

DBL[®] MORPHINE SULFATE INJECTION BP

Name of Medicine

DBL[®] Morphine Sulfate Injection BP 5 mg/1 mL, 10 mg/1 mL, 15 mg/1 mL, 30 mg/1 mL.

Presentation

DBL[®] Morphine Sulfate Injection BP is a clear colourless to slightly yellow, sterile solution. The solution does not contain any antioxidant or preservative.

DBL[®] Morphine Sulfate Injection BP is available as ampoules containing 5 mg/1 mL and 30 mg/1 mL. These are sterile solutions of morphine sulfate in water for injections. The pH of the solution ranges between 2.5 and 6.5.

Isotonic preparations of DBL[®] Morphine Sulfate Injection BP 10 mg/1 mL and 15 mg/1 mL are also available. These are sterile solutions of morphine sulfate and sodium chloride in water for injections. The pH of these solutions ranges from 3.2 to 3.8.

Uses

Actions

Morphine is the principal alkaloid of opium. Morphine acts as an agonist, binding to receptors in the brain, spinal cord and other tissues. These sites have been classified as *mu* receptors and are widely distributed throughout the central nervous system being present in highest concentration in the limbic system.

Morphine exerts its primary effects in the central nervous system and organs containing smooth muscle.

Morphine produces many effects, including analgesia, decreased gastrointestinal motility, respiratory depression, drowsiness, changes in mood and alterations of the endocrine and autonomic nervous systems.

Nausea and vomiting may occur through direct stimulation of the chemoreceptor trigger zone (CTZ).

Urinary retention may occur due to increased bladder sphincter tone.

Pharmacokinetics

Absorption of morphine sulfate after intramuscular and subcutaneous injection is fairly rapid with peak analgesia occurring 30 to 60 minutes and 50 to 90 minutes after injection via the respective routes. Peak analgesia occurs within 20 minutes after intravenous administration. Morphine is distributed throughout the body, but particularly to parenchymatous tissue such as kidney, lung, liver and spleen. Lower concentrations are found in skeletal muscle and brain tissue. Morphine diffuses across the placenta and trace amounts are found in sweat and breast milk. About 35% is protein bound, mainly to albumin. Morphine is metabolised principally in the liver by conjugation with glucuronic acid. The principal metabolites are morphine-3-glucuronide and morphine-6-glucuronide. Morphine-6-glucuronide is pharmacologically active and has a half-life somewhat longer than morphine. Elimination half-life from serum is approximately 1.5 to 2 hours in healthy subjects and 90% of the dose is recovered in urine within 24 hours. Approximately 7 to 10% of the dose is recovered in faeces, the majority after conjugation and excretion via bile.

Chinese subjects given intravenous morphine have a higher rate of clearance when compared to white subjects (1852 ± 116 mL/min versus 1495 ± 80 mL/min) because of an increase in the partial metabolic clearance by glucuronidation.

Children – see **Warnings and Precautions – Paediatrics** and **Dosage and Administration**.

Elderly – In older patients, the volume of distribution is considerably smaller and initial concentrations of morphine are correspondingly higher. See also **Warnings and Precautions – Other Special Risk Patients** and **Elderly Patients**.

Disease states – see **Warnings and Precautions – Renal or Hepatic Disease**.

Indications

Morphine sulfate is indicated for the relief of moderate to severe pain not responsive to non-opioid analgesics. It may also be used as a pre-operative medication and as an analgesic adjunct in general anaesthesia.

Dosage and Administration

Note: Opioid antagonists and facilities for administration of oxygen and control of respiration should be available during, and immediately following parenteral administration.

Subcutaneous, Intramuscular and Slow Intravenous Administration

Adults: Morphine sulfate is usually administered by intramuscular or subcutaneous injection, in the range of 5 to 20 mg, depending on the cause of pain and the patient response. Doses may be repeated every 4 to 6 hours.

Morphine sulfate may also be given intravenously when a rapid onset of action is desired. The dose is usually in the range of 2.5 to 15 mg diluted in 4 to 5 mL of Water for Injections given slowly over 4 to 5 minutes.

Children: Morphine sulfate is given by intramuscular or subcutaneous injection in doses of 0.1 to 0.2 mg/kg bodyweight to a maximum of 15 mg. Injection may be repeated every 4 to 6 hours.

