

## **1 NAME OF THE MEDICINAL PRODUCT**

Morphine Sulfate 1mg in 1mL Solution for Injection.

## **2 QUALITATIVE AND QUANTITATIVE COMPOSITION**

1mL contains 1mg of morphine sulfate (0.1% w/v)

Each 1mL ampoule contains 1mg of morphine sulfate and 3.6mg of sodium

Each 5mL ampoule contains 5mg of morphine sulfate and 18 mg of sodium

Each 10mL ampoule contains 10mg of morphine sulfate and 36mg of sodium.

Each 50mL vial contains 50mg of morphine sulfate and 180mg of sodium.

## **3. PHARMACEUTICAL FORM**

Solution for injection.

## **4 CLINICAL PARTICULARS**

### **4.1 Therapeutic indications**

Morphine Sulfate Solution for Injection is indicated for the relief of moderate to severe pain. Morphine is used especially in pain associated with cancer, myocardial infarction and surgery. Morphine also helps to relieve the anxiety and insomnia which may be associated with severe pain.

### **4.2 Posology and method of administration**

Prior to starting treatment with opioids, a discussion should be held with patients to put in place a strategy for ending treatment with morphine sulfate in order to minimise the risk of addiction and drug withdrawal syndrome (see section 4.4).

*Adults and children over 12 years:*

Morphine Sulfate Solution for Injection is formulated for use by the intravenous route in Patient Controlled Analgesia (PCA) systems. PCA, which permits adjustment of dosage according to the patient's individual needs, must only be carried out in departments and by staff who are trained and have experience of the system. Patient selection for the use of PCA must ensure that the patient is capable of understanding and following the instructions of the medical/nursing staff. The specific department or

unit protocols must be covered to ensure aseptic transfer of the contents of the ampoule or vial to the PCA system.

There is a considerable variation in analgesic requirements among patients and therefore individualised treatment strategies are required. Dosage should be based on the severity of the pain and the response and opiate tolerance of the patient.

#### Loading Dose

Loading doses of typically between 1mg and 10mg (maximum 15mg) of Morphine Sulfate Solution for Injection may be given by intravenous infusion over four or five minutes. The loading dose used will depend upon the patient's diagnosis and condition.

#### PCA demand dose

An initial demand dose of 1mg Morphine Sulfate Solution for Injection with a lockout period of 5 to 10 minutes is recommended. Dosages may vary depending on the loading dose, the tolerance and condition of the patient, and whether a background infusion of morphine sulfate is being given.

The patient should be specifically monitored for pain, sedation and respiratory rate during the first few hours of treatment to ensure that the dosage regimen is suitable.

The duration of treatment should be kept to a minimum, although dependence and tolerance are not generally a problem when morphine is used legitimately in patients with opioid-sensitive pain.

#### *Use in children:*

Not recommended for children under 12 years.

#### *Use in the elderly:*

Morphine doses need to be reduced in elderly patients.

#### Discontinuation of therapy

An abstinence syndrome may be precipitated if opioid administration is suddenly discontinued. Therefore the dose should be gradually reduced prior to discontinuation.

### **4.3 Contraindications**

Morphine Sulfate Solution for Injection should not be given to patients with known hypersensitivity to morphine or other opioid preparations. Use of Morphine Sulfate Solution for Injection is also contraindicated in patients with respiratory depression; obstructive airways disease; excessive bronchial secretions; during a bronchial asthma attack or in heart failure secondary to chronic lung disease; head injury; raised intra-cranial pressure; coma; convulsion disorders; ulcerative colitis; in presence of a risk of paralytic ileus; biliary and renal tract spasm and acute alcoholism; phaeochromocytoma.

Morphine Sulfate Solution for Injection should not be given to patients with moderate to severe renal impairment (glomerular filtration rate <20mL/min) or with severe or acute liver failure.

Morphine Sulfate Solution for Injection is contraindicated in patients receiving monoamine oxidase inhibitors or within two weeks of discontinuing such treatment. Use of Morphine Sulfate Solution for Injection during pregnancy or lactation is not recommended.

