Electrocardiograms in Young Ceylonese

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This investigation was undertaken with a view to obtaining basic data regarding the electrocardiogram of the healthy Ceylonese young adult.

SUBJECTS AND METHODS

The study comprised 196 healthy young adults (100 men, 96 women) between the ages of 20 and 30 years, many of whom were university undergraduates and pupil nurses. A full clinical history was followed by a detailed physical examination, and subjects who were not physically healthy were excluded from the study. A 12-lead electrocardiogram was recorded at least 2½ hours after the last meal, with no physical exertion or smoking being allowed ½ hour before the recording, which was done in the recumbent position, using a "Cardioview" direct-writing electrocardiograph (Honeywell, London). Each recording was made after the machine was calibrated, so that 10 mm. was equivalent to 1 mV.

RESULTS

With a few exceptions, most of the electrocardiographic measurements conformed to the accepted "normal" pattern with regard to the P wave, the P-R interval, and the QRS complex. As in other studies among coloured populations, the significant deviations from the "normal" were in the S-T segment and the T wave in the praecordial leads.

Elevation of the S-T segment of 1 mm. or more in one or more praecordial leads was found in 90 per cent of men and in only 2 per cent of women, and an elevation of 2 mm. or more was seen in 33 per cent of men and in none of the women. Fig. 1 shows the incidence of S-T elevation of 2 mm. or more in the praecordial leads in men. This was confined to leads V2 to V4. Over these leads the J point was raised, with a curved S-T segment ending in a tall T wave as shown in Fig. 2. The highest S-T elevation noted was 3.5 mm. T waves exceeding 10 mm. in height occurred in 85 per cent of

those with S-T elevation of 2 mm. or more. Of 8 subjects with maximum S-T elevation, 7 were found to have the same degree of elevation when repeat electrocardiograms were taken one to three months later. Two subjects in whom the electrocardiograms were repeated after one year still had the same degree of S-T elevation. Four subjects with S-T elevation were subjected to exercise (running in the laboratory corridor until tired) and this lowered the S-T segment, sometimes to isoelectric levels. Other procedures, like intravenous atropine (1 mg.) and hyperventilation, did not cause any changes in the raised S-T pattern.

Tall T waves were common in the right and mid-praecordial leads in men, 96 per cent of them having at least one praecordial T wave of 6 mm. or more,

FIG. 1.—The incidence of S-T elevation of 2 mm. or more in the praecordial leads in 100 male medical students.

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FIG. 2.—Electrocardiogram of a healthy young Ceylonese showing elevation of the S-T segment in the precordial leads.

whereas only 8 per cent of women had such T waves. Thirty-seven per cent of men had precordial T waves of 10 mm. or more, whereas the tallest T wave in the women was 7.5 mm. Fig. 3 shows an electrocardiogram of a 20-year-old medical student with 18 mm. T waves in V2. The tallest T waves were seen in V2 and V3.

T wave inversion in V1 was present in 10 per cent of men and 59 per cent of women, and T wave inversion in V1 and V2 was seen in 3 per cent of women and in none of the men.

Prominent U waves in the precordial leads were seen in 97 per cent of men and 27 per cent of women. These were best seen in V2 to V4.

DISCUSSION

Our investigation establishes that most of the standard electrocardiographic measurements in the young Ceylonese adult conform to the pattern described in the standard texts. The duration and height of the P wave, the length of the P-R and Q-T intervals, and the voltages and duration of the QRS complex are similar to the findings reported from western countries. However, the S-T seg-

ment and the T wave deviate from the accepted pattern in a high percentage of subjects. This is of considerable importance in the interpretation of the electrocardiogram in clinical practice. In this communication we confine ourselves to the S-T and T wave variants.

Goldman (1953) reported S-T elevation of 2 mm. or more as a frequent occurrence among American Negroes. In a detailed study of the electrocardiogram in South African Bantus, Grusin (1954) described three patterns of S-T and T changes. Grusin pattern II consisted of elevation of the S-T segment and a tall T wave, with a slowly rising ascending limb and a sharply falling distal limb ending in a U wave. Seriki and Smith (1966) reported a 34 per cent incidence of this pattern, with S-T elevation of 2 mm. or more, among Nigerian male medical students. We found this pattern with S-T elevation of 2 mm. or more in 33 per cent of our male subjects. It is seen in both Fig. 2 and 3.

Elevation of the S-T segment is generally interpreted as indicating myocardial damage, as in pericarditis and myocardial infarction. In view of the

FIG. 3.—Electrocardiogram of a healthy young Ceylonese showing tall T waves in the precordial leads.

high incidence of S-T elevation as a normal variant, one should pay great attention to the clinical picture, biochemical investigations, and serial electrocardiograms in the diagnosis of these conditions.

Tall T waves in the right and mid-precordial leads is another common finding among our male subjects. Somers and Rankin (1962) reported T waves exceeding 10 mm. in the precordial leads in 5 per cent of Bantus in Uganda. Precordial T waves of 10 mm. or more occurred in 37 per cent of our male subjects. Such T waves in two or more chest leads with normal QRS waves have been suggested as indicative of possible posterior myocardial infarction (World Health Organization, 1959). Such a pattern occurred in 30 per cent of our male subjects. Therefore, as Somers and Rankin (1962) suggested, this criterion should be applied with extreme care to our subjects.

T wave inversion in the precordial leads beyond V2 appears to have a high incidence among healthy Negro adults, while it is rare among the white races (Littmann, 1946; Brink, 1956; Pyke, 1963). In their survey of Nigerian young adults, Seriki and Smith (1966) found T inversion in V1 in 92 per

cent and in V1 and V2 in 52 per cent. T inversion beyond V1 appears to be rare among the Ceylonese, the incidence being 3 per cent in women and nil in men. Therefore, as in the white races, the presence of T inversion beyond V2 in the Ceylonese adult should be considered abnormal.

SUMMARY

The electrocardiogram was studied in 196 apparently healthy Ceylonese young adults. There is a high incidence of S-T elevation and tall T waves in the precordial leads. This is similar to the observations reported from Africa. But unlike that found in the Africans, T wave inversion beyond V2 is rare. This is more akin to the findings in the white races. Awareness of the incidence of these normal variants is important in the interpretation of the electrocardiogram in clinical practice.

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