When a rapid onset of action is desirable, in a closely monitored environment, morphine may be titrated intravenously with caution, in a dose of 0.05 to 0.1 mg/kg, incrementally over 5 to 15 minutes. Repeat intravenous dosing is unsubstantiated as a method of analgesia in children.

Morphine sulfate is not usually given pre-operatively in children under 1 year, and it should be given with extreme care to neonates. It should not be given to premature infants (see **Contraindications**).

Continuous Intravenous Infusion

The dosage of morphine should be titrated according to the patient's analgesic requirements and previous opiate experience. For the management of acute pain via intravenous infusion, most adults with no previous history of opioid intake can be continued on 0.5 to 2.0 mg/hour after adequate analgesia has been established.

In children, an infusion dose of 0.01 to 0.05 mg/kg/hour morphine to a maximum intravenous dose of 4 mg/hour is recommended.

It is recommended that an opioid antagonist and equipment for artificial ventilation be available.

Patient-Controlled Analgesia (PCA)

Patient-controlled analgesia allows patients to assess their own level of pain and consequently titrate the amount of morphine they require for adequate pain control against sedation and other side effects.

The dosages and time intervals are preset into a microprocessor-controlled infusion pump. When the patient experiences pain, a button is depressed by the patient and a dose of morphine is administered intravenously. If the patient should depress the button before the preset time interval (lockout interval) has elapsed, no extra drug is administered. For adults, demand doses of 0.5 to a maximum of 1.5 mg morphine have been given via PCA using a lockout interval of 6 to 10 minutes. Along with the self-administered dose of morphine, some syringe pumps also deliver a background continuous infusion of morphine at a basal rate. If a background infusion is adopted, a dose of 1 mg/hour morphine is often

used in adults. Some PCA pumps allow a maximum dosage over a defined period to be preset in order to avoid patient overdosage.

There is limited clinical experience of the use of patient-controlled analgesia in children. However, a demand dose of 0.01 to 0.025 mg/kg morphine has been used successfully in children and adolescents between the ages of 7 to 19 years with a lockout interval of 6 to 10 minutes. If a background infusion is employed, an infusion dose of 0.015 mg/kg/hour morphine may be used in children.

The demand dosage and lockout interval should be determined according to the patient's analgesic requirements. Patients receiving a background infusion of morphine should generally receive a smaller demand dose relative to equivalent patients utilising a demand dose only.

Techniques such as PCA with background continuous infusion are associated with a higher rate of adverse effects and require close monitoring.

General Information for Cancer Pain

When morphine is administered by continuous intravenous or subcutaneous infusion for relief of severe, chronic pain associated with cancer, the dosage of morphine must be individualised according to the response and tolerance of the patient. In some patients with exceptionally severe, chronic pain it may be necessary to exceed the usual dosage. Reduced dosage is indicated in poor-risk patients, in very young or very old patients, and in patients receiving other CNS depressants.

Orally administered morphine should be used in preference to parenteral morphine whenever adequate pain control can be achieved by this route. However, oral morphine is often inadequate or impractical in the terminally ill patient.

Patients being converted from oral morphine to either intramuscular (IM), intravenous (IV) or subcutaneous (SC) morphine require dosage reduction (about one-sixth), since about 60% of oral morphine is metabolised in first-pass metabolism (i.e. 1 mg of either IM, SC or IV morphine for every 6 mg of oral morphine). The dose should then be titrated according to the patient's clinical response.

For cancer pain, DBL[®] Morphine Sulfate Injection BP should be given regularly around the clock, in most instances every 4 hours. The basis of pain control with DBL[®] Morphine Sulfate Injection BP should be regular scheduling rather than on an 'as required' or PRN narcotic order. Patients requiring high doses of morphine usually need to be awakened for medication during the night to prevent morning pain.

Morphine Dosage Increase

Dosage increases for intravenous, subcutaneous or intramuscular administration of morphine should not be made more frequently than every 24 hours, since it will take approximately 4 to 5 morphine half-lives to attain a new steady state concentration in a patient with normal liver and kidney function.

Following all dosage increases, the patient must be monitored closely for side-effects, the most common being sedation, nausea, vomiting, constipation and hypotension.

