DESCRIPTION
TORBUGESIC (butorphanol tartrate injection) is a totally synthetic, centrally acting, narcotic agonist-antagonist analgesic with potent antitussive activity. It is a member of the phenanthrene series. The chemical name is Morphinan-3, 14-diol, 17-(cyclobutylmethyl)\(\cdot\)\((-\)\), (5- (R\(^*\), R\(^*\))\)-2,3-dihydroxybutanedioate (1:1) (salt). It is a white, crystalline, water soluble substance having a molecular weight of 477.55; its molecular formula is C\(_{21}\)H\(_{29}\)NO\(_2\) \(\cdot\) C\(_4\)H\(_6\)O\(_6\).

Chemical Structure

Each mL of TORBUGESIC contains 10 mg butorphanol base (as butorphanol tartrate), 3.3 mg citric acid, 6.4 mg sodium citrate, 4.7 mg sodium chloride, and 0.1 mg benzethonium chloride, q.s. with water for injection.

CLINICAL PHARMACOLOGY
Comparative Pharmacology
In animals, butorphanol has been demonstrated to be 4 to 30 times more potent than morphine and pentazocine (Talwin\(^{\text{V}}\)-V) respectively.\(^1\)
In humans, butorphanol has been shown to have 5 to 7 times the analgesic activity of morphine and 20 times that of pentazocine.\(^2\,3\)
Butorphanol has 15 to 20 times the oral antitussive activity of codeine or dextromethorphan in dogs and guinea pigs.\(^4\)
As an antagonist, butorphanol is approximately equivalent to nalorphine and 30 times more potent than pentazocine.\(^1\)
Cardiopulmonary depressant effects are minimal after treatment with butorphanol as demonstrated in dogs\(^5\), humans\(^6\,7\) and horses.\(^8\)
Unlike classical narcotic agonist analgesics which are associated with decreases in blood pressure, reduction in heart rate and concomitant release of histamine, butorphanol does not cause histamine release.\(^1\)
Furthermore, the cardiopulmonary effects of butorphanol are not distinctly dosage-related but rather reach a ceiling effect beyond which further dosage increases result in relatively lesser effects.
Reproduction: Studies performed in mice and rabbits revealed no evidence of impaired fertility or harm to the fetus due to butorphanol tartrate. In the female rat, parenteral administration was associated with increased nervousness and decreased care for the newborn, resulting in a decreased survival rate of the newborn. This nervousness was seen only in the rat species.

Equine Pharmacology
Following intravenous injection in horses, butorphanol is largely eliminated from the blood within 3 to 4 hours. The drug is extensively metabolized in the liver and excreted in the urine. In ponies, butorphanol given intramuscularly at a dosage of 0.22 mg/kg, was shown to alleviate experimentally induced visceral pain for about 4 hours.\(^9\)
In horses, intravenous dosages of butorphanol ranging from 0.05 to 0.4 mg/kg were shown to be effective in alleviating visceral and superficial pain for at least 4 hours, as illustrated in the following figure:

**Analgesic Effects of Butorphanol Given at Various Dosages in Horses with Abdominal Pain**

Repeated administration of butorphanol at 1 mg/kg (10 times the recommended dose) every four hours for 48 hours caused constipation in one of two horses.

**Subacute Equine Studies**

Horses were found to tolerate butorphanol given intravenously at dosages of 0.1, 0.3 and 0.5 mg/kg every 4 hours for 48 hours followed by once daily injections for a total of 21 days. The only detectable drug effects were slight transient ataxia observed occasionally in the high dosage group. No clinical, laboratory, or gross or histopathologic evidence of any butorphanol-related toxicity was encountered in the horses.

**INDICATIONS**

TORBUGESIC (butorphanol tartrate injection) is indicated for the relief of pain associated with colic in adult horses and yearlings. Clinical studies in the horse have shown that TORBUGESIC alleviates abdominal pain associated with torsion, impaction, intussusception, spasmodic and tympanic colic and postpartum pain.

**WARNINGS**

DO NOT USE IN HORSES INTENDED FOR HUMAN CONSUMPTION. NOT FOR HUMAN USE.

**CAUTION**

TORBUGESIC, a potent analgesic, should be used with caution with other sedative or analgesic drugs as these are likely to produce additive effects. There are no well-controlled studies using butorphanol in breeding horses, weanlings and foals. Therefore, the drug should not be used in these groups.

**ADVERSE REACTIONS**

In clinical trials in horses, the most commonly observed side effect was slight ataxia which lasted 3 to 10 minutes.

Marked ataxia was reported in 1.5% of the 327 horses treated. Mild sedation was reported in 9% of the horses.

**Dosage**

The recommended dosage in the horse is 0.1 mg of butorphanol per kilogram of body weight (0.05 mg/lb) by intravenous injection. This is equivalent to 5 mL of TORBUGESIC for each 1000 lbs body weight.

The dose may be repeated within 3 to 4 hours but treatment should not exceed 48 hours.

Use contents within 4 months of first puncture. Pre-clinical model studies and clinical field trials in horses demonstrate that the analgesic effects of TORBUGESIC are seen within 15 minutes following injection and persist for about 4 hours.

**How Supplied**

50 mL vials TORBUGESIC (butorphanol tartrate injection) Veterinary Injection, 10 mg base activity per mL.

10 mL vials TORBUGESIC (butorphanol tartrate injection) Veterinary Injection, 10 mg base activity per mL.

Store at controlled room temperature 20°–25°C (68°–77°F) with excursions between 15°–30°C (59°–86°F).

**References**