

EFFECTS OF ADRENALINE INJECTIONS ON ECG IN ELDERLY ASTHMATICS

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BESIDES antispasmodic action on the bronchi, adrenaline stimulates the heart and it causes an increase of the cardiac output. It raises the metabolism of the heart. It increases the coronary blood flow due to direct vasodilator action (Wright, 1961).

The purpose of this study was to see if the therapeutic doses of adrenaline injections have any significant effects on the ECG in elderly asthmatics.

Methods of observations. One hundred asthmatic patients over the age of 50 years were investigated in the allergy clinic. A detailed medical history was taken, and a complete physical examination was carried out. Two separate tracings of ECGs were taken: one before, and the second after adrenaline injection. The second ECG was taken five minutes after subcutaneous injection of adrenaline 1:1000.

There were 46 male and 54 female patients tested. Table I shows their age distribution.

TABLE I
AGE DISTRIBUTION OF THE PATIENTS

<i>Age in years</i>	<i>Number of patients</i>
50—60	50
60—70	39
70—80	11

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History taking showed that 11 male and 16 female patients suffered from angina pectoris. There were six men and seven women with elevated blood pressure. Chest x-rays showed enlarged hearts in three men and six women. Blood W.R.s were negative in all the patients.

The first ECG showed various abnormalities which are recorded in table II.

TABLE II
ABNORMALITIES OF THE FIRST ECG

<i>Abnormality</i>	<i>Number of patients</i>
Ventricular extrasystoles	6
Left axis deviation	18
P. pulmonale	1
Depressed s-T segments	11
Right bundle branch block	2
Left bundle branch block	1

There were no abnormalities on the first ECG which are present in chronic bronchitis and emphysema, as described by Stuart-Harris and Hanley (1957).

Table III shows the abnormalities in the second ECG, five minutes after the subcutaneous injection of 0.5 ml. of adrenaline 1:1000. These abnormalities were not observed on the first ECG.

TABLE III
ABNORMALITIES OF THE SECOND ECG.

<i>Abnormality</i>	<i>Number of patients</i>
Depressed s-T segments in the precordial leads	29
Elevation of s-T segments in the precordial leads	14
Inversion of T waves in the precordial leads	5
Inversion of P waves	1
Ventricular extrasystoles	9

It is seen that the most frequent abnormalities were the s-T segments depression, and s-T segments elevation in the precordial lead.

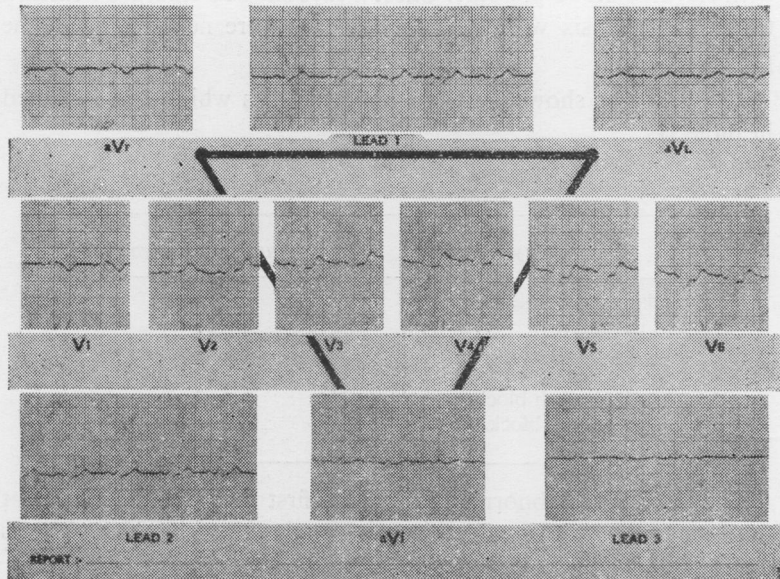
Tables IV and V show the typical ECG changes after adrenaline injection.

In addition to the changes described in table III, 16 patients showed marked tachycardia after adrenaline injection.