Contraindications

Morphine sulfate is contraindicated in patients with known hypersensitivity to morphine or other opioids; with acute or severe bronchial asthma or other obstructive airways disease; respiratory insufficiency or depression, especially in the presence of cyanosis and/or excessive bronchial secretion; other conditions where respiratory reserve is depleted, such as severe emphysema, chronic bronchitis or kyphoscoliosis; cor pulmonale; severe CNS depression; diabetic acidosis where there is a danger of coma; severe liver disease or incipient hepatic encephalopathy; following biliary tract surgery or surgical anastomosis; biliary colic; gastrointestinal obstruction; suspected surgical abdomen; in patients who are taking or who have taken MAO inhibitors within the previous fourteen days; cardiac arrhythmias; heart failure secondary to pulmonary disease; acute alcoholism or delirium

tremens; head injuries; brain tumour; raised intracranial or cerebrospinal pressure and in convulsive states such as status epilepticus, tetanus or strychnine poisoning. (See **Warnings and Precautions**.)

Morphine is contraindicated in premature infants or during labour for delivery of premature infants.

The administration of morphine via patient-controlled analgesia to children less than six years of age and adults with poor cognitive function is contraindicated.

The continuous intravenous infusion of morphine in patients with hepatic or renal disease is contraindicated (see **Warnings and Precautions**).

Warnings and Precautions

Therapy should only be initiated by a specialist with experience in chronic pain management and in accordance with guidelines approved by the New Zealand Medical Association.

Large doses and/or rapid administration of morphine may produce rapid onset of respiratory depression, bradycardia, or even cardiac arrest.

Morphine delays gastric emptying, which may be expected to increase the risks of aspiration, either associated with morphine induced CNS depression or coma, or during or after general anaesthesia.

Drug Dependence and Tolerance

Morphine can produce drug dependence and therefore has the potential for being abused. Psychological dependence, physical dependence, and tolerance may develop upon repeated administration of morphine. However it should be noted that clinically significant respiratory depression, addiction, rapid tolerance and euphoria rarely develop when doses of morphine are carefully titrated against the pain in patients with terminal disease and severe pain.

Drug dependence does not develop if morphine is administered regularly at individually optimised doses to the cancer patient with moderate to severe pain. While a certain degree of physical dependence occurs, a psychological dependence does not occur. If a cancer patient no longer requires an opioid for pain control, a gradual reduction in dose will prevent any withdrawal symptoms, although these are usually mild or absent even after abrupt discontinuance. Clinically significant tolerance to morphine is unusual in the cancer patient being treated for severe pain. In most cases, a plateauing of dose requirements is seen, as a need to increase morphine dose means an increase in pain and not tolerance.

Withdrawal of morphine should be undertaken gradually, as abrupt withdrawal in patients who are physically dependent may precipitate an acute withdrawal syndrome, including convulsions.

Use With Other CNS Depressants

Morphine should be used with caution and in reduced dosage in patients who are concurrently receiving other opioid analgesics, general anaesthetics, phenothiazines, other tranquillisers, sedative hypnotics, tricyclic antidepressants, and other CNS depressants (including alcohol). Respiratory depression, hypotension and profound sedation or coma may result.

Impaired Respiration

The respiratory depressant effects of morphine and its capacity to elevate cerebrospinal fluid pressure may be markedly exaggerated in the presence of head injury, other intracranial lesions, or a pre-existing increase in intracranial pressure. Furthermore, opioids produce adverse reactions, including confusion, miosis and vomiting, which may obscure the clinical course of patients with head injuries. Morphine should only be used in such patients with extreme caution, and only if it is judged to be essential.

Morphine should be used with extreme caution in patients having an acute asthmatic attack, patients with chronic obstructive pulmonary disease or cor pulmonale, patients having a substantially decreased respiratory reserve, and patients with pre-existing respiratory depression, hypoxia or hypercapnia. In such patients, even usual therapeutic doses of opioids may decrease respiratory

drive while simultaneously increasing airway resistance to the point of apnoea. Resuscitative equipment and opioid antagonist must be readily available.

Hypotensive Effect

The administration of morphine may result in severe hypotension in the post-operative patient or any individual whose ability to maintain blood pressure has been compromised by a depleted blood volume, shock, or the administration of such drugs as the phenothiazines or certain anaesthetics.

Morphine may produce orthostatic hypotension in ambulatory patients.

Supraventricular Tachycardias

Because of possible vagolytic action that may produce a significant increase in the ventricular response rate, morphine should be used with caution in patients with atrial flutter and other supraventricular tachycardias.

