

Endocrine disorders

Primary and secondary adrenal insufficiency

Subacute adrenal hyperplasia

Rheumatic disorders

Rheumatoid arthritis

Juvenile chronic arthritis

Ankylosing spondylitis

Collagen diseases/arteritis

Systemic lupus erythematosus

Systemic dermatomyositis (polymyositis)

Rheumatic fever with severe carditis

Giant cell arteritis/polymyalgia rheumatica

Dermatological diseases

Pemphigus vulgaris

Allergic states

Seasonal and perennial allergic rhinitis

Drug hypersensitivity reactions

Serum sickness

Allergic contact dermatitis

Bronchial asthma

Ophthalmic diseases

Anterior uveitis (iritis, iridocyclitis)

Posterior uveitis

Optic neuritis

Respiratory diseases

Pulmonary sarcoid

Fulminating or disseminated tuberculosis (with appropriate anti-tuberculous chemotherapy)

Aspiration of gastric contents

Haematological disorders

Idiopathic thrombocytopenic purpura

Haemolytic anaemia (autoimmune)

Neoplastic diseases

Leukaemia (acute and lymphatic)

Malignant lymphoma

Gastro-intestinal diseases

Ulcerative colitis

Crohn's disease

Miscellaneous

Tuberculous meningitis (with appropriate anti-tuberculous chemotherapy)

Transplantation

PHARMACEUTICAL FORM:

CIAMPRED 8 is a White colour, round, biconvex uncoated tablet plain on both sides. It is indicated in adults and children 12 years and older for the relief of symptoms associated with seasonal allergic rhinitis.

DOSAGE AND ADMINISTRATION:

The dosage recommendations shown in the table below are suggested initial daily doses and are intended as guides. The average total daily dose recommended may be given either as a single dose or in divided doses (excepting in alternate day therapy when the minimum effective daily dose is doubled and given every other day at 8.00 am). Undesirable effects may be minimised by using the lowest effective dose for the minimum period .

The initial suppressive dose level may vary depending on the condition being treated. This is continued until a satisfactory clinical response is obtained, a period usually of three to seven days in the case of rheumatic diseases (except for acute rheumatic carditis), allergic conditions affecting the skin or respiratory tract and ophthalmic diseases. If a satisfactory response is not obtained in seven days, re-evaluation of the case to confirm the original diagnosis should be made. As soon as a satisfactory clinical response is obtained, the daily dose should be reduced gradually, either to termination of treatment in the case of acute conditions (e.g., seasonal asthma, exfoliative dermatitis, acute allergic conjunctivitis) or to the minimal effective maintenance dose level in the case of chronic conditions (e.g., rheumatoid arthritis, systemic lupus erythematosus, bronchial asthma, atopic dermatitis). In chronic conditions, and in rheumatoid arthritis especially, it is important that the reduction in dosage from initial to maintenance dose levels be accomplished as clinically appropriate. Decrementations of not more than 2 mg at intervals of 7 - 10 days are suggested. In rheumatoid arthritis, maintenance steroid therapy should be at the lowest possible level.

In alternate-day therapy, the minimum daily corticoid requirement is doubled and administered as a single dose every other day at 8.00 am. Dosage requirements depend on the condition being treated and response of the patient.

Elderly patients:

Treatment of elderly patients, particularly if long-term, should be planned bearing in mind the more serious consequences of the common side-effects of corticosteroids in old age, particularly osteoporosis, diabetes, hypertension, susceptibility to infection and thinning of skin.

Paediatric population:

In general, dosage for children should be based upon clinical response and is at the discretion of the physician. Treatment should be limited to the minimum dosage for the shortest period of time. If possible, treatment should be administered as a single dose on alternate days.

