In Blann *et al*'s study only the subgroup of subjects with myocardial infarction and hypertension or raised cholesterol (and not the subgroup without these risk factors) had higher concentrations of vWFAG than controls. In Table 4 in our paper (*British Heart Journal* 1991;66:351–5) the results of multivariate Cox regression analysis demonstrate that the association between high concentrations of vWFAG and reinfarction or cardiovascular death was independent of these and other risk factors.

JAN-HÅKAN JANSSON
Department of Internal Medicine,
Skellefteå Hospital,
S-93186 Skellefteå,
Sweden

Thallium scans in syndrome X

SIR—In their interesting retrospective study, Tweddel *et al* (*British Heart Journal* 1992;68:48–50) identified 100 patients with typical angina and normal coronary arteriograms (syndrome X). Thallium defects were found in 98% of the patients leading the authors to conclude that microvascular angina is commoner than generally appreciated. However, this conclusion must be treated with some scepticism because of work-up bias which commonly undermines claims for the diagnostic value of non-invasive testing in studies of this type.¹ Thus we are told that it is the practice at the Royal Infirmary, Glasgow to use the thallium scan as a screening test to select patients for angiography. Preferential selection of patients on this basis itself ensures a high prevalence of abnormal scintigrams in the 10% of their patient population with normal coronary arteries. Only if selection for angiography were independent of the results of thallium imaging could firm conclusions be drawn about the role of microvascular angina in syndrome X.

ADAM D TIMMIS
National Heart and Lung Hospital (Victoria Park),
Borner Road,
London E2 9JX

- 1 Kottler TS, Diamond GA. Exercise thallium-201 scintigraphy in the diagnosis and prognosis of coronary artery disease. *Ann Intern Med* 1990;113:684–702.

SIR—Connoisseurs of the circular argument will find few better examples than that recently presented by Tweddel *et al*. They contend that the finding of a high incidence (98%) of abnormal thallium scans in a retrospective study of patients with angina and normal coronary arteries is indicative of a high prevalence of microvascular disease. Unfortunately this contention is completely invalidated by their own admission that abnormal thallium scans were used for the selection of such patients for angiography in the first place. This being the case, it is surprising that the incidence of abnormal scans was not 100%.

The authors fail to document the number of patients seen with angina during the period under study who had normal thallium scans and as a consequence did not proceed to

angiography. Thus it is impossible to estimate a possible lower limit for the true incidence of abnormal scans in such patients.

The assertion that the scan abnormalities detected represent microvascular disturbances is entirely speculative. Very few such patients have true myocardial ischaemia (reflected by lactate production on stress testing).¹ Indeed, the inability to demonstrate a correlation between severity of the scan defect and limitation of exercise capacity seems to indicate their lack of functional significance. On the contrary, as only 30% of the study patients had abnormal exercise tests the primary conclusion from this study must be the poor positive predictive accuracy and specificity of abnormal thallium scans for detecting significant coronary artery disease where the exercise electrocardiogram is normal.

CLIVE S LAWSON
Cardiovascular Research,
Rayne Institute,
St Thomas' Hospital,
London SE1 1EH

- 1 Greenberg MA, Grose RM, Neuberger N, Silverman R, Strain JE, Cohen MV. Impaired coronary vasodilator responsiveness as a cause of lactate production during pacing-induced ischemia in patients with angina pectoris and normal coronary arteries. *J Am Coll Cardiol* 1987;9:743–51.

These letters were shown to the author, who replies as follows:

SIR—A more thorough reading of our paper would have shown that we were of course careful to emphasise that our unit's general practice of using positive thallium tests as a pre-catheterisation screening test inevitably determines that a very high proportion of our patients have positive thallium tests. Our study was not, did not intend to be, and could not have been an epidemiological study. It set out to provide a description of thallium test findings in an otherwise unselected group of patients presenting with typical effort angina and entirely normal coronary arteriograms. These patients with normal arteriograms represented about 10% of all those undergoing coronary arteriographic investigation in our unit, a proportion that is not grossly different from general experience where thallium is not used as a pre-screening test. Our finding that 98% of these patients showed abnormal thallium tests thus at least suggests—we claimed no more—that abnormal thallium tests are not uncommon in such patients and indeed might be found, by extrapolation, in some 5% of patients undergoing diagnostic coronary arteriography in other units unless our population is very peculiar. We were of course also careful to emphasise that an abnormal thallium does not necessarily imply reduced perfusion, or "microvascular angina" (one current word for the cardiologist's syndrome X in our continuing state of uncertainty) since it might also reflect abnormal potassium handling by the myocyte. Exercise tests and lactate production are recognised as having limited sensitivity in diagnosing ischaemia. Gold standards are hard to find in this arena.

ANN C TWEDDEL
University Department of Medical Cardiology,
Royal Infirmary,
10 Alexandra Parade,
Glasgow G31 2ER

BOOK REVIEWS

Atrial fibrillation. J Rawles. (Pp243; £49.50) Berlin, Heidelberg, New York: Springer-Verlag, 1992. ISBN3-540-19699-4.

Atrial fibrillation is the commonest of all chronic sustained arrhythmias and until recently there was little to add to the early descriptions. The past decade has seen significant advances, with confirmation of the circus movement hypothesis. The other major development is in the understanding of how the atrioventricular node influences the ventricular response. Simple conduction of a proportion of the impulses from the fibrillating atria has been disputed by others in the past, and Rawles now adds his voice and (very usefully) his mathematical model to explain the behaviour of the atrioventricular node as an oscillator. Is this all too abstruse and too basic for the practising clinician? By no means: this slim volume deserves the attention of all cardiologists.

This is the work of one author. Some of the mathematical aspects are difficult, but they are worth studying and you will see that the explanations are quite clear. From them, phenomena such as concealed conduction and therapeutic regularisation of the ventricular rate are now easier to understand in logical terms.

The author's own interest in the changes in the cardiac output that occur during atrial fibrillation are carefully explained, on the basis of the use of non-invasive measurements and with the promise of further and better understanding with the continued use of Doppler techniques. The causes, ways of presentation, and treatment are all discussed, but more in terms of understanding than as a "cook book" list. What is particularly helpful is the bibliography. This is not just an accumulation of references haphazardly collected but rather a set of articles cited at the end of each chapter, each one having precise relevance to statements made in the text. This alone makes the book an important contribution.

While the clinical section is comprehensive it is rather tightly written. Why do coronary artery disease and myocardial infarction each have a subsection, yet lone atrial fibrillation and the sick sinus syndrome do not? The omission of any mention of the syndrome of alternating bradycardia and tachycardia is a surprise in a book written in Aberdeen. The role of chronic bronchitis, previously commonly believed to be important, also deserves more attention and a section of its own.

The discussion on drug actions is relevant with understandably considerable emphasis on what is known about the way in which digitalis works. Others will have to do more work on the mode of action of calcium antagonists before the author can give them corresponding depth of treatment, but what he says about each group of agents is ample and appropriate. He mentions also the use of techniques of ablation and considers carefully the need for prevention of embolic stroke and the ways in which this can be done.

John Rawles has provided us with an extremely useful addition to our knowledge, and his book on atrial fibrillation is one that I