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THE EFFECT OF A NEW SYMPATHOMIMETIC β -RECEPTOR STIMULATING AGENT, TERBUTALINE, GIVEN SUBCUTANEOUSLY TO ASTHMATIC CHILDREN

By

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Terbutaline is a new β -receptor-stimulating agent with affinity predominantly to the tracheal and bronchial muscles (*Persson & Olsson 1970*). Investigations of Terbutaline in adults with spontaneous asthma have shown that 0.25 mg Terbutaline administered subcutaneously gives satisfactory bronchodilatation with only a slight increase in heart rate (*Arner et al. 1970*). A mg for mg comparison has shown the broncholytic effect of Terbutaline to be about twice that of Orciprenaline in asthmatic adults (*Arner 1970*), while the increase in pulse rate was about the same.

The present study was made to investigate the effects of subcutaneously administered Terbutaline in children with spontaneous asthma.

MATERIAL

Ten children with known bronchial asthma were investigated. Table 1 shows ages, heights, and weights.

The children were hospitalized for an attack of bronchial asthma. The investigation took place 2-4 days after admission, when the dyspnoea had subsided. All the children, however, had auscultatory sign of bronchial obstruction in the morning of the day of the investigation. No drugs were given to the patients during the 12 hours before the investigation.

TABLE 1
Material. 10 Children with Bronchial Asthma.

	Age (years)	Weight (kg)	Height (cm)
Range	6-12	20-44	121-154
Mean	9.4	30.4	134.9

METHODS

The following *parameters* were measured: heart rate (electrocardiography), blood pressure (cuff method), peak expiratory flow rate (PEFR, l/min). PEFR was recorded with the patient sitting; a Wright's peak flow meter was used. The children became accustomed to the peak flow meter during the day before the investigation. Three recordings were made, the highest value of the recordings being used in the calculations.

Procedure. The parameters were determined before and 15 and 30 minutes after an injection of saline solution. Terbutaline was then administered subcutaneously, and the parameters were determined at the following times after the injection: 15, 30, 45, and 60 minutes.

If no effect of Terbutaline was noted in PEFR, adrenaline was administered subcutaneously about 65 minutes after the Terbutaline injection. The parameters were determined 15, 30, and 45 minutes after the Epinephrine injection.

The *doses* used were: Terbutaline 0.005 mg per kg body weight, and adrenaline 0.01 mg per kg body weight.

All the investigations were performed by the authors.

RESULTS

The results are given in Table 2 and Figures 1 and 2.

A significant increase in mean PEFR was noted 15 minutes after the injection of Terbutaline. The highest mean value (about 30 per cent above the initial value) was found 30 minutes after the injection. Four patients had an increase in PEFR less than 10 per cent of the initial value. In these patients, subcutaneously administered adrenaline, 120 minutes after the Terbutaline injection, did not produce a satisfactory increase in PEFR.

The slight increase in systolic blood pressure (about 4 mm Hg) and the slight decrease in diastolic pressure were

TABLE 2

Peak Expiratory Flow Rate, Systolic and Diastolic Blood Pressure, and Heart Rate After Subcutaneous Injection of Saline Solution and Terbutaline.

	PEFR		Heart rate		Blood pressure			
	M	± SEM	M	± SEM	Systolic	Diastolic	M	± SEM
Initial value	111.4	15.1	102.3	5.7	115.0	9.0	80.0	1.7
S.c. injection of saline solution								
+ 15 min	—	6.9	± 0	1.3	— 1.1	1.4	— 1.1	1.4
+ 30 min	—	0.1	— 3.2	1.9	— 1.1	1.8	— 0.6	1.5
S.c. injection of terbutaline								
+ 15 min	+ 27.9*	9.8	+ 8.1*	3.2	+ 3.9	2.4	— 1.1	0.7
+ 30 min	+ 32.5**	8.3	+ 6.2*	2.5	+ 0.6	2.7	— 3.9	1.4
+ 45 min	+ 23.7*	7.4	+ 5.6	2.7	+ 2.8	1.7	— 2.2	1.5
+ 60 min	+ 22.7*	9.2	+ 4.4	2.6	+ 2.2	2.1	— 1.7	1.4

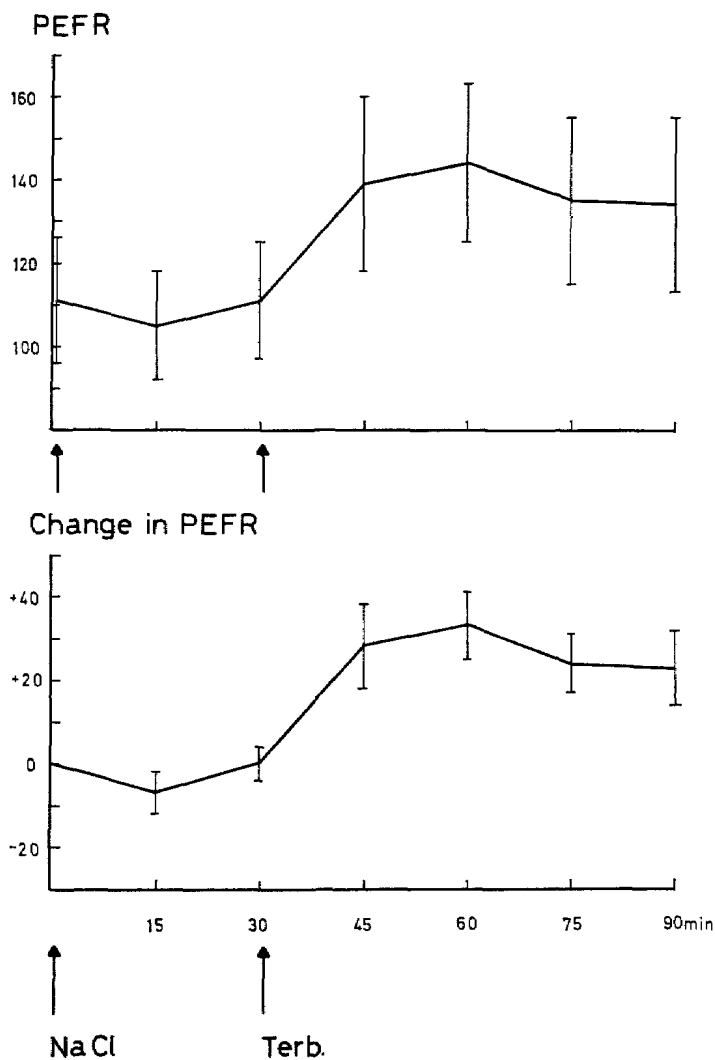
Peak expiratory flow rate (PEFR) (l/min).