Control studies. A group of 25 young adult asthmatics were chosen

TABLE IV

A. FIRST ECG OF A FEMALE ASTHMATIC, AGED 62. LEFT AXIS DEVIATION. INVERTED T WAVES IN LEAD I AND IN AVL.



B. SECOND ECG AFTER ADRENALINE INJECTION. TACHYCARDIA. DEPRESSED S-T SEGMENTS IN THE PRECORDIAL LEADS. ELEVATION OF S-T SEGMENTS IN L.2 AND aVf. TALL T WAVES IN THE PRECORDIAL LEADS.

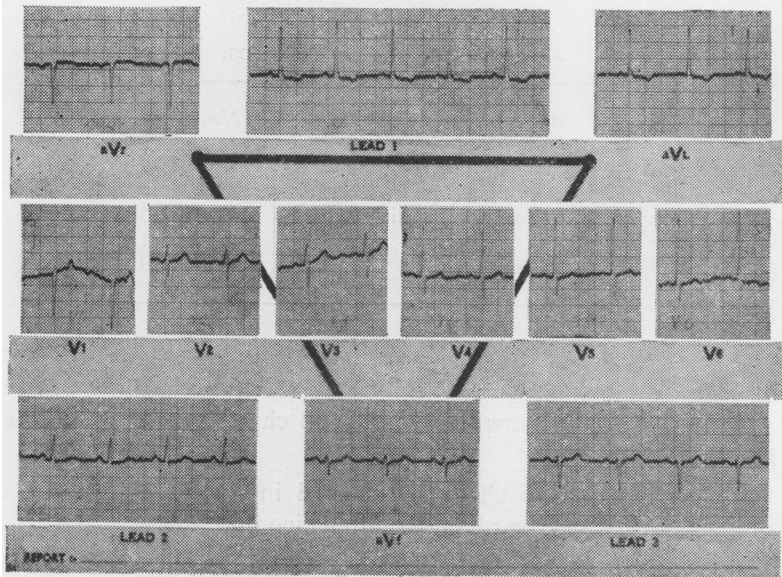
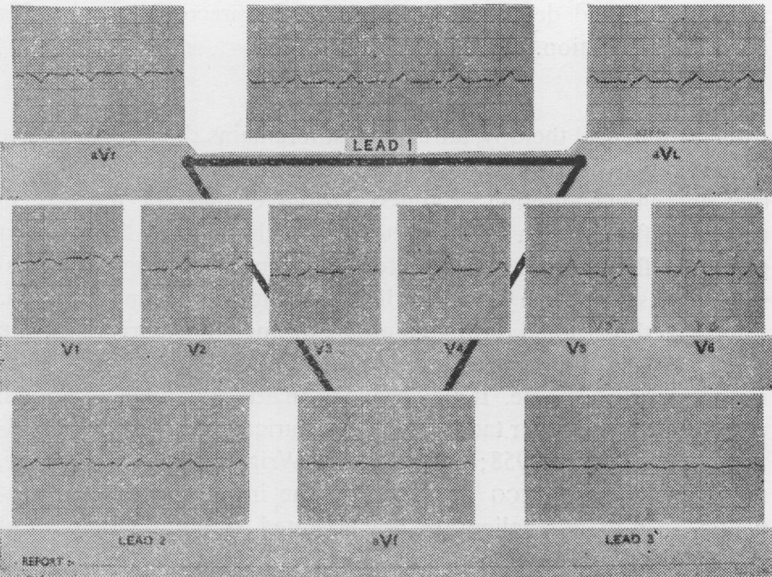
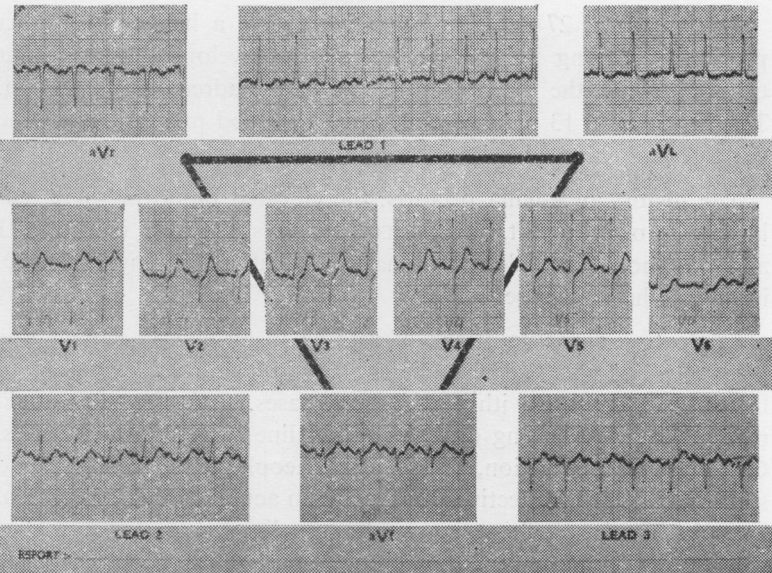


