Clinical Problems

The diastolic dilemma

DAVID SHORT

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There is hopeless confusion in the English-speaking world about the determination of the diastolic blood pressure by sphygmomanometry. In Britain generations of students have been taught that the point of muffling of the Korotkow sounds (often referred to as the fourth phase) should be taken as the index of diastolic pressure, and until recently all the major British studies on hypertension have been based on this practice. Workers in the United States, however, have long favoured the point of disappearance of the Korotkow sounds (the fifth phase) as the index of diastolic pressure. This disagreement was evident in the joint report of the Cardiac Society of Great Britain and Ireland and the American Heart Association (AHA)[1] published in 1939 and became explicit in the recommendations of the Scientific Council of the AHA[2] in 1951. Many important American studies on the epidemiology and treatment of hypertension used fifth phase recordings—notably the Build and Blood Pressure Study of the Society of Actuaries of Chicago[3] and the Veterans Administration Co-operative study on antihypertensive agents.[4] The Framingham study,[5] on the other hand, used fourth phase recording.

In 1967 agreement seemed to have been reached when a subcommittee of the Postgraduate Education Committee of the AHA concluded that the fourth phase should be regarded as the best index of diastolic pressure.[6] But in 1972, or possibly earlier, the Hypertension Detection and Follow-up Programme Collaborative Group in the USA decided to use the fifth phase,[7] and it has recently been intimated[8] that the fifth phase is to be used in the British Medical Research Council's mild hypertension treatment trial. So now the confusion is worse than ever. Two questions arise: Firstly, Is the issue important? Secondly, What can be done about it?

Is the issue important?

What does the difference between the fourth and fifth phases amount to? In fact, it is very variable. In some people, the point of muffling and the point of disappearance of the Korotkow sounds are virtually the same. In others, however, the fifth phase may be 10 mm Hg or even more below the fourth phase, and sometimes there is no fifth phase, the sounds being audible right down to zero pressure. On average the difference is a little over 5 mm Hg.[6] Is such a difference important? In most clinical conditions it is not. It matters little if the diastolic pressure is taken as 75 mm Hg when it should be 80 mm Hg, or vice versa. Similarly, in a patient with severe hypertension the treatment is the same whether the diastolic pressure is 130 mm Hg or 135 mm Hg. A difference of 5 mm Hg is, however, of considerable importance in epidemiology, and particularly in any consideration of the treatment of mild hypertension. If, for example, it was decided as a matter of policy to treat all people with a diastolic pressure of 100 mm Hg or greater, a difference of 5 mm Hg would make an enormous difference to the number of people to be treated. For example, Hawthorne *et al*[9] reported that 15% of the subjects they examined had a diastolic pressure of 100 mm Hg or more. In this study they recorded at the fifth phase. If they had been recording at the fourth phase the proportion would have been nearer 25%—the figure they report for those with a diastolic pressure of 95 mm Hg or over.

What can be done about it?

Do we reaffirm the agreement on the fourth phase precariously reached in 1967? Or do we follow the current fashion and go for the fifth phase? Or do we compromise by recording both phases, as recommended by the World Health Organisation?[10]

The advocates of the fourth phase[6] argue (*a*) that theoretically there is a connection between the true level of diastolic pressure (as determined by intra-arterial measurement) and the fourth phase, whereas there is no such connection with the fifth phase; (*b*) that the accurate detection of the disappearance of the Korotkow sounds depends on the efficiency with which the sounds are heard, and this in turn depends on the position and efficiency of the stethoscope and the sensitivity of the observer's hearing. The fourth phase, on the other hand, is a change in quality rather than in intensity of the sounds and is therefore less affected by these factors; and (*c*) that in high output states (and after exercise) the fifth phase is often far below the true diastolic level and may be unrecordable.

The advocates of the fifth phase[2] claim (*a*) that the fifth phase is, as a rule, much closer to the true diastolic pressure than is the fourth phase and (*b*) that it can be accurately determined in most patients, with better agreement between observers.

I think it must be accepted that the fifth phase is, as a rule, much closer to the true diastolic pressure than the fourth phase. The fifth phase is on average only 2 mm Hg above the true level whereas the fourth phase is about 8 mm Hg higher.[6] This fact must carry more weight than the argument that there is a theoretical connection between the true diastolic pressure and the fourth phase. The argument that accurate detection of the fourth phase is less affected by incorrect placement of the stethoscope and the impaired hearing of the observer is counterbalanced by the claim that there is better agreement between observers in determining the fifth phase. The fact that the fifth phase is sometimes much too low and cannot be identified in every case is an obvious disadvantage.