Acute Abdominal Condition

The administration of morphine or other opioids may obscure the diagnosis or clinical course in patients with acute abdominal conditions. Morphine should be used with caution in patients with inflammatory or obstructive bowel disorders, or with ulcerative colitis, and should only be used when necessary in patients with acute pancreatitis.

Convulsions

Morphine may aggravate pre-existing convulsions in patients with convulsive disorders. If dosage is escalated substantially above recommended levels because of tolerance development, convulsions may occur in individuals without a history of convulsive disorders.

Other Special Risk Patients

Morphine should be given with caution, and in reduced dosages, to certain patients, such as the elderly or debilitated and those with severe impairment of hepatic or renal function, hypothyroidism, Addison's disease, myxoedema, and prostatic hypertrophy or urethral stricture. Caution should also be observed if morphine is administered to patients with toxic psychosis or myasthenia gravis. Morphine should be used with extreme caution in patients with disorders characterised by hypoxia, since even usual therapeutic doses of opioids may decrease respiratory drive to the point of apnoea while simultaneously increasing airway resistance.

Renal or Hepatic Disease

Morphine may have a prolonged duration and cumulative effect in patients with kidney or liver dysfunction. In these patients, analgesia may last for 6, 8 or even up to 24 hours following a standard dose. Continuous infusions are contraindicated in these patients (see **Contraindications**).

Caution should be observed when morphine is administered to patients with impaired renal function, as the pharmacologically active metabolite, morphine-6-glucuronide, may accumulate in these patients. This may lead to CNS and respiratory depression.

Shock Patients

In patients with shock, impaired perfusion may prevent complete absorption following subcutaneous or intramuscular injection of morphine. Repeated administration may result in overdosage due to an excessive amount of morphine suddenly being absorbed when circulation is restored.

Pregnancy and Lactation

Impairment of Fertility

Prolonged use of opioids may result in impairment of reproductive function, including fertility and sexual dysfunction in both sexes, and irregular menses in women.

Use in Pregnancy

Category C:

Morphine has been associated with foetal CNS defects in rodent studies. It is not known whether morphine can cause foetal harm in humans when administered during pregnancy. Pregnant patients should only be given morphine when the benefits clearly outweigh potential risks to the foetus.

Long term use of morphine during pregnancy may result in a neonatal opioid withdrawal state. Babies born to mothers who are physically dependent on morphine may also be physically dependent on the drug.

Use in Labour/Delivery

Morphine is not recommended for use in women during and immediately before labour. The effects of opioid analgesics are unpredictable. They may prolong labour by temporarily reducing the strength, duration and frequency of uterine contractions, or conversely they may tend to shorten labour by increasing the rate of cervical dilatation.

Morphine crosses the placenta, and can produce respiratory depression in the neonate if it is administered during labour. Infants born to mothers receiving opioid analgesics during labour should be observed closely for signs of respiratory depression. In such infants, a specific opioid antagonist, naloxone hydrochloride, should be available for reversal of opioid-induced respiratory depression.

Use in Lactation

Morphine is excreted in human milk and breast-feeding is not recommended while a patient is receiving morphine. Withdrawal symptoms have been observed in breast-fed infants when maternal administration of morphine sulfate is stopped.

Paediatrics

Safety and efficacy of morphine in neonates have not been established. However, neonates have an enhanced susceptibility to the respiratory depressant effects of morphine. Morphine should not be administered to premature infants (see **Contraindications**).

Elderly Patients

See Warnings and Precautions – Other Special Risk Patients and Renal or Hepatic Disease.

Morphine should be administered with caution and in reduced dosages to elderly or debilitated patients. Respiratory depression occurs more frequently in these patients. The pharmacodynamics of morphine are more variable in geriatric patients than in younger adults. Therefore, initial dosage should be selected carefully based on clinical assessment of response to test doses and consideration of the patient's age and ability to clear the drug.

Effects on Ability to Drive and Use Machines

Occupational hazards: Morphine may impair the mental and/or physical abilities required for the performance of potentially hazardous tasks, such as driving a car or operating machinery. Morphine in combination with other opioid analgesics, phenothiazines, sedative-hypnotics and alcohol have additive depressant effects. Patients should be cautioned accordingly.

Adverse Effects

The adverse reactions caused by morphine are essentially the same as those observed with other opioid analgesics. They include the following major hazards: respiratory depression, apnoea and to a lesser degree circulatory depression, respiratory arrest, shock and cardiac arrest.