#### **4.4 Special warnings and precautions for use**

##### Drug dependence, tolerance and potential for abuse

For all patients, prolonged use of this product may lead to drug dependence (addiction), even at therapeutic doses. The risks are increased in individuals with current or past history of substance misuse disorder (including alcohol misuse) or mental health disorder (e.g., major depression).

Additional support and monitoring may be necessary when prescribing for patients at risk of opioid misuse.

A comprehensive patient history should be taken to document concomitant medications, including over-the-counter medicines and medicines obtained on-line, and past and present medical and psychiatric conditions.

Patients may find that treatment is less effective with chronic use and express a need to increase the dose to obtain the same level of pain control as initially experienced. Patients may also supplement their treatment with additional pain relievers. These could be signs that the patient is developing tolerance.

The risks of developing tolerance should be explained to the patient.

Overuse or misuse may result in overdose and/or death. It is important that patients only use medicines that are prescribed for them at the dose they have been prescribed and do not give this medicine to anyone else.

Patients should be closely monitored for signs of misuse, abuse, or addiction.

The clinical need for analgesic treatment should be reviewed regularly.

##### Drug withdrawal syndrome

Prior to starting treatment with any opioids, a discussion should be held with patients to put in place a withdrawal strategy for ending treatment with morphine sulfate.

Drug withdrawal syndrome may occur upon abrupt cessation of therapy or dose reduction. When a patient no longer requires therapy, it is advisable to taper the dose gradually to minimise symptoms of withdrawal. Tapering from a high dose may take weeks to months.

The opioid drug withdrawal syndrome is characterised by some or all of the following: restlessness, lacrimation, rhinorrhoea, yawning, perspiration, chills, myalgia, mydriasis and palpitations. Other symptoms may also develop including irritability, agitation, anxiety, hyperkinesia, tremor, weakness, insomnia, anorexia, abdominal cramps, nausea, vomiting, diarrhoea, increased blood pressure, increased respiratory rate or heart rate.

If women take this drug during pregnancy, there is a risk that their newborn infants will experience neonatal withdrawal syndrome.

##### Hyperalgesia

Hyperalgesia may be diagnosed if the patient on long-term opioid therapy presents with increased pain. This might be qualitatively and anatomically distinct from pain related to disease progression or to breakthrough pain resulting from development of opioid tolerance. Pain associated with hyperalgesia tends to be more diffuse than the pre-existing pain and less defined in quality. Symptoms of hyperalgesia may resolve with a reduction of opioid dose.

As with other narcotics, a dose reduction may be appropriate in elderly patients, in patients with hypothyroidism, renal and chronic hepatic disease.

Morphine Sulfate Solution for Injection should be used with caution in debilitated patients and those with Acute chest syndrome (ACS) in patients with sickle cell disease (SCD); adrenal insufficiency; hypopituitarism; prostatic hypertrophy; shock; diabetes mellitus; diseases of the biliary tract; myasthenia gravis; cardiac arrhythmias; excessive obesity; hypotension and severe cardiac failure. It should also be used with caution post-operatively following total joint arthroplasty (colonic pseudo-obstruction).

#### Acute chest syndrome (ACS) in patients with sickle cell disease (SCD)

Due to a possible association between ACS and morphine use in SCD patients treated with morphine during a vaso-occlusive crisis, close monitoring for ACS symptoms is warranted.

#### Adrenal insufficiency

Opioid analgesics may cause reversible adrenal insufficiency requiring monitoring and glucocorticoid replacement therapy. Symptoms of adrenal insufficiency may include e.g. nausea, vomiting, loss of appetite, fatigue, weakness, dizziness, or low blood pressure.

Risk from concomitant use of sedative medicines such as benzodiazepines or related drugs: Concomitant use of Morphine Sulfate 1mg in 1mL Solution for Injection and sedative medicines such as benzodiazepines or related drugs may result in sedation, respiratory depression, coma and death. Because of these risks, concomitant prescribing with these sedative medicines should be reserved for patients for whom alternative treatment options are not possible. If a decision is made to prescribe Morphine Sulfate 1mg in 1mL Solution for Injection concomitantly with sedative medicines, the lowest effective dose should be used, and the duration of treatment should be as short as possible.