Dosage Recommendations:

Indications	Recommended initial daily dosage
Rheumatoid arthritis	
severe	12 - 16 mg
moderately severe	8 - 12 mg
moderate	4 - 8 mg
children	4 - 8 mg
Systemic dermatomyositis	48 mg
Systemic lupus erythematosus	20 - 100 mg
Acute rheumatic fever	48 mg until ESR normal for one week.
Allergic diseases	12 - 40 mg
Bronchial asthma	Up to 64 mg single dose/alternate day up to 100 mg maximum.
Ophthalmic diseases	12 - 40 mg
Haematological disorders and leukaemias	16 - 100 mg
Malignant lymphoma	16 - 100 mg
Ulcerative colitis	16 - 60 mg
Crohn's disease	Up to 48 mg per day in acute episodes.
Organ transplantation	up to 3.6 mg/kg/day
Pulmonary sarcoid	32 - 48 mg on alternate days.
Giant cell arteritis/polymyalgia rheumatica	64 mg
Pemphigus vulgaris	80 - 360 mg

CONTRAINDICATION:

Methylprednisolone tablets are contraindicated:

∓ In patients who have systemic fungal infections

∓ In patients who have systemic infections unless specific anti-infective therapy is employed

∓ In patients who have hypersensitivity to the active substance or to any of the excipients.

Administration of live or live, attenuated vaccines is contraindicated in patients receiving immunosuppressive doses of corticosteroids.

SPECIAL WARNING AND PRECAUTION FOR USE:

Immunosuppressant Effects/Increased Susceptibility to Infections

Corticosteroids may increase susceptibility to infection, may mask some signs of infection, and new infections may appear during their use. Suppression of the inflammatory response and immune function increases the susceptibility to fungal, viral and bacterial infections and their severity. The clinical presentation may often be atypical and may reach an advanced stage before being recognised.

Persons who are on drugs which suppress the immune system are more susceptible to infections than healthy individuals. Chicken pox and measles, for example, can have a more serious or even fatal course in non-immune children or adults on corticosteroids.

Chickenpox is of serious concern since this normally minor illness may be fatal in immunosuppressed patients. Patients (or parents of children) without a definite history of chickenpox should be advised to avoid close personal contact with chickenpox or herpes zoster and if exposed they should seek urgent medical attention. Passive immunization with varicella/zoster immunoglobulin (VZIG) is needed by exposed non-immune patients who are receiving systemic corticosteroids or who have used them within the previous 3 months; this should be given within 10 days of exposure to chickenpox. If a diagnosis of chickenpox is confirmed, the illness warrants specialist care and urgent treatment. Corticosteroids should not be stopped and the dose may need to be increased.

Exposure to measles should be avoided. Medical advice must be sought immediately if exposure occurs. Prophylaxis with normal immunoglobulin may be needed.

Similarly corticosteroids should be used with great care in patients with known or suspected parasitic infections such as Strongyloides (threadworm) infestation, which may lead to Strongyloides hyperinfection and dissemination with widespread larval migration, often accompanied by severe enterocolitis and potentially fatal gram-negative septicemia.

Administration of live or live, attenuated vaccines is contraindicated in patients receiving immunosuppressive doses of corticosteroids. The antibody response to other vaccines may be diminished.

The use of corticosteroids in active tuberculosis should be restricted to those cases of fulminating or disseminated tuberculosis in which the corticosteroid is used for the management of the disease in conjunction with an appropriate antituberculous regimen. If corticosteroids are indicated in patients with latent tuberculosis or tuberculin reactivity, close observation is necessary as reactivation of the disease may occur. During prolonged corticosteroid therapy, these patients should receive chemoprophylaxis.

Kaposi's sarcoma has been reported to occur in patients receiving corticosteroid therapy. Discontinuation of corticosteroids may result in clinical remission.

The role of corticosteroids in septic shock has been controversial, with early studies reporting both beneficial and detrimental effects. More recently, supplemental corticosteroids have been suggested to be beneficial in patients with established septic shock who exhibit adrenal insufficiency. However, their routine use in septic shock is not recommended. A systematic review of short-course high-dose corticosteroids did not support their use. However, meta-analyses, and a review have suggested that longer courses (5-11 days) of low-dose corticosteroids might reduce mortality.

Immune System

Because rare instances of skin reactions and anaphylactic/anaphylactoid reactions have occurred in patients receiving corticosteroid therapy, appropriate precautionary measures should be taken prior to administration, especially when the patient has a history of allergy to any drug.

Endocrine Effects

In patients on corticosteroid therapy subjected to unusual stress, increased dosage of rapidly acting corticosteroids before, during, and after the stressful situation is indicated.