Most Common Adverse Effects: Constipation, light-headedness, dizziness, sedation, nausea, vomiting, sweating, dysphoria and euphoria.

Sedation: Most patients receiving morphine will experience initial drowsiness. This usually disappears in three to five days and is not a cause for concern unless it is excessive, or accompanied with unsteadiness or confusion. Excessive or persistent sedation should be investigated. Factors to be considered should include: concurrent sedative medications, the presence of hepatic or renal insufficiency, exacerbated respiratory failure, tolerance to the dose used, especially in older patients,

disease severity and the patient's general condition. If the dose of morphine has been reduced and pain is not adequately controlled, the dose may be carefully increased again after a few days.

Dizziness and unsteadiness may be associated with morphine-induced postural hypotension particularly in elderly or debilitated patients. The dosage should be adjusted according to individual needs but, because of reduced clearance, dosage may be lower in patients over 50 years of age.

Nausea and Vomiting: Nausea and vomiting are common after single doses of morphine or as an early undesirable effect of regular opioid therapy. The prescription of a suitable antiemetic should be considered. The frequency of nausea and vomiting usually decreases within a week or so but may persist due to opioid-induced gastric stasis. Metoclopramide is often useful in such patients.

Constipation: Virtually all patients suffer from constipation while taking opioids on a chronic basis. Some patients, particularly elderly, debilitated or bedridden patients, may become impacted. Patients must be cautioned accordingly and laxatives, softeners and other appropriate treatments should be initiated at the beginning of opioid therapy.

Other Adverse Reactions Include:

Cardiovascular: Flushing of the face, chills, tachycardia, bradycardia, palpitations, faintness, syncope, hypotension and hypertension.

Central Nervous System: Euphoria, dysphoria, weakness, headache, restlessness, anxiety, agitation, tremor, uncoordinated muscle movements, insomnia, dizziness, vertigo, delirium, confusional symptoms and occasionally hallucinations.

Gastrointestinal: Dry mouth, anorexia, constipation, cramps, laryngospasm, colic, taste alterations and biliary tract cramps and biliary spasm.

Genitourinary: Urinary retention or hesitancy, ureteric spasm, reduced libido or potency.

Endocrine: A syndrome of inappropriate antidiuretic hormone secretion characterised by hyponatraemia secondary to decreased free-water excretion may occur (monitoring of electrolytes may be necessary). Morphine stimulates prolactin release, and may also cause hyperglycaemia.

Visual Disturbances: Blurred vision, nystagmus, diplopia and miosis.

Allergic: Pruritis, urticaria, other skin rashes including contact dermatitis, and oedema. Allergic reactions may be due to histamine release, and may be more frequent in asthmatic patients. Anaphylactic reactions following intravenous injection have been reported rarely.

Local Effects: Pain at injection site; local tissue irritation and induration following subcutaneous injection, particularly when repeated.

Dependence/Tolerance: Physical dependence and tolerance may develop with long term use of morphine.

Withdrawal (Abstinence) Syndrome: Chronic use of opioid analgesics may be associated with the development of physical dependence, with or without psychological dependence. An abstinence syndrome may be precipitated when opioid administration is suddenly discontinued or opioid antagonists administered.

Withdrawal symptoms that may be observed after discontinuation of opioid use include; body aches, diarrhoea, piloerection, anorexia, nervousness or restlessness, rhinorrhoea, sneezing, tremors or shivering, abdominal colic, nausea, sleep disturbance, unusual increase in sweating and yawning, weakness, tachycardia and unexplained fever. With appropriate dose adjustments and gradual withdrawal these symptoms are usually mild.

Interactions

Acidifying agents generally increase the clearance of morphine, thus antagonising its effects, while alkalisating agents decrease clearance and so potentiate the effects of morphine.

CNS Depressants: Morphine should be used with great caution and in reduced dosage in patients concurrently receiving other central nervous system depressants including other opioids, sedatives, hypnotics, general anaesthetics, phenothiazines, other tranquillisers and alcohol because of the risk of respiratory depression, hypotension and profound sedation or coma. When such combined therapy is contemplated, the dose of one or both agents should be reduced.

Significant impairment of motor function has also been noted following concomitant morphine administration and alcohol ingestion.

Concurrent administration with tricyclic antidepressants or beta-blockers may enhance the CNS depressant effects of morphine.

