in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnea, or anginal pain." "Ordinary physical activity," "slight limitation" and "marked limitation" may lead to different interpretations by independent observers. It was therefore felt necessary to incorporate a detailed description of ordinary activities and the circumstances in which they were carried out. The N.Y.H.A. class IV includes: "patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest." It should be stressed that angina at rest is not mandatory in grade IV effort angina of the C.C.S. grading nor in the N.Y.H.A. functional class IV ("the anginal syndrome may be present even at rest"). In fact rest angina may be found in patients having grade I to III effort angina, although it is usually observed in more severely disabled patients.

The A.H.A. grading of severity of chest pain1 differs markedly from the F.C. of the N.Y.H.A.2 and from the grading of effort angina proposed by the C.C.S. The A.H.A. category "mild" is equivalent to the C.C.S. grade I. The category "moderate" encompasses, however, the C.C.S. grades II and III. The category "severe" requires that the patient has angina at rest. It seems that this prerequisite may create problems in the classification of patients severely limited in their physical activities but without rest angina. The category "moderate" appears too broad; for instance, it does not separate patients who have angina while walking at a regular pace from patients who experience pain while walking briskly or uphill. Furthermore, "ordinary physical activity which can be considered usual and typical of everyday activity for that individual patient" does not allow comparison from patient to patient nor does it permit grouping patients in subsets.

The A.H.A.'s classification of severity of chest pain includes emotion as a provoking agent. Since angina produced by exertion and that provoked by emotional stress are not always present to the same degree, the C.C.S. grading system considers angina of effort separately. It should be noted that emotional stress is not mentioned in the functional classification of the N.Y.H.A. It was proposed by the C.C.S. that nonexertional angina be classified in the following manner: a) at rest (unprovoked), b) decubitus (lying down, before sleep), c) nocturnal (during sleep), and d) with emotional stress.

We agree with Selzer and Cohn3 that functional classifications, because of their subjective nature, may lead to bias. They may be meaningless if they are not reproducible by independent observers. A detailed description of the physical activities and of other parameters involved becomes mandatory. We recognize, however, that all functional classifications are subjective in their nature and should be complemented by objective means of evaluation.

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References

In Favor of Retaining mm Hg

To the Editor:
At their recent meetings in Sydney, Australia, the Scientific Council on Hypertension of the International Society of Cardiology and the International Society of Hypertension unanimously accepted the following resolution regarding the units for the measurement of blood pressure:

"The International Society of Hypertension resolves that the millimetre of mercury (mm Hg) should be retained for blood-pressure measurement in both clinical and clinical laboratory use and in related scientific publications.

It is the opinion of the Society that the use of SI-units (kilopascal — kPa or millibar — mbar) in such circumstances is totally inappropriate."  

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Quadrigeminy in Concealed Bigeminy

To the Editor:
I read with much interest the report by Kerin et al. on ventricular quadrigeminy as a manifestation of concealed bigeminy.1 Before this report, I also indicated that, under a certain condition, stable quadrigeminy occurs in concealed bigeminy.2 However, the mechanism suggested by them is different from that suggested by me. It seems to me that predominant quadrigeminy in their cases is also governed by the mechanism suggested in my cases.

In cases showing concealed bigeminy, sinus impulses intervening between ventricular extrasystoles are in even numbers only. The sinus impulses here include both conducted and nonconducted to the ventricles. This phenomenon was first reported by us in 1960 and termed the "rule of multiples of 2." In cases of concealed bigeminy without interpolation, stable quadrigeminy often occurs. The upper diagram of figure 1 shows that, in quadrigeminy here, four sinus impulses intervene between extrasystoles, though the sinus impulse labelled (S,) following the extrasystole is nonconducted to the ventricles. Kerin et al. considered that the extrasystolic impulse caused by the sinus impulse S, in the upper diagram fails to become manifest because of prolongation of the ventricular refractory period after the compensatory pause; whereas the extrasystolic impulse caused by the impulse S, becomes manifest because the preceding S,-S, interval is much shorter than the compensatory pause E-S2. However, it seems to me that, in clinical cases of concealed bigeminy, prolongation of the refractory period after the compensatory pause is not the main mechanism governing predominant quadrigeminy. One reason for this is that, when the extrasystolic

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**Figure 1.** Diagrams to illustrate the mechanism of quadrigeminy in concealed bigeminy. Shaded areas represent the absolute refractory period. Intraventricular conduction of the sinus impulse leading to the re-entry path is indicated by dashed lines. V = ventricles; RP = re-entry path; S and (S) = sinus impulses conducted and nonconducted to the ventricles, respectively; E = extrasystole.
[Letter: Quadrigeminy in concealed bigeminy].
S Kinoshita, N Kerin, I Mori and M N Levy

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