From the clinical point of view, and indeed from most points of view, the paramount consideration is that the point that is

Cardiac Department, Aberdeen Royal Infirmary, Aberdeen AB9 2ZB
DAVID SHORT, MD, FRCP, consultant physician

chosen should be the one on which there is the best observer agreement; here the fifth phase seems to win. When the fifth phase cannot be determined the fourth phase should be recorded, with a note to this effect, or a question mark placed against the diastolic reading. Until the issue is resolved both fourth and fifth phases should be recorded—for example, 140/80-70 mm Hg or 140/80-80 mm Hg or 140/80-?40 mm Hg. This is in line with the recommendation of the Expert Committee of the World Health Organisation,[10] which has been re-emphasised by Kirkendall *et al.*[6] If only one figure is given for the diastolic pressure and the phase is not stated, a margin of uncertainty of at least 5 mm Hg must be accepted. It should be assumed that the recording is made on the right arm unless otherwise stated, since patients are routinely examined from the right side.

References

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Hospital Topics

Deviation from prescribed drug treatment after discharge from hospital

D M PARKIN, C R HENNEY, J QUIRK, J CROOKS

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Summary

A study of 130 patients discharged from four hospital wards dealing mainly with acute medical cases showed that 66 deviated from the drug regimen prescribed on discharge. Of the patients, 46 did not have a clear understanding of the regimen (non-comprehension) and 20 of the remaining 84 patients understood the prescribed regimen but did not follow the instructions (non-compliance). The prescribing of complex drug regimens, and the availability of medicines prescribed before admission to hospital appeared to be the two main factors influencing non-comprehension and non-compliance.

Introduction

General medical wards are dealing increasingly with acute episodes of chronic diseases. Hence many patients are discharged receiving treatment for the chronic disease as well as for any aftermath of the acute episode. Some patients, however, fail to take the prescribed treatment correctly or default from it.[1 2] We report the extent to which patients discharged from four general medical wards deviated from their prescribed drug treatment and try to identify the main factors responsible.

Scottish Home and Health Department, Edinburgh
D M PARKIN, MRCP, DIP SOC MED, fellow in community medicine (present address: Royal College of Physicians, Edinburgh)

Medicines Evaluation and Monitoring Group, Ninewells Hospital and Medical School, Dundee DD2 1UD
C R HENNEY, RGN, SCM, research nursing officer
J QUIRK, SRN, research nurse

University Pharmacology and Therapeutics Department, Ninewells Hospital and Medical School, Dundee DD2 1UD
J CROOKS, MD, FRCP, head of department

Patients and methods

Altogether 169 patients were considered for inclusion in the study. They had been discharged, during a four-month period, from two men's and two women's general medical wards of a teaching hospital that also serves as a district general hospital. The criterion for inclusion was that one or more drugs had been prescribed at the time of discharge and had to be taken regularly for more than 14 days. Permission to visit the patients at home 10 days after leaving hospital was sought both from the patients and from their general practitioners. At the the time of discharge each patient was given a supply of drugs to last exactly 14 days. The general practitioner gave information on changes to the regimen together with details of additional drugs prescribed. Such changes were taken into account when assessing the degree of deviation from the prescribed regimen.

At the home visit a standard interview schedule was used. The patients were asked to state what medicines they were taking, what their dosage and times of administration were, and whether they were prescribed at hospital or by the general practitioner or were self-prescribed. Each patient's description of his regimen was compared with the regimen prescribed by the hospital or as modified by the general practitioner. Any discrepancies between them were defined as being due to non-comprehension.

After interview the patients were asked to produce all the medicines they were taking. In the studies of non-compliance the quantities and dates of issue of the drugs were known, so that by checking the amounts remaining we could estimate how much of each the patient was likely to have taken. The discrepancy between that amount and the amount prescribed for an individual drug was expressed as a percentage of the correct dose and described as the "percentage deviation" for that drug. Estimates of patients' compliance with treatment were derived by taking the percentage deviation score for each of the drugs prescribed