Sphygmorecording for Assessing Thyroid Function

To the Editor:

Parisi et al. state that noninvasive techniques have not been used routinely to assess the influence of thyroid function on the circulatory system.

They have elected to disregard the noninvasive technique of sphygmorecording which has been in widespread use for the analysis of thyroid4 and cardiac function4 for more than a decade. An extensive literature has appeared in American journals as well as in Japan,6 Switzerland,6 India,7 Argentina, Czechoslovakia, Romania, Sweden, etc.

Sphygmorecording can be obtained on a two-channel phonocardiograph. XY plotters, oscilloscopes, and digital read-outs are also in use for this purpose. Onset (Q) of each QRS complex is taken as zero time of each beat. Microphonic voltages generated by the brachial arterial sounds of Korotkoff (K) heard during blood pressure measurement enter the second channel. The time interval between onsets of Q and K at diastolic cuff pressure (d) is referred to as QKd. The normal value is 210 msec with a standard deviation of 12 msec.

QKd provides a quantitative measure of the specific response of the target organ, the heart, to myocardial-bound thyroid hormones. In hyperthyroidism QKd may be as short as 100 msec. Antithyroid therapy (131I, propylthiouracil, etc.) progressively returns QKd to the normal range.

In hypothyroidism QKd may be as late as 320 msec.3 With thyroid replacement, QKd approaches euthyroid values as T3 and T4 rise. QKd is of special value in evaluating cardiovascular reactivity to thyroid hormones in patients with genetic end-organ resistance or with disturbances of thyroxine binding globulin such that total T4 and T3 values are misleading with respect to clinical status.

The remarkable sensitivity of QKd to myocardial contractility is also seen in the shortening of this interval to 100 msec during treadmill exercise, or in the presence of elevated catecholamines as in pheochromocytoma. QKd is prolonged by propranolol, and markedly so (to 350 msec) by halothane.

QKd is unaffected by heart rate, blood pressure, or gender. Further, measurement of QKd does not require recording of heart sounds or the carotid pulse and thus is prone to fewer sources of error. Unlike systolic time intervals, QKd does not require resort to corrections for heart rate, indices or exponential manipulation.

Sphygmorecording techniques and results have been presented at meetings of the American Heart Association, American College of Cardiology, American and European Thyroid Associations, etc. A recent scientific exhibit with specific attention to thyroid dysfunction was presented at the 1973 meeting of the American Heart Association.

We must conclude that Parisi et al. are wrong when they state that their currently reported technique is "a unique noninvasive measurement" of cardiac responsiveness to thyroid function.

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References

The authors reply:

To the Editor:

The QKd interval of Rodbard et al. represents a summation of the cardiac pre-ejection period (PEP) and extracardiac pressure pulse transmission time to the brachial artery. Since the velocity of pulse transmission is dependent on many factors, such as the state of the blood vessel wall, the length of the pulse propagation path, blood viscosity, as well as myocardial force, the QKd is a measure of over-all cardiovascular response to alterations in thyroid activity.

Determination of systolic time intervals specifically measures the cardiac response to thyroid dysfunction. Our data indicate that there is a shortened cardiac...
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Circulation. 1974;50:640
doi: 10.1161/01.CIR.50.3.640
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
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Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
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