Diazepam, when used following high doses of morphine, exacerbates the hypotensive effects produced by morphine, and is associated with reduced plasma catecholamine levels.

Antihypertensive Agents: Concurrent administration of morphine may increase the hypotensive effects of antihypertensive agents or other drugs with hypotensive effects.

Muscle Relaxants: Morphine may enhance the neuromuscular blocking action of skeletal muscle relaxants and produce an increased degree of respiratory depression.

Mixed Agonist/Antagonist Opioid Analgesics: From a theoretical perspective, mixed agonist/antagonist opioid analgesics (e.g. pentazocine and buprenorphine) should **NOT** be administered to a patient who has received or is receiving a course of therapy with a pure opioid agonist analgesic. In these patients, mixed agonist/antagonist analgesics may reduce the analgesic effect or may precipitate withdrawal symptoms.

Monoamine Oxidase Inhibitors (MAOIs): MAOIs intensify the effects of morphine and other opioid drugs which can cause anxiety, confusion, and significant depression of respiration, sometimes leading to coma. Morphine should not be given to patients taking MAOIs or within 14 days of stopping such treatment. It is unknown whether there is an interaction between the new selective MAOIs (e.g. moclobemide and selegeline) and morphine. Therefore, caution is advised with such drug combinations.

Cimetidine and Other H₂ Receptor Antagonists: There is a report of confusion and severe respiratory depression when a haemodialysis patient was administered morphine and cimetidine.

A potentially lethal interaction between cimetidine and morphine, in which the patient exhibited apnoea, a significantly reduced respiratory rate and suffered a grand mal seizure, has been reported. Administration of naloxone increased the respiratory rate; however, confusion, disorientation, generalised twitching and periods of apnoea persisted for 80 hours. Confusion has also been associated with concomitant use of ranitidine and morphine.

Diuretics: Morphine reduces the efficacy of diuretics by inducing the release of antidiuretic hormone. Morphine may also lead to acute retention of urine by causing spasm of the sphincter of the bladder, particularly in men with prostatism.

Phenothiazines: The analgesic effect of morphine is potentiated by chlorpromazine.

Amphetamines: Dexamphetamine and other amphetamines may enhance the analgesic effects, and decrease the sedation and lack of alertness caused by morphine.

Anticoagulants: Morphine may potentiate the anticoagulant activity of coumarin anticoagulant agents.

Metoclopramide: Morphine may antagonise the effects of metoclopramide on gastrointestinal motility. Intravenous metoclopramide antagonises the effects of morphine on gastric emptying.

Zidovudine: Morphine may alter the metabolism of zidovudine, by competitively inhibiting glucuronidation or directly inhibiting hepatic microsomal metabolism. Zidovudine and morphine should therefore not be administered concurrently, because the toxicity of either or both of these drugs may be increased.

Oral Drugs: Morphine delays gastric emptying, so may affect the absorption of orally administered drugs. For example, morphine delays the absorption of paracetamol and mexiletine.

Anticholinergic Agents: Concurrent administration of morphine and anticholinergic agents or other drugs with anticholinergic activity may increase the risk of severe constipation; this may lead to paralytic ileus and/or urinary retention.

Antidiarrhoeal Agents: Concurrent administration of morphine and antidiarrhoeal agents with antiperistaltic actions may increase the risk of severe constipation and CNS depression.

Opioid Antagonists: Naloxone antagonises the analgesic, CNS and respiratory depressive effects of morphine, and may precipitate withdrawal in patients who are physically dependent on opioids.

Naltrexone blocks the therapeutic effects of opioids, so should be discontinued several days prior to elective surgery if administration prior to, during, or following surgery is unavoidable. Administration of naltrexone to a patient who is physically dependent on morphine will precipitate withdrawal symptoms.

Effect on Laboratory Tests

Morphine delays gastric emptying, thereby invalidating test results in gastric emptying studies.

Morphine may interfere with hepatobiliary imaging using technetium Tc^{99m} diosfenin. Morphine may constrict the sphincter of Oddi and increase biliary tract pressure, preventing delivery of Tc^{99m} diosfenin to the small bowel. These actions result in delayed visualisation, and thus resemble obstruction of the common bile duct.

