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TERBUTALINE SUBCUTANEOUSLY INJECTED FOR THE TREATMENT OF BRONCHIAL ASTHMA IN CHILDREN

By

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For treating bronchial asthma in children and also in adults, adrenergic drugs have long held a central position. In animal experimental studies, β_2 -stimulating sympathomimetic amines—for instance, terbutaline*—have proved their relative selectivity to the bronchial muscle (7). Terbutaline given subcutaneously to asthmatic patients, adults (1, 2) and also children (5) has had a good bronchodilating effect.

As only few studies of the broncholytic effect of terbutaline in children have been published (5, 6) and as the study by Hansing & Kjellman with subcutaneous injections only comprises 10 children, we thought it desirable to study the effect in a larger number of patients. We studied the bronchodilating effect and the possible cardiovascular effects of subcutaneous injections of terbutaline in children with pronounced clinical signs of acute bronchoconstriction.

MATERIAL AND METHODS

55 children aged 6 months to 16 years with an acute asthmatic attack or acute obstructive bronchitis were given subcutaneous injections of terbutaline 0.5 mg/ml on a total of 185 occasions. Some of the children were treated at the out-patient department, but most (39) were hospitalized because of pronounced symptoms of bronchial asthma.

* Bricanyl ®, AB Draco, Lund/Sweden; Subsidiary to AB Astra, Sweden.

On all occasions, heart rate was registered before and 15 minutes after the injection.

In close connexion with the above mentioned treatment, six children with pronounced asthmatic symptoms were given intravenous injections of hydrocortisone and theophylline drugs. 19 children, treated only with terbutaline in connexion with the investigation and who were familiar with Wright's peak flow meter, were investigated for peak expiratory flow rate (PEFR), blood pressure, and heart rate. The measurements were made before the injection and after 10, 30, and 60 minutes. Repeated injections of terbutaline, when needed, were not given until three hours later.

Table 1 gives the number of patients, doses and treatment occasions in the different weight groups.

TABLE 1
Number of patients, doses and treatment occasions.

Body weight kg	No. of patients	Terbutaline mg	No. of treatment occasions
6-10	8	0.05	35
10-15	16	0.05-0.10	43
15-20	6	0.10	8
20-30	11	0.15	37
30-40	6	0.20	26
40-50	8	0.25	36

RESULTS

Table 2 and Fig. 1 report the results in the 19 patients who were controlled with PEFR.

A highly significant increase in mean PEFR was noted 10, 30, and 60 minutes after the injection. No significant changes in blood pressure or heart rate were registered.

All the children reacted well clinically to all the 185 treatments. The 166 injections, when only heart rate before and after 15 minutes was registered, did not influence heart rate except in two nine-year old children who had an uncomplicated, short-lasting tachycardia following a second injection of terbutaline after three hours. The heart rate increased from 100 and 110 before, to 150 and 160 beats per minute, respectively,

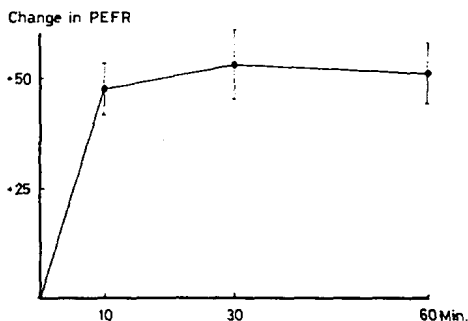


Fig. 1.

Mean of individual changes in peak expiratory flow rate (l/min) from the initial value in 19 asthmatic children after subcutaneous injection of terbutaline.

15 minutes after the last injection. The heart rate became normal again within 10 and 30 minutes, respectively.

DISCUSSION

Subcutaneously given terbutaline in the above mentioned doses is well tolerated by children with acute bronchoconstriction. The onset is rapid and the bronchodilating effect good. The results agree well with those previously published by Hansing & Kjellman (5). The cardiovascular side effects in the form of tachycardia in two of the children were probably dose dependent. These children were given 0.20 mg terbutaline, but weighed only a little more than 30 kg. The same dose had also been given to both children three hours before this occasion; probably the effect depends on a certain accumulation of the drug.

The present study does not include any controlled comparison with adrenaline in corresponding therapy situations, but previous clinical experiences prove that subcutaneous injections of terbutaline have as rapid and good a bronchodilating effect as adrenaline and a considerably longer duration of action (3, 4).

TABLE 2

19 patients registered with peak expiratory flow rate (PEFR), heart rate and systolic and diastolic blood pressure before and after subcutaneous injection of terbutaline.

	PEFR				Heart rate			
	Before	10 min	30 min	60 min	Before	10 min	30 min	60 min
M	113.4	+45.3	+56.1	+52.4	96.2	-0.7	-0.4	-3.4
SEM	7.5	5.9	8.2	7.0	3.2	1.5	1.7	2.1
t ₀		7.71***	6.80***	7.43***		0.47	0.24	1.67

	Systolic				Diastolic			
	Before	10 min	30 min	60 min	Before	10 min	30 min	60 min
M	108.4	-1.4	-2.4	-2.9	69.7	±0	+0.3	-0.3
SEM	2.0	0.9	1.2	1.4	1.3	1.01	1.4	1.7
t ₀		1.46	1.92	2.00		0	0.19	0.16

M: mean of individual changes from initial value.

Degrees of significance: *** highly significant ($P < 0.001$).

Terbutaline injected subcutaneously must be regarded as a good alternative to adrenaline injections. Treatment with injections is especially suitable in young children in whom it is difficult to perform inhalation therapy with β_2 -stimulating sympathomimetics.

SUMMARY

55 children aged 6 months to 16 years with acute broncho-obstruction have on a total of 185 occasions been given subcutaneous injections of terbutaline according to a useful dose schedule for different weight groups. Only a few single transient conditions of tachycardia were noted. 19 of the children were followed with PEFR, blood pressure, and heart rate, and a good clinical effect was registered without influence on haemodynamic parameters.

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