Atracurium Besylate

Brand names	Tracrium, generic
Medication error potential	ISMP high-alert medication that has an increased risk of causing significant patient harm if it is used in error.[1]
Contraindications and warnings	**Contraindications:** Patients with a hypersensitivity to atracurium or any of its components.[2] **Warnings:** Use carefully under the supervision of experienced clinicians; personnel should also be skilled in airway management and respiratory support. Intubation and ventilatory support equipment (assisted or controlled), including positive pressure oxygen, should be readily available. Reversal agents should be readily available when giving atracurium.[2]
Infusion-related cautions	Histamine release resulting in flushing, erythema, pruritus, urticaria, bronchospasm, hypotension, and changes in heart rate may occur.[2,3] Caution should be taken when administering this agent to patients who may be histamine sensitive (e.g., cardiovascular disease, previous anaphylactoid reactions, asthma).[2] Asystole has occurred in *adults*.[4]
Dosage	*Respiratory function must be supported and concurrent administration of a sedative is also necessary. Monitoring of neuromuscular transmission with a peripheral nerve stimulator is recommended during continuous infusion or with repeated dosing*.[2,5] **Dosing adjustment for obesity:** In morbidly obese *adults*, doses based on ideal body weight (0.5 mg/kg) produced effective neuromuscular blockade for endotracheal intubation with good muscle recovery times.[6] Authors of an opinion-based review on dosing adjustments of anesthetic agents in morbidly obese patients recommend atracurium be dosed using ideal body weight to avoid prolonged duration of paralysis.[36] Pediatric consensus guidelines also recommend using ideal body weight for atracurium dosing.[17] **Dosing adjustment for hypothermic cardiac bypass:** Smaller atracurium doses (50% of usual infusion) may be required in patients undergoing hypothermia (25°C to 28°C) during cardiac bypass.[2] **Dosing adjustment during concomitant inhaled anesthetic agents:** Atracurium infusions should be reduced by 33% in patients undergoing enflurane or isoflurane anesthesia; a smaller dose reduction is required for halothane anesthesia.[2] In patients with a history of histamine sensitivity (anaphylactoid reactions or asthma), doses should be infused over 1 minute.[2] (See the Infusion-Related Cautions section.) **Induction and maintenance of neuromuscular blockade** **Neonates (≤1 month)** **Initial dose:** 0.25–0.4 mg/kg.[7-10] (See Other in the Comments section.) **Maintenance dose:** 0.25 mg/kg[7] PRN **Continuous infusion:** One study reported 0.4 mg/kg/hr (6.7 mcg/kg/min).[11] **Infants and children (1 month to 2 years)** **Initial dose:** 0.3–0.5 mg/kg[2,3,7,8,12-16] **Maintenance dose:** 0.3–0.4 mg/kg[2,7] PRN **Continuous infusion:** 0.3–1.2 mg/kg/hr (5–20 mcg/kg/min)[3,7,11,14-17] **Children (≥2 years)** **Initial dose:** 0.3–0.5 mg/kg[2,3,7,8,12-14,17,18] **Maintenance dose:** 0.08–0.1 mg/kg[2,7] PRN. Children may require more frequent administration than *adults*.[2] **Continuous infusion:** 0.3–0.9 mg/kg/hr (5–15 mcg/kg/min)[2,3,7,11,14,17,19,20] Larger doses have been required to facilitate mechanical ventilation in critically ill children; mean doses were 1.6–1.72 mg/kg/hr (27–29 mcg/kg/min).[20] Infusion requirement may increase with prolonged administration.[15] (See the Maximum Dosage section.)

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Dosage adjustment in organ dysfunction	No dosage adjustment is required in renal[2,7,21] or hepatic dysfunction.[2,7]
Maximum dosage	0.6 mg/kg has been used safely in infants with severe hepatic dysfunction under halothane/nitrous oxide/oxygen anesthesia.[22] An infusion of 0.53 mg/kg/hr (8.8 mcg/kg/min) has been used in those >1 month of age and 0.4 mg/kg/hr (6.7 mcg/kg/min) has been given to neonates.[11] Occasionally, continuous infusion doses as large as 2.4 mg/kg/hr (40 mcg/kg/min) may be required.[14] In one study, seven pediatric patients required a mean infusion of 1.72 mg/kg/hr (28.7 mcg/kg/min) for up to 72 hours.[20] A case report described a 17-year-old who received 4.5 mg/kg/hr (75 mcg/kg/min) but experienced prolonged muscle weakness afterward.[23] (See Significant Adverse Effects in the Comments section.)
Additives	Multidose vials contain benzyl alcohol 0.9% as a preservative.[2,24] See Appendix C for more specific information about potential adverse effects and/or benzyl alcohol toxicity in neonates.
Suitable diluents	D5W, D5NS, NS. Dilution in LR results in degradation of atracurium.[2]
Maximum concentration	10 mg/mL for IV push[7]; 0.2–0.5 mg/mL for continuous infusion.[2,24]
Preparation and delivery	*Parenteral products should be visually inspected for particulate matter and discoloration before use. Refer to appropriate reference for more information on compatibility with other drugs and solutions, compatibility following Y-site delivery, and suggested storage and extended stability.*[24] Atracurium is an acidic solution; do not administer with alkaline solutions.[2,24] May be incompatible with propofol; however, the potential for incompatibility is concentration dependent and formulation specific.[24]
IV push	10 mg/mL given rapidly or over 1 minute in patients with a history of histamine reactions.[2]
Intermittent infusion	No information is available to support administration by this method.[2,3,7]
Continuous infusion	0.2–0.5 mg/mL[2,24]
Other routes of administration	Should not be given IM due to tissue irritation.[2,7,24] No information available to support administration by other routes.
Comments	**Significant adverse effects:** Prolonged paralysis lasting 81 days was reported following atracurium infusion (20–75 mcg/kg/min) for 2 weeks in a 17-year-old patient.[23] The patient was also receiving corticosteroids, which may be a risk factor for this adverse effect. Prolonged paralysis has also been reported after following other neuromuscular blocking agents.[25-30] (See Drug Interactions below.) Severe toxicity including death was reported in six neonates who received doses of 0.5 mg/kg. These babies ranged in gestational age from 24–37 weeks and in postnatal age from 1 day to 23 weeks. Toxicities included tachycardia, bradycardia, and oxygen desaturation. Three events resulted in death. The authors reported that atracurium could not be definitively linked to these outcomes but suggested lower doses (0.25 mg/kg) for neonates.[10] Prolonged administration of atracurium may lead to the accumulation of its laudanosine metabolite. This metabolite has been associated with CNS irritation and seizures in animal models. Accumulation of laudanosine has been reported in patients with renal failure as well as those with hepatic failure, before and after liver transplantation, but generally at concentrations significantly lower than those associated with CNS excitation.[2,31-33]