Adrenal cortical atrophy develops during prolonged therapy and may persist for months after stopping treatment. In patients who have received more than physiological doses of systemic corticosteroids (approximately 6 mg methylprednisolone) for greater than 3 weeks, withdrawal should not be abrupt. How dose reduction should be carried out depends largely on whether the disease is likely to relapse as the dose of systemic corticosteroids is reduced. Clinical assessment of disease activity may be needed during withdrawal. If the disease is unlikely to relapse on withdrawal of systemic corticosteroids, but there is uncertainty about HPA suppression, the dose of systemic corticosteroid may be reduced rapidly to physiological doses. Once a daily dose of 6 mg methylprednisolone is reached, dose reduction should be slower to allow the HPA-axis to recover.

Abrupt withdrawal of systemic corticosteroid treatment, which has continued up to 3 weeks, is appropriate if it considered that the disease is unlikely to relapse. Abrupt withdrawal of doses up to 32 mg daily of methylprednisolone for 3 weeks is unlikely to lead to clinically relevant HPA-axis suppression, in the majority of patients. In the following patient groups, gradual withdrawal of systemic corticosteroid therapy should be considered even after courses lasting 3 weeks or less:

∓ Patients who have had repeated courses of systemic corticosteroids, particularly if taken for greater than 3 weeks.

∓ When a short course has been prescribed within one year of cessation of long-term therapy (months or years).
∓ Patients who may have reasons for adrenocortical insufficiency other than exogenous corticosteroid therapy. In addition, acute adrenal insufficiency leading to a fatal outcome may occur if glucocorticoids are withdrawn

abruptly.

∓ Patients receiving doses of systemic corticosteroid greater than 32 mg daily of methylprednisolone.

∓ Patients repeatedly taking doses in the evening.

In drug-induced adrenocortical insufficiency mineralocorticoid secretion may be impaired, therefore salt and/or a mineralocorticoid should be administered concurrently.

A steroid "withdrawal syndrome," seemingly unrelated to adrenocortical insufficiency, may also occur following abrupt discontinuance of glucocorticoids. This syndrome includes symptoms such as: anorexia, nausea, vomiting, lethargy, headache, fever, joint pain, desquamation, myalgia, weight loss, and/or hypotension. These effects are thought to be due to the sudden change in glucocorticoid concentration rather than to low corticosteroid levels.

Glucocorticoids can produce or aggravate Cushing's syndrome, therefore glucocorticoids should be avoided in patients with Cushing's disease.

Particular care is required when considering the use of systemic corticosteroids in patients with hypothyroidism and frequent patient monitoring is necessary.

Metabolism and Nutrition Disorders

Corticosteroids, including methylprednisolone, can increase blood glucose, worsen pre-existing diabetes, and predispose those on long-term corticosteroid therapy to diabetes mellitus.

Particular care is required when considering the use of systemic corticosteroids in patients with Diabetes mellitus (or a family history of diabetes) and frequent patient monitoring is necessary.

Psychiatric Effects

Patients and/or carers should be warned that potentially severe psychiatric adverse reactions may occur with systemic steroids. Symptoms typically emerge within a few days or weeks of starting treatment. Risks may be higher with high doses/systemic exposure, although dose levels do not allow prediction of the onset, type, severity or duration of reactions. Most reactions recover after either dose reduction or withdrawal, although specific treatment may be necessary.

Patients/carers should be encouraged to seek medical advice if worrying psychological symptoms develop, especially if depressed mood or suicidal ideation is suspected. Patients/carers should be alert to possible psychiatric disturbances that may occur either during or immediately after dose tapering/withdrawal of systemic steroids, although such reactions have been reported infrequently.

Particular care is required when considering the use of systemic corticosteroids in patients with existing or previous history of severe affective disorders in themselves or in their first degree relatives. These would include depressive or manic-depressive illness and previous steroid psychosis.

Nervous System Effects

Particular care is required when considering the use of systemic corticosteroids in patients with seizure disorders and myasthenia gravis and frequent patient monitoring is necessary.

There have been reports of epidural lipomatosis in patients taking corticosteroids, typically with long-term use at high doses.

Ocular Effects

Particular care is required when considering the use of systemic corticosteroids in patients with glaucoma (or a family history of glaucoma) and ocular herpes simplex as there is a fear of corneal perforation, and frequent patient monitoring is necessary.