Overdosage

Symptoms

Overdosage with morphine is characterised by respiratory depression (a decrease in respiratory rate and/or tidal volume, Cheyne-Stokes respiration, cyanosis), extreme somnolence progressing to stupor or coma, skeletal muscle flaccidity, cold and clammy skin, and sometimes bradycardia and hypotension. In severe overdosage, apnoea, circulatory collapse, cardiac arrest and death may occur.

Treatment

Immediate attention should be given to the re-establishment of adequate respiratory exchange through provision of a patent airway and institution of assisted or controlled ventilation.

In patients physically dependent on opioids, respiratory support is the first line of treatment. In these patients, the use of naloxone is potentially dangerous.

Oxygen, intravenous fluids, vasopressors, and other supportive measures should be employed as indicated.

The opioid antagonist, naloxone, is a specific antidote against respiratory depression which may result from overdosage or unusual sensitivity to opioids. The recommended adult dose of naloxone for the treatment of severe opiate induced respiratory depression is 0.4 to 2 mg intravenously every 2 to 3 minutes as necessary, simultaneously with assisted respiration.

For children, the initial dose recommended is 0.01 mg/kg naloxone. A response should be seen after 2 to 3 doses. Note the duration of action of naloxone is usually shorter than that of morphine and thus the patient should be carefully observed for signs of CNS depression returning.

If the response to naloxone is suboptimal or not sustained, additional naloxone may be administered as needed, or given by continuous intravenous infusion to maintain alertness and respiratory function. There is no information available about the cumulative dose of naloxone that may be safely administered.

Naloxone should not be administered in the absence of clinically significant respiratory or circulatory depression secondary to morphine overdosage.

Naloxone should be administered cautiously to persons who are known or suspected to be physically dependent on morphine. In such cases, an abrupt or complete reversal of opioid effects may precipitate an acute withdrawal syndrome. The severity of the withdrawal syndrome produced will depend on the degree of physical dependence and the dose of the antagonist administered. If it is necessary to treat serious respiratory depression in the physically dependent patient, the antagonist should be administered with extreme care and by titration with smaller than usual doses of the antagonist.

Morphine toxicity may be a result of overdosage but because of the large inter-individual variation in sensitivity to opioids, it is difficult to assess the exact dose of any opioid that is toxic or lethal. The toxic effects of morphine tend to be overshadowed by the presence of pain or tolerance. Patients having chronic morphine therapy have been known to take in excess of 3,000 mg/day with no apparent toxic effects being present.

Pharmaceutical Precautions

Incompatibilities

A solution of thiopentone and morphine forms an inactive preparation.

Shelf Life

The shelf life of unopened DBL[®] Morphine Sulfate Injection BP ampoules is 24 months for the 5 mg/1 mL and 30 mg/1 mL presentations, and 30 months for the 10 mg/1 mL and 15 mg/1 mL presentations.

DBL[®] Morphine Sulfate Injection BP should be used within 24 hours of opening, in order to avoid the risk of microbial contamination.

Warning: As with all parenteral drug products, intravenous admixtures should be visually inspected for clarity, particulate matter, precipitate and leakage prior to administration, whenever solution and container permit. Solutions showing haziness, particulate matter, precipitate or leakage should not be used. Development of a yellow colour in morphine solutions does not indicate toxicity or loss of potency or efficacy.

Special Precautions for Storage

Store below 25°C. Protect from light.

Medicine Classification

DBL[®] Morphine Sulfate Injection BP is a Class B1 Controlled Drug.

Package Quantities

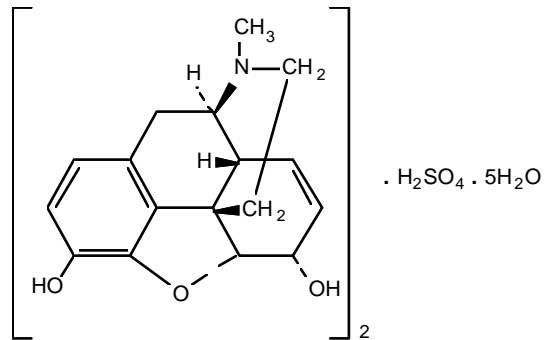
DBL[®] Morphine Sulfate Injection BP ampoules are available as follows:

Strength	Pack Size(s)
5 mg/1 mL	5
10 mg/1 mL	5 and 50

15 mg/1 mL 5 and 50
30 mg/1 mL 5 and 50

Further Information

The structural formula of morphine sulfate is shown below:



Name and Address

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1 March 2008

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