LETTER TO THE EDITOR

LOCAL ANAESTHETIC AND MYOCARDIAL DEPRESSANT EFFECTS OF BETA ADRENOCEPTOR BLOCKING AGENTS

Sir,

Beta adrenoceptor blocking agents possess myocardial depressant and local anaesthetic activities but these are not related to their beta receptor blocking action. Myocardial depressant effect and local anaesthetc activity of procinolol, bunolol, H 35/25 and practolol were studied in this work to test if these activities are anyway related.

The methods employed were : (a) Conduction block anaesthesia : foot withdrawal reflex (FWR) in frog (1); (b) Infiltration anaesthesia : intradermal wheal method (1) in guinea pigs and (c) Surface anesthesia : rabbit cornea (5).

Myocardial depressant effect was studied on spontaneously beating and electrically driven rabbit atrial preparations, set up as described earlier (4).

The potency ratios of four beta adrenoceptor blocking agents in producing nerve conduction block and infiltration anaesthesia (procaine= 1) are presented in Table I. Practolol had minimal local anaesthetic activity whereas procinolol was the most potent local anaesthetic on frog nerves. Likewise, practolol had no effect but procinolol was the most potent infiltration anaesthetic; effects of bunolol and H 35/25 ranged in between the two.

On the other hand, surface anaesthesia on the rabbit cornea was not observed with practolol, bunolol and H 35/25. Procinolol (2%) produced surface anaesthesia lasting for 31.25 ± 2.40 min ($n=4$) which did not differ significantly from duration of anaesthesia (30.00 ± 2.05 min; $n= 4$; $P>0.05$) due to cocaine (2%).

Practolol (1 and 10 $\mu g/ml$) had no depressant effect on the spontaneous atrial rate (Table I); however, it reduced the contractility of electrically driven left atrial preparations significantly (Table I). Procinolol (10 $\mu g/ml$) was the most potent myocardial depressant whereas, the myocardial depresant effects of bunolol and H 35/25 ranged in between the two (Table I).

The effectiveness of the beta-adrenoceptor blocking agents in restoring ouabain-induced ventricular tachycardia into the normal sinus rhythm is directly related to their

local anaesthetic activity (2, 3, 6). Likewise, the degree of myocardial depression observed in the present study with four beta-adrenoceptor blocking agents appeared to be directly related to their local anaesthetic potencies.

TABLE I : Local anaesthetic and myocardial depressant effects of beta-adrenoceptor blocking agents.

	Potency ratio for local anaesthetic activity		*Myocardial depressant effect – percent inhibition of control response (Mean ± S.E.M.)*			
	Nerve conduction block	*Infiltration anaesthesia*	*Force of contraction (twitch tension)*		*Atrial rate (beats/min)*	
			1 μg/ml	10 μg/ml	1 μg/ml	10 μg/ml
Procinolol	1.18	5.04	58.90**(5) ± 7.40	93.75**(5) ± 6.25	9**(6) ± 1.90	33**(6) ± 1.92
Bunolol	0.57	1.02	39.77**(6) ± 6.55	64.97**(6) ± 6.88	7**(7) ± 1.45	19**(7) ± 1.84
H 35/25	0.50	0.67	36.54**(6) ± 5.10	51.30**(6) ± 5.51	7*(6) ± 2.52	12**(6) ± 2.90
Practolol	0.25	0.00	21.35*(5) ± 5.06	29.00**(5) ± 4.10	3@(5) ± 3.10	3@(5) ± 4.20
Procaine	1.00	1.00	NOT TESTED			

Values were analysed by Student 't' test for paired samples ;

*($P<0.05$) ; **($P< 0.01$) ;

@increase in atrial rate which was not significant ;

Figures in parentheses represent the number of experiments.

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