Prolonged use of corticosteroids may produce posterior subcapsular cataracts and nuclear cataracts (particularly in children), exophthalmos or increased intraocular pressure, which may result in glaucoma with possible damage to the optic nerves.

Secondary fungal and viral infections of the eye may also be enhanced in patients receiving glucocorticoids. Corticosteroid therapy has been associated with chorioretinopathy, which may lead to retinal detachment.

Cardiac Events

Adverse effects of glucocorticoids on the cardiovascular system, such as dyslipidemia and hypertension, may predispose treated patients with existing cardiovascular risk factors to additional cardiovascular effects, if high doses and prolonged courses are used. Accordingly, corticosteroids should be employed judiciously in such patients and attention should be paid to risk modification and additional cardiac monitoring if needed. Low dose and alternate day therapy may reduce the incidence of complications in corticosteroid therapy.

Systemic corticosteroids should be used with caution, and only if strictly necessary, in cases of congestive heart failure.

Particular care is required when considering the use of systemic corticosteroids in patients with recent myocardial infarction (myocardial rupture has been reported) and frequent patient monitoring is necessary.

Care should be taken for patients receiving cardioactive drugs such as digoxin because of steroid induced electrolyte disturbance/potassium loss.

Vascular Effects

Particular care is required when considering the use of systemic corticosteroids in patients with the following conditions and frequent patient monitoring is necessary.

Hypertension

Predisposition to thrombophlebitis

Thrombosis including venous thromboembolism has been reported to occur with corticosteroids. As a result corticosteroids should be used with caution in patients who have or may be predisposed to thromboembolic disorders.

Gastrointestinal Effects

Particular care is required when considering the use of systemic corticosteroids in patients with the following conditions and frequent patient monitoring is necessary.

∓ Peptic ulceration,

∓ Fresh intestinal anastomoses,

∓ Abscess or other pyrogenic infections.

∓ Ulcerative colitis.

∓ Diverticulitis.

In combination with NSAIDs, the risk of developing gastrointestinal ulcers is increased.

Hepatobiliary Effects

High doses of corticosteroids may produce acute pancreatitis.

Particular care is required when considering the use of systemic corticosteroids in patients with liver failure or cirrhosis and frequent patient monitoring is necessary.

Rarely hepatobiliary disorders were reported, in the majority of these cases, they were reversible after withdrawal of therapy. Therefore appropriate monitoring is required.

Musculoskeletal Effects

An acute myopathy has been reported with the use of high doses of corticosteroids, most often occurring in patients with disorders of neuromuscular transmission (e.g. myasthenia gravis), or in patients receiving concomitant therapy with anticholinergics such as neuromuscular blocking drugs (e.g. pancuronium). This acute myopathy is generalized, may involve ocular and respiratory muscles, and may result in quadriplegia. Elevations of creatine kinase may occur. Clinical improvement or recovery after stopping corticosteroids may require weeks to years.

Particular care is required when considering the use of systemic corticosteroids in patients with osteoporosis (post-menopausal females are particularly at risk) and frequent patient monitoring is necessary.

Renal and Urinary

Particular care is required when considering the use of systemic corticosteroids in patients with renal insufficiency and frequent patient monitoring is necessary.

Injury, poisoning and procedural complications

Systemic corticosteroids are not indicated for, and therefore should not be used to treat, traumatic brain injury, a multicenter study revealed an increased mortality at 2 weeks and 6 months after injury in patients administered methylprednisolone sodium succinate compared to placebo. A causal association with methylprednisolone sodium succinate treatment has not been established.

Other

Undesirable effects may be minimised by using the lowest effective dose for the minimum period, and by administering the daily requirement as a single morning dose or whenever possible as a single morning dose on alternative days. Frequent patient review is required to appropriately titrate the dose against disease activity

Patients should carry 'Steroid Treatment' cards which give clear guidance on the precautions to be taken to minimise risk and which provide details of prescriber, drug, dosage and the duration of treatment. Aspirin and non-steroidal anti-inflammatory agents should be used cautiously in conjunction with corticosteroids. Pheochromocytoma crisis, which can be fatal, has been reported after administration of systemic corticosteroids. Corticosteroids should only be administered to patients with suspected or identified pheochromocytoma after an appropriate risk/benefit evaluation.

