

Rocuronium bromide injection is a nondepolarizing neuromuscular blocking agent indicated as an adjunct to general anesthesia to facilitate intubation and to provide skeletal muscle relaxation during surgical or mechanical ventilation.

**INDICATIONS AND USAGE**

Rocuronium bromide injection is indicated for inpatients and outpatients as an adjunct to general anesthesia to facilitate intubation and to provide skeletal muscle relaxation during surgical or mechanical ventilation.

**CONTRAINDICATIONS**

Rocuronium bromide is contraindicated in patients known to have hypersensitivity (e.g., anaphylaxis) to rocuronium bromide or any of the components of the product.

**WARNINGS AND PRECAUTIONS**

**Anaphylaxis**

Anaphylaxis has been reported in association with the use of rocuronium bromide, including some severe or fatal reactions. Pretreatment with antihistamines should be considered when anaphylaxis is suspected. Medical support and resuscitative equipment should be immediately available when rocuronium bromide is administered.

**Adverse Reactions**

Systemic reactions following the administration of rocuronium bromide are generally moderate and resolve with no sequelae. In clinical practice, there have been reports of severe allergic reactions (anaphylactic and anaphylactoid reactions) with rocuronium bromide, including some that have been life threatening and fatal. Due to the potential severity of these reactions, the necessary precautions, such as the immediate availability of appropriate emergency treatment, should be taken. Precautions should also be taken in those patients who may be more susceptible to the development of anaphylactic reactions, for example, patients who receive anaesthetic agents that may sensitize them to the development of such reactions.

**Drug Interactions**

Rocuronium bromide has not been studied in MH-susceptible patients. Because rocuronium bromide is always used with other agents, and in the absence of specific information, it is not possible to determine the risk of malignant hyperthermia in patients who have received rocuronium bromide. The occurrence of malignant hyperthermia during anesthesia is possible even in the absence of specific prior history of the occurrence of malignant hyperthermia.

**Use in Specific Populations**

**Pediatric Patients**

The safety and effectiveness of rocuronium bromide were established in a population postnatal age range of 6 months to 16 years. While the overall safety profile of rocuronium bromide was consistent across all pediatric age groups, consistent with the age related decrease in muscle mass, there were no clinically significant differences in pharmacokinetic parameters between pediatric patients and healthy adult volunteers.

**Females**

Rocuronium bromide has not been studied in pregnant or lactating women. Because of the potential for nondepolarizing neuromuscular blocking agents to impair fetal function, rocuronium bromide should be used during pregnancy only if the potential benefit justifies the risk to the fetus.

**Geriatric Patients**

The pharmacokinetics of rocuronium bromide are similar in geriatric patients and healthy adult volunteers.

**Pharmacokinetics**

Rocuronium bromide is rapidly absorbed following intravenous administration and is distributed predominantly into extracellular body compartments. The mean apparent volume of distribution is approximately 0.65 L/kg. Rocuronium bromide is predominantly metabolized by pseudocholinesterase to inactive products, which are excreted in the urine.

**Pharmacodynamics**

Rocuronium bromide-induced neuromuscular blockade was modified by alkalosis and acidosis in experimental animals. Neuromuscular block was significantly prolonged by the respiratory acidosis induced by hypercapnia and could be partially antagonized by the respiratory alkalosis induced by hyperventilation. Rocuronium bromide-induced block was modified by moderate hypothermia in clinical studies.

**Dosage and Administration**

**Maintenance Dosing**

Infusion at an initial rate of 10 to 12 mcg/kg/min of rocuronium bromide should be initiated only after early evidence of clinical duration under opioid/nitrous oxide/oxygen anesthesia (more than 10% of control T 1), may necessitate additional bolus doses to maintain adequate block for surgery. [see Clinical Pharmacology (12.3)].

**Maximum Intubating Dose**

A maximum dose of 10 mg/kg is achieved within the first 10 minutes. About 25% of patients may have a clinically insignificant cumulation of effect with subsequent doses. [see Clinical Pharmacology (12.3)]

**Residual Paralysis**

Residual paralysis is more likely to occur in patients with renal or hepatic impairment and in patients with neuromuscular disease, and in patients with carcinomatosis. Conditions associated with an increased circulatory delayed time, e.g., cardiovascular disease or advanced age, may delay recovery. Residual neuromuscular block may occur under opioid/nitrous oxide anesthesia. In these or other patients in whom potentiation of neuromuscular block or difficulty with reversal may be anticipated, appropriate management should be considered. Use of paralysis monitoring techniques, e.g., twitch monitoring or nerve stimulation to assess residual paralysis, may help to detect and manage residual neuromuscular blockade. In patients with residual neuromuscular blockade, residual paralysis may be antagonized by intravenous administration of a nondepolarizing reversal agent such as edrophonium or neostigmine.

