13136 P

Total Cardiac Vibrations in Aged Hearts and in Coronary Disease.

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By means of the vibrocardiograph[1] it is possible to record all the cardiac vibrations (audible and inaudible) that are transmitted through the chest wall. A study of the vibrocardiograms of 100 normal young adults,[2] taken from the usual auscultation areas, established the presence of dominant vibration groups at the onset of systole and at the second sound. These curves were dissimilar to the usual stethogram, as the vibration groups were modified by low-frequency (inaudible) components with which the sound elements are mixed. In 5% of the tracings there appeared low-frequency waves (approximately 1-5 dv. per sec.), the largest mound occurring in mid-systole and two or more in diastole. These waves were of very low amplitude.

The vibrocardiographic curves of 102 individuals over 55 years of age, with and without evidence of coronary disease, were examined. The cases fell into three groups: those with clinical and electrocardiographic evidence of coronary disease (34 cases); those with objective evidence but with normal electrocardiograms (33 cases); and those with no evidence of heart disease. Cases having definite evidence of coronary disease, despite the presence or absence of electrocardiographic change, all showed a prolongation of the total vibration complex at the onset of systole. Normally this complex averages 0.22 second in duration; in these cases the average length was 0.33 second. In some instances of severe myocardial damage, deflections of low frequency with occasional steep slopes occupied nearly all of systole, and on auscultation the sounds were "impure" and muffled. In most of these tracings large, low-frequency waves appeared in systole and diastole similar to those seen in some normals, except that they were definitely augmented in amplitude, occasionally becoming as tall as the most dominant sound deflections; they were in phase with each other and with the onset of ventricular systole. In 15 of the cases without evidence of heart disease, prolongation of the first vibration complex and the presence of the large,

1 Kountz, W. B., Gilson, A. S., and Smith, J. R., *Am. Heart J.*, 1940, **20**, 667.

2 Smith, J. R., Edwards, J. C., and Kountz, W. B., *Am. Heart J.*, 1941, **21**, 228.

slow systolic-diastolic waves were noted. None of these cases had received cardiac therapy of any kind.

The low-frequency (inaudible) vibrations recorded by this method may be due to actual motions of the myocardium. Absolute proof for this is yet lacking. However, the tentative suggestion may be made that as the myocardium is compromised by a diminished coronary flow, and tends to become flaccid, slow vibrations may be provoked in the muscle mass by the violent onset of contraction. Whatever the cause, these slow waves as recorded are constant enough in coronary disease to warrant the suggestion that they may indicate flaccidity and weakness of the heart muscle, and may appear before definite signs of myocardial disease develop.

13137 P

Glycogen Content of the Human Liver.*

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In recent years much attention has been given to the value of the preoperative diet and its relation to the level of liver glycogen in surgical patients. Unfortunately, little is known about the effect of diet, anesthesia and liver pathology upon the glycogen levels of the human liver. Most of our knowledge has been obtained from analysis of human livers obtained at autopsy or from livers of experimental animals. In order to obtain direct information on liver glycogen levels in surgical patients, it was decided to determine the glycogen content of liver specimens obtained by biopsy, and this program was carried out on a series of 33 patients undergoing laparatomy during the winter of 1939-40.

A small section of the biopsy specimen taken during the operation was reserved for microscopic examination and the remainder, approximately 1 g, was immediately frozen in carbon dioxide snow and ether. While still frozen the specimen was ground very fine and transferred into a weighed centrifuge tube containing potas-

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