Paediatric population:

Corticosteroids cause growth retardation in infancy, childhood and adolescence. Growth and development of infants and children on prolonged corticosteroid therapy should be carefully observed. Treatment should be limited to the minimum dosage for the shortest possible time. In order to minimise suppression of the hypothalamo-pituitary-adrenal axis and growth retardation, treatment should be administered where possible as a single dose on alternate days.

Infants and children on prolonged corticosteroid therapy are at special risk from raised intracranial pressure.

High doses of corticosteroids may produce pancreatitis in children.

Use in the elderly:

The common adverse effects of systemic corticosteroids may be associated with more serious consequences in old age, especially osteoporosis, hypertension, hypokalaemia, diabetes, susceptibility to infection and thinning of the skin. Close clinical supervision is required to avoid life-threatening reactions.

ADVERSE REACTION:

MedDRA System Organ Class	Frequency†	Undesirable Effects
Infections and infestations	Common	Infection (including increased susceptibility and severity of infections with suppression of clinical symptoms and signs)
	Not Known	Opportunistic infection; recurrence of dormant tuberculosis
Neoplasms benign, malignant and unspecified (including cysts and polyps)	Not Known	Kaposi's sarcoma
Blood and lymphatic system disorders	Not Known	Leukocytosis
Immune system disorders	Not Known	Drug hypersensitivity (including Anaphylactic reaction and Anaphylactoid reaction); Suppression of reactions to skin tests
Endocrine disorders	Common	Cushingoid
	Not Known	Hypopituitarism; Steroid Withdrawal syndrome
Metabolism and nutrition disorders	Common	Sodium retention; Fluid retention
	Not Known	Alkalosis, hypokalaemic, Metabolic acidosis; Glucose tolerance impaired; increased risk for insulin and hypoglycaemic agents in diabetics; Increased appetite (which may result in Weight increased); Epitdural lipomatosis
Psychiatric disorders	Common	Affective disorder (including Depressed mood and Euphoric mood)
	Not Known	Psychotic disorder (including Mania, Delusion, Hallucination, and Schizophrenia (aggravation of)); Psychotic behaviour; Affective disorder (including Affect lability, Psychological dependence, Suicidal ideation); Mental disorder; Personality change; Mood swings; Confusional state; Abnormal behaviour; Anxiety; Insomnia; Irritability
Nervous system disorders	Not Known	Convulsions; Intracranial pressure increased (with Papilloedema [Benign intracranial hypertension]); Amnesia; Cognitive disorder; Dizziness; Headache
Eye disorders	Common	Cataract subcapsular
	Not Known	Glaucoma; Exophthalmos; Corneal thinning; Scleral thinning; Chorioretinopathy
Ear and labyrinth disorders	Not Known	Vertigo
Cardiac disorders	Not Known	Cardiac failure congestive (in susceptible patients); Myocardial rupture following myocardial infarction
Vascular disorders	Common	Hypertension
	Not Known	Hypotension; Embolism arterial; Thrombotic events
Respiratory, thoracic and mediastinal disorders	Not Known	Pulmonary embolism; Hiccups
Gastrointestinal disorders	Common	Peptic ulcer (with possible Peptic ulcer perforation and Peptic ulcer haemorrhage)
	Not Known	Intestinal perforation; Gastric haemorrhage; Pancreatitis; Oesophagitis ulcerative; Abdominal distension; Oesophagitis; Abdominal pain; Diarrhoea; Dyspepsia; Nausea
Hepatobiliary disorders	Not Known	Increase of liver enzymes (e.g. alanine aminotransferase increased, aspartate aminotransferase increased)
Skin and subcutaneous tissue disorders	Common	Skin atrophy; Acne
	Not Known	Erythema; Angioedema; Pruritus; Urticaria; Eczymosis; Petechiae; Rash; Hirsutism; Hyperhidrosis; Skin striae; Telangiectasia
Musculoskeletal and connective tissue disorders	Common	Muscular weakness; Growth retardation
	Not Known	Pathologic fracture; Osteonecrosis; Muscle atrophy; Neuropathic arthropathy; Myopathy; Osteoporosis; Arthralgia; Myalgia
Reproductive system and breast disorders	Not Known	Menstruation irregular
General disorders and administration site conditions	Common	Impaired healing
	Not Known	Fatigue; Malaise; Withdrawal symptoms - too rapid a reduction of corticosteroid dosage following prolonged treatment can lead to acute adrenal insufficiency, hypotension and death (see section 4.4)
Investigations	Common	Blood potassium decreased
	Not Known	Intraocular pressure increased; Carbohydrate tolerance decreased; Blood alkaline phosphatase increased; Urine calcium increased
Injury, poisoning and procedural complications	Not Known	Tendon rupture (particularly of the Achilles tendon); Spinal compression fracture