Heart rate (beats/min).

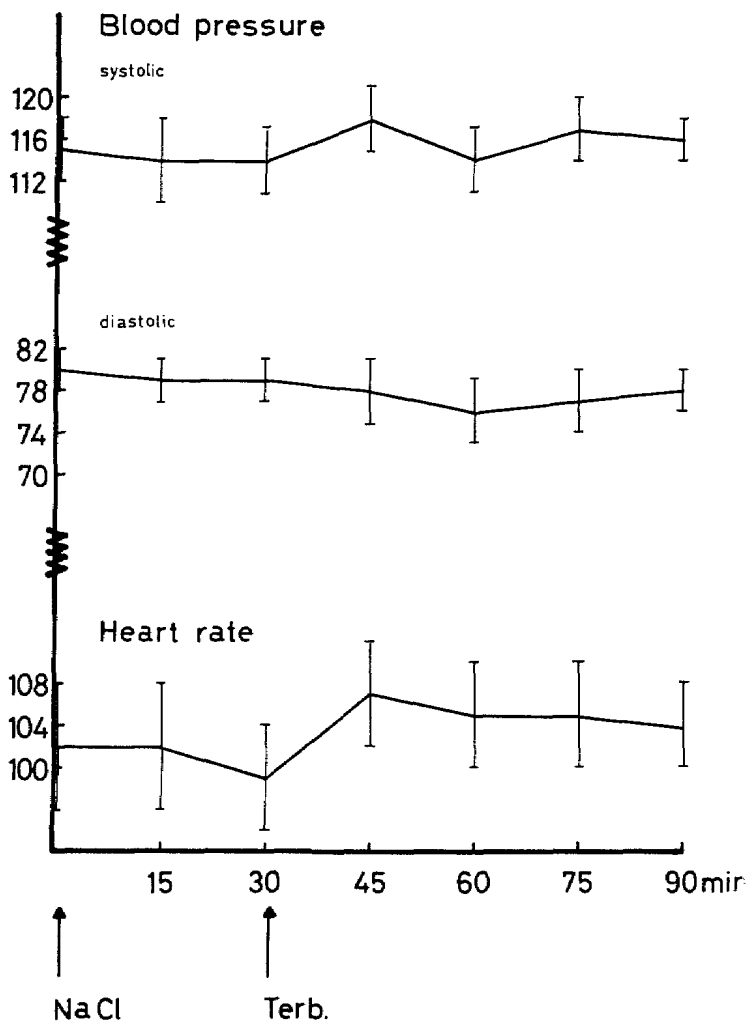
Blood pressure (mmHg).

Mean of individual changes in 10 patients after subcutaneous administration of saline solution and terbutaline.

The degree of significance is indicated with the symbols * ($p < 0.05$), ** ($p < 0.01$), and *** ($p < 0.001$).

*Fig. 1.*

Peak expiratory flow rate (absolute values) and change in PEFR after injections of saline solution and terbutaline. The means and the SE are given.

*Fig. 2.*

Systolic and diastolic blood pressure and heart rate after injection of saline solution and terbutaline.

not statistically significant. The slight increase in heart rate (mean: 8/min) was significant.

One of the 10 children complained of tremor after Terbutaline. She did not show any change in blood pressure or heart rate. She had earlier had the same reaction after moderate, orally given doses of Orciprenaline. No other child claimed subjective distress.

DISCUSSION

Subcutaneously administered Terbutaline in a dose of 0.005 mg per kg body weight is apparently well tolerated in children and gives acceptable bronchodilatation. The results agree well with those found in adults examined in the same way (*Arner et al.* 1970, *Arner* 1970).

The reason that four of the children had less than 10 per cent increase in PEFR could be because their asthmatic distress was combined with infection.

The children as a group showed no significant increase in pulse amplitude, but a statistically significant though only

TABLE 3
Suggested Dosage Schedule for Terbutaline in Children.

Body weight kg	Terbutaline (subcut.) mg
15-20	0.10
20-30	0.15
30-40	0.20
40-50	0.25

slight increase in heart rate. In no child were these effects sufficient to contraindicate the use of these doses.

Our investigation does not provide information concerning the *exact* dose for children. However, we consider that our results suggest the dosage schedule shown in Table 3. This was used in 10 children with acute asthma, and no undesirable side effects were observed.

SUMMARY

Terbutaline was administered subcutaneously to 10 children aged between 6 and 12 years in a dose of 0.005 mg per kg body weight. PEF, heart rate, and blood pressure were determined. The dose produced an acceptable effect and no undesirable side effects were observed.

REFERENCES

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