TABLE V

A. FIRST ECG OF A 59-YEAR-OLD MALE ASTHMATIC. NO ABNORMALITIES NOTED.



B. SECOND ECG AFTER ADRENALINE INJECTION. S-T SEGMENTS DEPRESSION IN THE PRECORDIAL LEADS.



at random as controls. There were 13 men and 12 women, and their ages varied from 23 years to 37 years. Only one of them, a woman, aged 35, showed depressed s-T segments in precordial leads after adrenaline injection.

Discussion

Despite steroid therapy, adrenaline still remains the drug of choice in relieving an acute attack of asthma. Levine *et al.* (1930) observed that adrenaline injection produced various changes in the ECG in patients suffering from angina pectoris. Further studies showed that patients suffering from angina pectoris developed elevation or depression of s-T segments in the precordial leads after adrenaline injection, similar to those noted during an attack of angina pectoris (Riseman *et al.*, 1940). Adrenaline can be dangerous in patients suffering from ischaemic heart disease. It may provoke an attack of angina pectoris, paroxysmal ventricular tachycardia, and auricular fibrillation (Goodman and Gilman, 1958; Wood, 1960; Wright, 1961). However, the changes in the ECG produced by the injection of the therapeutic dose of adrenaline are not accepted as pathognomonic of angina pectoris (Goodman and Gilman, 1958). Tuft and Girsh (1960) pointed out that coexistence of bronchial asthma with heart disease is not uncommon. Brown *et al.* (1958) found hypertension and coronary heart disease in a high proportion of men in the seventh decade.

In this work, 27 per cent of patients gave a history of angina pectoris. Among these 27 patients, 13 developed s-T segment depression in the precordial leads after adrenaline injection. There were also 13 patients with elevated blood pressure, and nine patients had enlarged hearts shown on chest x-rays.

The history of angina pectoris, the elevated blood pressure, enlargement of the heart, and the ECG changes observed in tables II and III, show that elderly asthmatics do suffer from hypertensive, ischaemic heart disease.

In treating an acute attack of asthma in an elderly patient, the possibility of ischaemic heart disease should be considered. Adrenaline should be used with care in such cases. It is better to avoid repeated and increasing doses of adrenaline in elderly asthmatics. One adrenaline injection, followed by theophylline derivatives and steroids, should be effective in relieving an acute attack of bronchial asthma. The issue of a syringe and adrenaline to elderly asthmatics is not a wise practice, and the author can account for two deaths of

elderly asthmatics from self-administration of adrenaline injections.

Summary

Effects of adrenaline injections on the ECG were studied in the elderly asthmatics.

One hundred patients of both sexes over the age of 50 years were tested.

A therapeutic dose of 0.5 ml. of adrenaline 1:1000 by subcutaneous injection produced depression of s-T segments in the precordial leads in 29 patients, and elevation of s-T segments in 14 patients.

Inversion of r waves in precordial leads occurred in five patients, and inversion of P waves in one patient.

Ventricular extrasystoles were observed in nine patients, and marked tachycardia in 16 patients.

There were 27 patients who gave a history of angina pectoris, and 13 patients had elevated blood pressure. Enlarged hearts on the x-ray were found in nine patients.

The dangers of adrenaline injections in elderly asthmatics are discussed.

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