† Common (≥1/100 to <1/10); Uncommon (≥1/1,000 to <1/100); Rare (≥1/10,000 to <1/1,000); Not known (frequency cannot be estimated from the available data)

The incidence of predictable undesirable side-effects associated with the use of corticosteroids, including hypothalamic-pituitary-adrenal suppression correlates with the relative potency of the drug, dosage, timing of administration and duration of treatment

INTERACTION WITH OTHER MEDICINE AND CONCOMITANT USE

Methylprednisolone is a cytochrome P450 enzyme (CYP) substrate and is mainly metabolized by the CYP3A4 enzyme. CYP3A4 is the dominant enzyme of the most abundant CYP subfamily in the liver of adult humans. It catalyzes 6β-hydroxylation of steroids, the essential Phase I metabolic step for both endogenous and synthetic corticosteroids. Many other compounds are also substrates of CYP3A4, some of which (as well as other drugs) have been shown to alter glucocorticoid metabolism by induction (upregulation) or inhibition of the CYP3A4 enzyme.

Drug Class or Type - DRUG or SUBSTANCE	Interaction	Effect
Antitubercular - RIFAMPIN - RIFABUTIN	CYP3A4 inducer	CYP3A4 INDUCERS - Drugs that induce CYP3A4 activity generally increase hepatic clearance, resulting in decreased plasma concentration of medications that are substrates for CYP3A4. Co-administration may require an increase in methylprednisolone dosage to achieve the desired result.
Anticonvulsants - PHENOBARBITAL - PHENYTOIN - PRIMIDONE		
Anticonvulsant - CARBAMAZEPINE	CYP3A4 Inducer (and Substrate)	CYP3A4 INDUCERS – see box above CYP3A4 SUBSTRATES - In the presence of another CYP3A4 substrate, the hepatic clearance of methylprednisolone may be affected, with corresponding dosage adjustments required. It is possible that adverse events associated with the use of either drug alone may be more likely to occur with co-administration.
Macrolide Antibacterial - TROLEANDOMYCIN	CYP3A4 Inhibitor	CYP3A4 INHIBITORS - Drugs that inhibit CYP3A4 activity generally decrease hepatic clearance and increase the plasma concentration of CYP3A4 substrate medications, such as methylprednisolone. In the presence of a CYP3A4 inhibitor, the dose of methylprednisolone may need to be titrated to avoid steroid toxicity.
GRAPEFRUIT JUICE		
Calcium Antagonist - NIFEDIPINE		
Festamine H2 receptor antagonist - CIMETIDINE		
Antibacterial - ISONIAZID		In addition, there is a potential effect of methylprednisolone to increase the acetylation rate and clearance of Isoniazid.