The patients should be followed closely for signs and symptoms of respiratory depression and sedation. In this respect, it is strongly recommended to inform patients and their caregivers to be aware of these symptoms (see section 4.5).

Plasma concentrations of morphine may be reduced by rifampicin. The analgesic effect of morphine should be monitored and doses of morphine adjusted during and after treatment with rifampicin.

#### Decreased Sex Hormones and increased prolactin

Long-term use of opioid analgesics may be associated with decreased sex hormone levels and increased prolactin. Symptoms include decreased libido, impotence or amenorrhea.

#### Oral P2Y12 inhibitor antiplatelet therapy

Within the first day of concomitant P2Y12 inhibitor and morphine treatment, reduced efficacy of P2Y12 inhibitor treatment has been observed (see section 4.5).

This medicinal product contains 3.6mg sodium per 1mL, equivalent to 0.2 % of the WHO recommended maximum daily intake of 2g sodium for an adult.

## **4.5 Interaction with other medicinal products and other forms of interaction**

Concomitant or recent use of monoamine oxidase inhibitors with morphine is contraindicated since interactions have been reported, resulting in CNS excitation or depression with hyper- or hypotensive crises.

The CNS depressant effects of morphine are increased by the co-administration of CNS depressants including alcohol, anaesthetics, muscle relaxants, hypnotics, sedatives, tricyclics, neuroleptics and phenothiazines. Hyperpyrexia and CNS toxicity may result from an opiate selegiline combination. Sedative medicines such as benzodiazepines or related drugs: The concomitant use of opioids with sedative medicines such as benzodiazepines or related drugs increases the risk of sedation, respiratory depression, coma and death because of additive CNS depressant effect. The dose and duration of concomitant use should be limited (see section 4.4).

The analgesic effects of opioids tend to be enhanced by the concomitant administration of dexamfetamine, hydroxyzine and some phenothiazines (although the latter may also cause respiratory depression). Morphine may reduce the efficacy of diuretics by inducing the release of antidiuretic hormone. The combination of morphine with anticholinergics may enhance the constipatory effect and urinary retention.

Cimetidine and ranitidine appear to interfere with the metabolism of morphine and the metabolism and excretion of morphine may be inhibited by disulfiram. Increased morphine levels may result from the co-administration of cisapride. Metoclopramide and domperidone may antagonise morphine's gastrointestinal effects and metoclopramide enhances its sedative effect. Ciprofloxacin concentration may be reduced and mexiletine absorption delayed by co-administered opiate. Animal data suggest that propranolol may increase the toxicity of opioids. Ritonavir can induce the formation of metabolising enzymes made in the liver and can cause increased metabolism of morphine sulfate which can reduce the clinical efficacy of the analgesic.

Both antipsychotics and morphine sulfate have sedative effects which can be addictive when co-administered.

Co-administration of morphine sulfate with esmolol results in a slight increase in the esmolol levels, but the clinical implications of this increase are not considered very significant.

A delayed and decreased exposure to oral P2Y<sub>12</sub> inhibitor antiplatelet therapy has been observed in patients with acute coronary syndrome treated with morphine. This interaction may be related to reduced gastrointestinal motility and apply to other opioids. The clinical relevance is unknown, but data indicate the potential for reduced P2Y<sub>12</sub> inhibitor efficacy in patients co-administered morphine and a P2Y<sub>12</sub> inhibitor (see section 4.4). In patients with acute coronary syndrome, in whom morphine cannot be withheld and fast P2Y<sub>12</sub> inhibition is deemed crucial, the use of a parenteral P2Y<sub>12</sub> inhibitor may be considered.

## **4.6 Fertility, pregnancy and lactation**

### Pregnancy

Regular use during pregnancy may cause drug dependence in the foetus, leading to withdrawal symptoms in the neonate.

If opioid use is required for a prolonged period in a pregnant woman, advise the patient of the risk of neonatal opioid withdrawal syndrome and ensure that appropriate treatment will be available.