**Drug Interactions**

Rocuronium bromide injection is available as:

- 10 mL Multiple Dose Vials containing 100 mg Rocuronium Bromide Injection (10 mg/mL)
- 2 mL Multiple Dose Vials containing 20 mg Rocuronium Bromide Injection (10 mg/mL)
- 1 mL Multiple Dose Vials containing 10 mg Rocuronium Bromide Injection (10 mg/mL)
- 1 mL Multiple Dose Vials containing 2 mg Rocuronium Bromide Injection (10 mg/mL)
- 1 mL Multiple Dose Vials containing 0.2 mg Rocuronium Bromide Injection (10 mg/mL)

**Use in Specific Populations**

**Pediatric Patients**

In patients with renal or hepatic impairment and in patients with neuromuscular disease, and in patients with carcinomatosis.

**Presentation With Drug or Condition Causing Potentiation of Neuromuscular Block**

In patients with renal or hepatic impairment and in patients with neuromuscular disease, and in patients with carcinomatosis.

**Preparation for Administration of Rocuronium Bromide**

**Infusion Compatibility**

Rocuronium bromide injection is compatible with sodium bicarbonate, potassium chloride, and hydrocortisone sodium succinate. It is not recommended to mix with other drugs.

**Pharmacokinetics**

Rocuronium bromide-induced neuromuscular blockade was modified by alkalosis and acidosis in experimental animals. Neuromuscular block was significantly prolonged by the respiratory acidosis induced by hypercapnia and could be partially antagonized by the respiratory alkalosis induced by hyperventilation. Rocuronium bromide-induced block was modified by moderate hypothermia in clinical studies.
1.0 Anticonvulsants

In the same study to 10 patients under opioid/nitrous oxide/oxygen anesthesia. The clinical duration of initial doses of (enflurane > isoflurane > halothane).

8.7 Patients with Renal Impairment

These findings are consistent with the increase in volume of distribution at steady state observed in pediatric patients are discussed in other sections (such as Neonatology and Administration (2.4). Anticholinesterase agents are recommended in neonates with normally functioning liver and normal renal function.

In general, patients recovering from elective surgery have a small reduction in dosage during which in effect it is almost equal to that at induction. Following discontinuation, there is a rapid decrease in plasma concentrations of rocuronium. Table 6 describes the pharmacokinetic parameters in adults and geriatric patients during induction and maintenance of neuromuscular blockade in patients aged 18 years or older during spontaneous ventilation.

A number of drug-drug interaction studies have been reported. Interactions with cimetidine and ranitidine, which are potent inhibitors of CYP2D6, may result in an increased plasma concentration of rocuronium and increased duration of action.

Concomitant administration of medications with similar actions may result in prolonged neuromuscular blockade. If rocuronium bromide is administered with other neuromuscular blocking agents, the duration of action may be prolonged.

In adult surgical patients undergoing either opioid/nitrous oxide/oxygen or inhalational anesthesia, the observed incidence of changes from baseline (30% or greater) in mean arterial pressure was 4.7% (2.4–7.0) for patients receiving rocuronium bromide, with a median duration of 6 minutes (2.4–12) at induction and 4 minutes (2.4–12) at maintenance.

Since rocuronium bromide is primarily excreted by the liver, it should be used with caution in patients with clinically significant hepatic insufficiency. Prolonged neuromuscular blockade has been reported in patients with severe chronic liver disease. In patients with hepatic cirrhosis, the half-life of rocuronium is increased.

In the elderly, up to 25% lower doses than those used in younger patients may be required. In geriatric patients, the half-life of rocuronium is increased and the clearance is decreased.

The mean time to 80% or greater block and clinical duration as a function of dose are presented in Figures 1 and 2.

In the elderly, the mean time to 80% or greater block was increased to 14.4 minutes (12.3–18.0) for doses of 0.6 mg/kg and to 17.7 minutes (16.0–21.0) for doses of 0.8 mg/kg.

In adult surgical patients undergoing either opioid/nitrous oxide/oxygen or inhalational anesthesia, the observed clinical durations of initial doses of (enflurane > isoflurane > halothane).

The terminal half-life and other pharmacokinetic parameters of rocuronium in these populations are also presented in Table 8.

The mean intubating conditions score was 30 (27–33) for patients receiving rocuronium bromide at a dose of 0.6 mg/kg, with a median duration of 4 minutes (2.4–12) at induction and 2 minutes (2.4–12) at maintenance.

In adult surgical patients undergoing either opioid/nitrous oxide/oxygen or inhalational anesthesia, the observed mean time to 80% or greater block and clinical duration of initial doses of (enflurane > isoflurane > halothane).