Drug Class or Type - DRUG or SUBSTANCE	Interaction	Effect
Antitubercular - ISONIAZID - FOSAPREPIANT	CYP3A4 Inhibitor (and Substrate)	CYP3A4 INHIBITORS – see box above CYP3A4 SUBSTRATES - In the presence of another CYP3A4 substrate, the hepatic clearance of methylprednisolone may be affected, with corresponding dosage adjustments required. It is possible that adverse events associated with the use of either drug alone may be more likely to occur with co-administration. (1) Mutual inhibition of metabolism occurs with concurrent use of ciclesonin and methylprednisolone, which may increase the plasma concentrations of either or both drugs. Therefore, it is possible that adverse events associated with the use of either drug alone may be more likely to occur upon co-administration. (2) Protease inhibitors, such as indinavir and ritonavir, may increase plasma concentrations of corticosteroids. (3) Corticosteroids may induce the metabolism of HIV-protease inhibitors resulting in reduced plasma concentrations.
Antifungal - ITRACONAZOLE - VORICONAZOLE		
Calcium Channel Blocker - DILTIAZEM		
Contraceptives (oral) - ETHINYL OESTRADIOL/ NORETHINDRONE		
Immunosuppressant - CYCLOSPORIN (1)		
Macrolide Antibacterial - CLARITHROMYCIN - ERYTHROMYCIN		
Antiviral - HIV-PROTEASE INHIBITORS (2) (3)		
Immunosuppressant - CYCLOPHOSPHAMIDE - TACROLIMUS	CYP3A4 Substrate	CYP3A4 SUBSTRATES - In the presence of another CYP3A4 substrate, the hepatic clearance of methylprednisolone may be affected, with corresponding dosage adjustments required. It is possible that adverse events associated with the use of either drug alone may be more likely to occur with co-administration.
NSAIDs (nonsteroidal anti-inflammatory drugs) (4) - High-dose ASPIRIN (5) (asetylsalicylic acid)	Non-CYP3A4-mediated effects	(4) There may be increased incidence of gastrointestinal bleeding and ulceration when corticosteroids are given with NSAIDs. (5) Methylprednisolone may increase the clearance of high-dose aspirin, which can lead to decreased salicylate serum levels. Discontinuation of methylprednisolone treatment can lead to raised salicylate serum levels, which could lead to an increased risk of salicylate toxicity.
Anticholinergics (7) - NEURIMUSCLAR		(6) An acute myopathy has been reported with the concurrent use of high doses of corticosteroids and anticholinergics, such as neuromuscular blocking drugs. (See section 4.4 Musculoskeletal, for additional information.) (7) Antagonism of the neuromuscular blocking effects of pancuronium and vecuronium has been reported in patients taking corticosteroids. This interaction may be expected with all competitive neuromuscular blockers.
Anticholinesterases		Steroids may reduce the effects of anticholinesterases in myasthenia gravis.
Anti-diabetics		Because corticosteroids may increase blood glucose concentrations, dosage adjustments of anti-diabetic agents may be required.
Anticoagulants (oral)		The efficacy of coumarin anticoagulants may be enhanced by concurrent corticosteroid therapy and close monitoring of the INR or prothrombin time is required to avoid spontaneous bleeding.
Potassium-depleting agents		When corticosteroids are administered concomitantly with potassium-depleting agents (i.e. diuretics), patients should be observed closely for development of hypokalaemia. There is also an increased risk of hypokalaemia with concurrent use of corticosteroids with amphotericin B, zanamivir, or beta2 agonists.
Aromatase inhibitors - AMINOGLUTETHIMIDE		Aminoglutethimide-induced adrenal suppression may exacerbate endocrine changes caused by prolonged glucocorticoid treatment.

PREGNANCY AND LACTATION:

Fertility

There is no evidence that corticosteroids impair fertility

Pregnancy

The ability of corticosteroids to cross the placenta varies between individual drugs; however, methylprednisolone does cross the placenta.

Administration of corticosteroids to pregnant animals can cause abnormalities of fetal development including cleft palate, intra-uterine growth retardation and effects on brain growth and development. There is no evidence that corticosteroids result in an increased incidence of congenital abnormalities, such as cleft palate in man, however, when administered for long periods or repeatedly during pregnancy, corticosteroids may increase the risk of intra-uterine growth retardation. Infants born to mothers, who have received substantial doses of corticosteroids during pregnancy must be carefully observed and evaluated for signs of adrenal insufficiency. Hypoadrenalism may, in theory, occur in the neonate following prenatal exposure to corticosteroids but usually resolves spontaneously following birth and is rarely clinically important. As with all drugs, corticosteroids should only be prescribed when the benefits to the mother, embryo, foetus or child outweigh the risk. When corticosteroids are essential, however, patients with normal pregnancies may be treated as though they were in the non-gravid state.

Cataracts have been observed in infants born to mothers undergoing long-term treatment with corticosteroids during pregnancy.

