Incomplete right bundle branch block and vital capacity

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Sparros, L. D., Xirouchaki, E., and Trichopoulos, D. (1976). *British Journal of Preventive and Social Medicine*, **30, 266-267. Incomplete right bundle branch block and vital capacity.** Right bundle branch block (RBBB) is occasionally encountered in young persons who lack any other evidence of overt cardiac disease (Hiss and Lamb, 1962; Lancaster, Schechter, and Massing, 1972). The block may be complete or incomplete, the latter being more common. Right bundle branch block has been studied in relation to body weight, obesity, serum cholesterol and glucose levels, and blood pressure, but the results have been negative (Ostrander, 1964; Kannel *et al.*, 1962). Data presented here suggest that incomplete RBBB is related to vital capacity.

One thousand male workers of a Greek firm underwent multiphasic health screening in a private clinic in Athens. Among the apparently healthy workers, four had electrocardiographic evidence of complete and 53 of incomplete RBBB. Incomplete block was defined as a QRS configuration not exceeding 0.11 seconds and consisting of a rSr or rsR in V₁ with or without associated s or S waves in the standard leads I, II, III, and aVF (Moore, Boineau, and Patterson, 1971). The four cases of complete block were excluded from the analysis. The age of the subjects with incomplete block ranged between 22 and 59 years (mean = 34.9).

For each subject with incomplete RBBB a control subject with normal electrocardiograms was selected from the same roster, matched for age ($\pm$ one year). Selection of controls was random within the age stratum. Cases and controls were compared with respect to height, serum cholesterol (determined in a Technicon autoanalyser), and vital capacity. Results expressed as mean values ($\pm$ standard error of mean) are shown in the Table.

Mean serum cholesterol values did not differ significantly between the two groups. However, subjects with incomplete block were taller, although not significantly so ($0.10 < P < 0.15$), and had greater vital capacity ($P < 0.02$) than control subjects.

Since vital capacity varies directly with height (Smith and Kory, 1965), we tried to determine whether the greater vital capacity in subjects with incomplete block could be explained in terms of

TABLE
MEAN VALUES OF HEIGHT, SERUM CHOLESTEROL
AND VITAL CAPACITY OF 53 SUBJECTS WITH
INCOMPLETE RBBB AND 53 AGE-MATCHED CONTROLS

Parameters	Subjects with Incomplete RBBB	Controls
Height (cm)	168.47 $\pm$ 0.94	166.58 $\pm$ 0.81
Serum cholesterol (mg/100 ml)	205.0 $\pm$ 5.0	204.0 $\pm$ 4.0
Vital capacity	3993 $\pm$ 93	3638 $\pm$ 98

their greater height. We have used covariance analysis for the two groups, see Figure (Armitage, 1971). The regression lines of vital capacity on height for subjects with incomplete RBBB and for control subjects are parallel (regression coefficients 71.6 ± 9.8 and 66.7 ± 13.3 respectively) and their vertical difference (d) varies significantly from zero ($d = 223.6 \pm 105.1$; $P < 0.05$). Therefore, the mean vital capacity of subjects with incomplete RBBB is greater than that of control subjects with normal electrocardiograms, even when the difference between the mean height of the two groups has been accounted for in the analysis.

DISCUSSION

The relationship between pulmonary function and RBBB without overt cardiac disease has been suspected (Hamburger, 1960), but it has not been specifically explored. We have shown that subjects with incomplete RBBB have greater vital capacity

FIGURE. Linear regression lines of vital capacity on height in subjects with incomplete right bundle branch block and age-matched controls.

VC_1 and VC_2 = mean vital capacity for subjects and controls respectively.

H_1 and H_2 = mean height for subjects and controls respectively.

b = common regression coefficient of regression lines.

than age-matched control subjects. It is conceivable that this relationship is also true for the functional form of complete RBBB.

The difference in average vital capacity between cases and controls is not entirely explicable in terms of the existing difference in average height. Indeed the opposite may be true—that the relationship between height and incomplete RBBB, if in fact it exists, is mediated through the well-known relationship between height and vital capacity (Smith and Kory, 1965).

The link between vital capacity and RBBB (complete or incomplete) is not immediately obvious. It may be that a constitutional factor is independently related to both the studied conditions. Or, perhaps the vital capacity influences the vagal tone and therefore indirectly the intraventricular conduction. Lastly, it may be that individuals

with greater vital capacity are persons at higher risk for thoracic blows, which are considered to be a possible cause of benign varieties of bundle branch block (Smith *et al.*, 1970).

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