TITLE: ONSET AND DURATION OF ACTION OF PIPECURONIUM BROMIDE

AUTHORS: JC Stanley FFARCS, RK Mirakhur MD, MM Sampaio FFARCS, RSJ Clarke PhD

AFFILIATION: Dept of Anaesthesia, Royal Victoria Hospital and the Queens University, Belfast, Northern Ireland

Pipecuronium bromide is a nondepolarizing muscle relaxant free from any significant cardiovascular effects[1]. There is little information available about the effect of volatile anesthetics on its neuromuscular effects. In the present study we have assessed its onset and duration of action under fentanyl (F) and halothane (H) anesthesia.

Eighty adult patients were studied with their informed consent and ethical committee approval. Anesthesia was induced with F 2-3 ug/kg and thiopental 4-5 mg/kg and maintained with 70% nitrous oxide in oxygen and 0.45% H or further increments of F. Ulnar nerve was stimulated at the wrist with supramaximal stimuli in a train-of-four (TOF) or single twitch (ST) mode every 10 s and the force of contraction of the adductor pollicis muscle recorded. The allocation to ST or TOF or to H and F anesthesia was randomised.

Following stabilisation of the control ST or TOF responses $1xED_{95}$ pipecuronium (45 ug/kg)[2] was administered. The time taken to the maximum depression of ST or the first response (T1) of the TOF stimulation was recorded as was the time to their recovery to 25% (Dur 25). Wherever possible, time to their recovery to 50, 75 and 90% of control values (Dur 50, 75 and 90) was also recorded. Another 10 patients anesthetised with H were given an equipotent dose of pancuronium (60 ug/kg)[2] and monitored using ST stimulation.

The results are given in table 1. These show pipecuronium to be a muscle relaxant of relatively long duration. The recovery index (Dur 25-75) where measured was about 29 min. Cardiovascular effects were minimal. The onset and Dur 25 of the ST halothane group shows there to be no significant difference from the group given pancuronium (5.7±1.3 and 46±11.6 min respectively).

REFERENCES:

1. Arzneimittel Forschung 30: 346-354, 1980
2. Br J Anaesth 61: 505P-506P, 1988

Table 1. Neuromuscular effects of pipecuronium

	ST		TOF	
	Fentanyl	Halothane	Fentanyl	Halothane
Onset (min)	5.7±1.4*	4.3±1.1*	3.5±0.6	3.5±0.5
Dur25 (min)	41±12.6	54±14.8#	41±9.6	49±13.1
50 (min)	53± 10.7(6)	63± 14.1(10)	47± ** 9.3(9)	65± 15.3(15)
75 (min)	70± 10.3(6)	86± 16.7(10)	58± 5.1(5)	77± 19.7(12)
90 (min)	83± 12.3(6)	87± 15.5(7)	73± 3.0(3)	89± 21.2(10)

n = 20 except where shown in parentheses. Values are mean ± SD. *p<0.05 from other groups; #p<0.05 in comparison to the two fentanyl groups. **p<0.05 in comparison to the two halothane groups.

TITLE: INTUBATING CONDITIONS AT 1 1/2 & 2 1/2 MINUTES AFTER PIPECURONIUM BROMIDE

AUTHORS: S.S. AZAD, M.D., G.E. LARIJANI, PH.D., R.R. BARTKOWSKI, M.D., PH.D. J.L. SELTZER, M.D., M.E. GOLDBERG, M.D.

AFFILIATION: ANESTHESIOLOGY DEPARTMENT JEFFERSON MEDICAL COLLEGE PHILADELPHIA, PENNSYLVANIA 19107

Pipecuronium (PIP) is a new non-depolarizing muscle relaxant with an ED95 of 0.035 mg/kg. The objective of this study was to administer 2 and 3 times the ED95 dose of PIP under balanced anesthesia and compare the intubating conditions of these two doses at 1 1/2 and 2 1/2 minutes.

36 ASA Class I-II patients of either sex, mean ages 43±10 years old, mean weight of 66.9±12 kg, gave informed consent to participate in this IRB approved study. After premedication with morphine 0.1 mg/kg and atropine 0.02 mg/kg IM, anesthesia was induced with fentanyl 3-6 mcg/kg and thiopental 3-6 mg/kg I.V. 0_2 and N_2O were administered by face mask in a 40:60 ratio. After induction the isometric force of contraction of the adductor pollicis muscle was elicited utilizing a train-of-four (TOF) 0.2 Hz supra maximal square wave impulse of 0.2 milliseconds duration every 12 seconds via surface electrodes over the ulnar nerve. The response was quantitated with a Grass FT10 Transducer and continuously recorded on a Gould polygraph. Once the baseline of TOF was established, PIP 0.07 mg/kg or 0.1 mg/kg was administered IV. The trachea was intubated at 1 1/2 and 2 1/2 minutes after either doses and intubating conditions compared and scored. Excellent was given for full relaxation of vocal cords, good for a slight movement of cords or diaphragm and poor for bucking and movement. Table 1 shows that the onset of blockade is quicker with the 0.1 mg/kg dose. Figure 1, shows intubating conditions were good or excellent in all patients except two who received 0.07 mg/kg PIP and intubated at 1 1/2 minutes.

Discussion: Intubating conditions at 2 1/2 minutes appear significantly better than at 1 1/2 minutes. The PIP dose did not make a significant difference in intubating conditions at either time. We found the patients could be intubated successfully in 1 1/2 minutes with either dose but with less than optimal condition. If the clinical situation requires perfect relaxation with no movement or bucking we recommend waiting at least 2 1/2 minutes.

Fig 1 : Intubation scores vs. dose and time

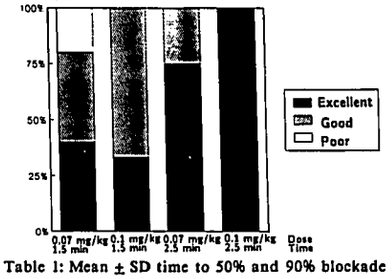

Table 1: Mean ± SD time to 50% and 90% blockade after PIP

DOSE (mg/kg)	50% BLOCKADE OF T1 (min)	90% BLOCKADE OF T1 (min)
0.07	1.36±0.51	2.29±0.8
0.10	1.07±0.27*	1.72±0.45*

* P<0.05 for difference between doses