Administration during labour may depress respiration in the neonate and an antidote for the child should be readily available.

### Breast feeding

Administration to nursing women is not recommended as morphine sulfate may be secreted in breast milk and may cause respiratory depression in the infant. Morphine has been shown to suppress lactation.

### Fertility

Animal studies have shown that morphine may reduce fertility (see 5.3. preclinical safety data).

## **4.7 Effects on ability to drive and use machines**

Morphine may modify the patient's reactions to a varying extent depending on the dosage and individual susceptibility. Ambulatory patients should be warned not to use machines.

This medicine can impair cognitive function and can affect a patient's ability to drive safely. This class of medicine is in the list of drugs included in regulations under 5a of the Road Traffic Act 1988.

When prescribing this medicine, patients should be told:

- The medicine is likely to affect your ability to drive
- Do not drive until you know how the medicine affects you
- It is an offence to drive while under the influence of this medicine
- However, you would not be committing an offence (called 'statutory defence') if:
  - The medicine has been prescribed to treat a medical or dental problem and
  - You have taken it according to the instructions given by the prescriber and in the information provided with the medicine and
  - It was not affecting your ability to drive safely.

## **4.8 Undesirable effects**

The side-effects most commonly seen with morphine and other opioids are respiratory depression, nausea, vomiting, constipation, drowsiness and confusion. With long term use these symptoms generally lessen, although constipation frequently persists.

The following adverse effects are from published literature and frequencies are not known.

### Psychiatric disorders

Drug dependence (see section 4.4), restlessness, mood changes, hallucinations, delirium, disorientation, excitation, agitation, sleep disturbance.

### Nervous system disorders

Headache, vertigo, euphoria, dysphoria, dizziness, taste disturbances, seizures, paraesthesia, raised intracranial pressure, hyperhidrosis, allodynia and hyperalgesia (see section 4.4).

#### Endocrine

Long term use of opioid analgesics can cause adrenal insufficiency. Exacerbation of pancreatitis.

#### Eye disorders

Visual disturbances, nystagmus, miosis.

#### Ear and Labyrinth disorders

Vertigo.

#### Cardiac disorders

Bradycardia, tachycardia, palpitations, hypotension, hypertension, syncope.

#### Vascular disorders

Orthostatic hypotension, facial flushing, oedema.

#### Gastrointestinal disorders

Dry mouth, dyspepsia, paralytic ileus, abdominal pain, anorexia.

#### Hepatobiliary disorders

Biliary spasm.

#### Immune system disorders

Anaphylactoid reactions. Anaphylactic reactions to morphine have been reported rarely.

#### Musculoskeletal, connective tissue and bone disorder

Muscle fasciculation, myoclonus, rhabdomyolysis, muscle rigidity.

#### Renal and urinary disorders

Difficult micturition, ureteric spasm, urinary retention.

#### Reproduction and sexual disorders

Long term use of opioid analgesics can cause hypogonadism in both men and women. This can lead to amenorrhoea, reduced libido, infertility, depression and erectile dysfunction.

#### Respiratory disorders

Bronchospasm (in association with anaphylaxis), inhibition of cough reflex.

#### Skin and subcutaneous tissue disorders

Rashes, urticaria, pruritus.

#### General disorders and administration site conditions.

Sweating, hypothermia, malaise, asthenia, pain and irritation at the injection site, drug withdrawal syndrome.

### **Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the Yellow Card Scheme at: Website: [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store.

## **4.9 Overdose**

Patients should be informed of the signs and symptoms of overdose and to

ensure that family and friends are also aware of these signs and to seek immediate medical help if they occur.

*Signs:*

The signs of morphine overdose consist of pin-point pupils, respiratory depression, Pneumonia aspiration and hypotension. Death may occur from respiratory failure. Circulatory failure and deepening coma may develop in severe cases and death may ensue. Less severe cases may be manifest by nausea, vomiting, tremor, dysphoria, hypothermia, hypotension, confusion and sedation. Rhabdomyolysis progressing to renal failure can also be a consequence of overdosage.

