

TITLE NEUROMUSCULAR AND CARDIOVASCULAR EFFECTS OF BW 33A (ATRACURIUM) IN PATIENTS UNDER HALOTHANE ANESTHESIA

AUTHORS: John J. Savarese, M.D., Salvatore J. Basta, M.D., Hassan H. Ali, M.D., N. Sunder, M.D., Jonathan Moss, M.D., PhD

AFFILIATION: Department of Anesthesia, Harvard Medical School at the Massachusetts General Hospital, Boston, MA 02114

Introduction. We have evaluated the neuromuscular and cardiovascular effects of the new intermediate-duration nondepolarizing relaxant BW 33A (atracurium) in subjects under N2O/O2 thiopental-fentanyl anesthesia (1).

Intermediate onset and duration and less cardiovascular effect than other currently used nondepolarizers have been observed(1). At the highest dosage studied in this initial clinical trial, a relatively weak hypotensive property was noted which correlated well with mild increases in serum histamine levels(2).

The present study was undertaken to evaluate (a) whether the neuromuscular blocking effect (onset and duration) of atracurium is potentiated or prolonged by a potent inhalation anesthetic (halothane); (b) whether the relative lack of cardiovascular effect remains consistent in the presence of the cardiovascular depressant property of halothane; (c) whether the potent anesthetic vapor has any influence on the relatively weak histamine-releasing property of atracurium (2).

Methods. Forty ASA I patients aged 18-59 gave institutionally approved informed consent. They received morphine (0.1 mg/kg) and diazepam (0.15mg/kg) one hour preoperatively. Anesthesia was induced with thiopental (4-5 mg/kg). Halothane and oxygen were then administered by mask and tracheal intubation was accomplished without a relaxant. Radial arterial pressure, tachograph-measured heart rate and the repetitive train-of-four response (2Hz for 2 sec repeated every 10 sec) were recorded simultaneously. Esophageal temperature and arterial gases were maintained within normal limits. End tidal halothane concentration was kept between 0.7-0.9% (1.0-1.25 MAC).

After at least 15 min of stable baseline measurements, atracurium was given as a rapid (5 sec) IV bolus. Surgical stimulation was withheld until after the maximal neuromuscular and cardiovascular effects of atracurium had been ascertained.

Arterial blood samples for serum histamine determination (3) were obtained immediately before and at two and five minutes after the administration of the highest dose of atracurium employed (0.4mg/kg) in the present study.

Results and Discussion.

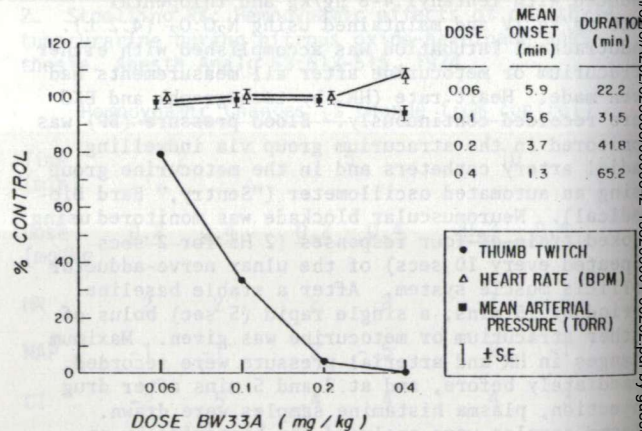
The neuromuscular and cardiovascular effects of atracurium under halothane are summarized in Figure 1 (10 subjects per dose). The ED95 for neuromuscular blockade is 0.17 mg/kg. This represents only a very slight (10%) potentiating effect of

halothane versus results obtained under balanced anesthesia (1). Similarly, the onset and duration of action of atracurium at both 0.2 and 0.4 mg/kg were not significantly different from data generated under balanced anesthesia (1). Cardiovascular changes (Fig 1) did not differ significantly from control levels at 0.06, 0.1 or 0.2 mg/kg. Maximum changes in heart rate at 0.4 mg/kg were statistically significant. The change in mean arterial pressure approached statistical significance ($p=0.056$). These changes, however, represent a decrease in mean arterial pressure of only 6% and an average increase in heart rate of only 8%. Serum histamine levels did not change significantly (Table 1) at 0.4 mg/kg, the highest dose studied.

Table 1
Effect of Atracurium (0.4mg/kg) on Serum Histamine

Control Level	Levels (pg/ml±SE)	
	+2 min	+5 min
483±76	520±100 (NS)	480±103 (NS)

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Conclusion: The neuromuscular blocking potency, onset and duration of action of atracurium, unlike other nondepolarizers, seem virtually unaffected by halothane (1-1.2MAC), since they do not differ significantly from data obtained under balanced anesthesia(1). Cardiovascular changes were minimal, and histamine levels did not change at the highest dose studied (0.4 mg/kg), which is at least twice the ED95 under halothane and which caused 100% block in all subjects.

References.

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