Breast-feeding

Corticosteroids are excreted in small amounts in breast milk; however, doses of up to 40 mg daily of methylprednisolone are unlikely to cause systemic effects in the infant. Infants of mothers taking higher doses than this may have a degree of adrenal suppression. Since adequate reproductive studies have not been performed in humans with glucocorticoids, these drugs should be administered to nursing mothers only if the benefits of therapy are judged to outweigh the potential risks to the infant.

EFFECTS ON ABILITY TO DRIVE AND USE MACHINES:

The effect of corticosteroids on the ability to drive or use machinery has not been systematically evaluated. Undesirable effects, such as dizziness, vertigo, visual disturbances and fatigue are possible after treatment with corticosteroids. If affected, patients should not drive or operate machinery.

OVERDOSE:

Administration of methylprednisolone should not be discontinued abruptly but tailed off over a period of time. Appropriate action should be taken to alleviate the symptoms produced by any side-effect that may become apparent. It may be necessary to support the patient with corticosteroids during any further period of trauma occurring within two years of overdose. There is no clinical syndrome of acute overdose with methylprednisolone. Reports of acute toxicity and/or death following overdose of glucocorticoids are rare. In the event of overdose, no specific antidote is available; treatment is supportive and symptomatic. Methylprednisolone is haemodialysable.

PHARMACOLOGICAL PROPERTIES

PHARMACOKINETICS:

Methylprednisolone pharmacokinetics is linear, independent of route of administration.

Absorption

Methylprednisolone is rapidly absorbed and the maximum plasma methylprednisolone concentration is achieved around 1.5 to 2.3 hours across doses following oral administration in normal healthy adults. The absolute bioavailability of methylprednisolone in normal healthy subjects is generally high (82% to 89%) following oral administration.

Distribution

Methylprednisolone is widely distributed into the tissues, crosses the blood-brain barrier, and is secreted in breast milk. Its apparent volume of distribution is approximately 1.4 L/kg.

The plasma protein binding of methylprednisolone in humans is approximately 77%.

Metabolism

Corticosteroids are metabolised mainly in the liver but also in the kidney and are excreted in the urine.

In humans, methylprednisolone is metabolized in the liver to inactive metabolites; the major ones are 20α-hydroxymethylprednisolone and 20β-hydroxymethylprednisolone.

Metabolism in the liver occurs primarily via the CYP3A4 enzyme.

Methylprednisolone, like many CYP3A4 substrates, may also be a substrate for the ATP-binding cassette (ABC) transport protein p-glycoprotein, influencing tissue distribution and interactions with other medicines.

Elimination

The mean elimination half-life for total methylprednisolone is in the range of 1.8 to 5.2 hours. Total clearance is approximately 5 to 6 mL/min/kg.

No dosing adjustments are necessary in renal failure.

Methylprednisolone is haemodialysable.

PHARMACODYNAMICS:

Pharmacotherapeutic group: Glucocorticosteroids.

ATC Code: H02AB04

Methylprednisolone is a synthetic glucocorticoid and a methyl derivative of prednisolone. Methylprednisolone is a potent anti-inflammatory agent with the capacity to profoundly inhibit the immune system.

Glucocorticoids act primarily by binding to and activating intracellular glucocorticoid receptors. Activated glucocorticoid receptors bind to promoter regions of DNA (which may activate or suppress transcription) and activate transcription factors resulting in inactivation of genes through de-acetylation of histones.

Following corticosteroid administration there is a delay of several hours for the clinical effects resulting from changes in gene expression to be seen.

Other effects not related to gene expression may be more immediate.

Corticosteroids influence the kidney and fluid and electrolyte balance, lipid, protein, and carbohydrate metabolism, skeletal muscle, the cardiovascular system, the immune system, the nervous system, and the endocrine system. Corticosteroids are also critical in the maintenance of function during stress.

PACKAGING:

10 tablets are packed in Alu- PVC Blister and such 3 blisters packed in a printed carton along with pack insert.

STORAGE CONDITION:

Store in a dry place below 30°C.

Keep out of reach of children.

SHELF LIFE:

36 months

MANUFACTURED BY:

CIAN HEALTH CARE PVT. LTD.

Khasra No.: 248, Sisona, Bhagwanpur,

Roorkee, Dist. Haridwar, Uttarakhand, India.