*Treatment:*

It is vital to maintain and support respiration and circulation. The specific opioid antagonist naloxone should be employed for the reversal of coma and restoration of spontaneous respiration. 400 micrograms of naloxone should be administered intravenously, repeated at 2 - 3 minute intervals as necessary up to a maximum dose of 10mg.

## **5. Pharmacological Properties**

### **5.1. Pharmacodynamic properties**

Morphine acts as a competitive agonist at opiate receptors in the CNS, particularly mu and to a lesser extent kappa receptors. Activity at the mu-1 subtype receptor is thought to mediate analgesia, euphoria and dependence whilst activity at the mu-2 receptor is thought to be responsible for respiratory depression and inhibition of gut motility. Action at the kappa receptor may mediate spinal analgesia. The analgesic action of morphine is effective at several spinal and supraspinal sites.

### **5.2 Pharmacokinetic Properties**

Onset of action is rapid following parenteral administration of morphine with peak analgesic effect occurring within 20 minutes via the intravenous route.

Morphine is widely distributed in the body, with an apparent volume of distribution of 2-3Lkg<sup>-1</sup>. Due to its relatively hydrophilic nature, morphine does not readily cross the blood-brain barrier although it is detectable in the cerebrospinal fluid.

Morphine is extensively metabolised by the liver. Renal glucuronidation also takes place. The major metabolite, quantitatively, is morphine-3-glucuronide although morphine-6-glucuronide is significant in terms of potency.

The metabolites are excreted mainly via the renal route.

### **5.3 Preclinical safety data**

The toxicological profile of morphine in animals has not been systematically identified as a result of its established widespread clinical use. Recent animal studies have confirmed some targets for morphine toxicity. A nephrotoxic action has been reported in rats following subcutaneous administration of relatively high levels (up to 96mg/kg) of morphine. In male rats, reduced fertility and chromosomal damage in gametes have been reported. Adverse effects of morphine on development of the foetus and newborn have been confirmed in rats and mice. Morphine has been shown to reduce the release of LH from the pituitary causing reductions in serum testosterone levels, reduction in the weight of secondary sex organs and reductions in spermatogenic cell populations. The adverse effects of morphine sulfate in both males and females are consistent with recent findings that morphine exhibits significant genotoxic actions in several in vivo test systems. Immunotoxicity associated with morphine treatment has been reported in animal tests for several parameters which provide possible mechanisms for decreased resistance to a range of infections. Evidence suggests that part of this effect may be mediated via release of endogenous corticosterone.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Sodium Chloride  
Water for Injections

### **6.2 Incompatibilities**

Morphine Sulfate Solution for Injection should not be mixed with other preparations.

Morphine salts are incompatible with aminophylline, sodium salts of barbiturates and phenytoin, aciclovir sodium, furosemide, heparin sodium, pethidine HCl, prochlorperazine edisylate and promethazine HCl.

Physicochemical incompatibility (formation of precipitates) has been demonstrated between solutions of morphine sulfate and 5- fluorouracil.

### **6.3. Shelf life**

2 years.

### **6.4. Special precautions for storage**

Keep away from light. Store below 25°C.

## **6.5 Nature and contents of container**

Clear glass ampoules of 1mL, 5mL or 10mL volume or vials of 50mL volume, with bromobutyl rubber stoppers and tamper-evident aluminium caps. The product is packed into cartons containing 10 ampoules, 1 vial or 10 vials. Both pack sizes of vials may not be available at the same time.

## **6.6 Special Precautions for Disposal**

Morphine Sulfate Solution for Injection is for use as presented ( $1\text{mg mL}^{-1}$ ) in IV PCA devices.

## **7 MARKETING AUTHORISATION HOLDER**

Torbay and South Devon NHS Foundation Trust  
Torbay Pharmaceuticals,  
Wilkins Drive,  
Paignton,  
Devon, TQ4 7FG  
UK

## **8. MARKETING AUTHORISATION NUMBER**

PL 13079/0001.

## **9. Date of first authorisation/renewal of authorisation**

16/06/1998 / 16/06/2003

## **10 DATE OF REVISION OF THE TEXT**

25/03/2022