Medical Education and the X-ray Department

KENNETH SWINBURNE, MB, DMRD
Radiologist, Wharfedale General Hospital, Otley and
St James’s University Hospital, Leeds; Hon. Lecturer in Radiodiagnosis,
University of Leeds

One of the subjects that has suffered most from the changes in the pre-clinical course is anatomy. The minimal time now allotted to its study has had serious consequences for both undergraduate and postgraduate teaching[1] for, while the value placed upon the study of anatomy has declined, there has been an enormous increase in the development and utilisation of all kinds of imaging techniques, to which a secure basis of anatomical knowledge is fundamental. It therefore follows that the study of anatomy is not less important than formerly but of greater importance than ever before[2].

Among anatomists, clinicians, and radiologists there is a growing impression that the process of change in our medical schools has, in this particular respect, been taken too far, and there is agreement that the general level of anatomical knowledge shown by young graduates is not up to the standard required in day-to-day hospital practice. The truth of this assertion is constantly being revealed in the X-ray Department, and it is emphasised anew with each intake of house officers. The problem is of such proportions that, in many X-ray departments, more queries may arise from ignorance of radiological anatomy than from the presence of specific pathological conditions. Indeed, in one study, carried out at the University of Michigan, it was shown that questions concerning anatomy outnumber those relating to pathology by as much as three to one[3]. This is deplorable, one of the more important causes of unnecessary X-ray examinations, and a direct result of the severe reduction in the time allocated to the teaching and study of anatomy. In real terms, it means that medical students become involved with learning about the abnormal before they have acquired a sound knowledge of the normal.

There may now, however, be some grounds for cautious optimism as, during the past five years or so, there have been a number of publications expressing concern about the teaching of anatomy, and stressing the importance of teaching radiological anatomy from the outset of the pre-clinical course[4-7]. Radiologists represent a largely untapped source of teaching potential and could do much more to contribute to the training of doctors[8]. In particular, they can assist in distinguishing between normal anatomical variations and true pathology, can indicate the need, or otherwise, for further investigation, and can advise on the selection of techniques[9,10].

There is little room for doubt that radiologists should contribute to the teaching of anatomy throughout the medical course and also at postgraduate level, for in a very real sense they can illuminate the subject, improve the enjoyment and efficiency of teaching sessions, and foster greater understanding of the use of imaging techniques in diagnosis[11,12]. This relationship will provide opportunities for students to work constructively with X-ray departments and may, in the longer term, make some much-needed converts to radiology[13,14].

The Diagnostic Work-Up

A second factor of equal importance can, however, be discerned underlying the problems of X-ray departments. In parallel with the changes of subject and emphasis that have been introduced in medical schools, there has come a profound change of philosophy which has produced a climate of opinion in which diagnostic investigations of all kinds have increasingly become regarded as a matter of routine. The concept of the diagnostic work-up has been more and more widely adopted as representing the optimum in medical practice, especially in hospitals. Almost unnoticed, emphasis has shifted from studying patients to studying the results of investigations. The elegance and precision with which the indications for a particular investigation are trotted out, for the purpose of passing an examination, are an exciting rarity in daily practice. The prevailing tendency is to write up a batch of tests before a patient has been examined, in order to save time. Of what use is it to save time in one department at the expense of wasting it in another, and more costly, department?

A mindless, rigid, 'routine' approach to the use of investigations results in the acquisition of an enormous quantity of data. Some of this is helpful, some of doubtful significance, some downright contradictory, and much of it of questionable relevance to the actual problem. The sheer volume of data accumulated in many cases must arouse concern as to how much of it is really assimilated and utilised in decision-making, before the pressure of events compels transfer of attention to newer and more urgent problems. In fact, a significant part of our
thinking appears gripped and distorted by the notion of occult illness in healthy patients. The desire never to be caught out induces an attitude of life-long pessimism, in which everything is regarded as either abnormal or about to be abnormal. This philosophy exerts a peculiar force in the hospital environment and is used to justify multiple investigations, repeated visits to out-patients, and long-term follow-up. This gloomy viewpoint produces irresistible pressures to continue investigations, which then come to be used, not as a check upon the condition of the patient, but as a check upon the investigations themselves. However 'normal' the various tests may be, there remains the lurking feeling that they are unreliable, or wrong, and must be repeated until they concede, however grudgingly, the required diagnosis. Our medical ethos reaches its ultimate folly in this style of practice, described by the late Edward Cullinan as 'witch-hunting for disease'.

The use of clinical investigations appears to be governed by certain strict and universal rules—

1. Only those investigations that prove to be abnormal can be believed.
2. Normal investigations are very likely to be wrong and should be repeated, preferably at another centre.
3. Investigations initially carried out at another centre are unreliable, and must be repeated on home ground.
4. Investigations requested by general practitioners are inadequate and irrelevant, and must be discounted.
5. New investigations never replace older ones but merely augment them.
6. The more widely investigations are made available, the greater will be the clamour for more investigations.
7. Investigations that are available must be used, whether or not they are relevant to the problem in hand.
8. Investigations demanded by patients are mandatory.

The widespread use of investigations on a massive scale might not matter too greatly if this could be seen to increase clinical confidence and facilitate decision-making. An end-product of early diagnosis, prompt and effective treatment, and rapid discharge to the care of the family doctor, would provide sufficient justification. Broadly speaking, it does nothing of the kind, for a very great deal of indecision and uncertainty is manifest in the scenario that is being played out in our hospitals. How can one account for this tumult? Could it be the unholy alliance of lack of basic knowledge and overproduction of data, which leads not to the practice of good medicine but to doubt and confusion, hedging of diagnostic bets, multiple investigations, and prolonged attendance at out-patient clinics? While there seems to be increasing acceptance that the teaching of anatomy needs to be strengthened, it has yet to be agreed and understood that excessive data gathering brings obfuscation rather than clarification[15,16]. Modern medicine, it should be acknowledged, is neither an art nor a science but largely an empirical craft.

A most striking contrast to the foregoing pattern of clinical care is to be found in the sphere of private medicine. Few will deny that private practice provides all the advantages of a one-to-one relationship between doctor and patient, in optimum working conditions, uninterrupted by trivia, uncluttered by attendants, encouraging maximum communication, in which the consultation is the thing, and in which the use of investigations normally plays only a minor role in reaching a diagnosis. In all of these respects, it appears that the NHS has something to learn from private medicine.

The routine diagnostic work-up, with its profligate and ill-directed use of investigations should, therefore, be consigned to the scrap heap. It has no logical place in clinical practice, and its application should be resolutely excluded from medical teaching. The recent custom of junior medical staff, and an ever-increasing team of lay assistants, ordering long lists of tests on behalf of their chief, deserves to be totally discredited. The authority of junior staff to order investigations should be carefully controlled, and ought to be part of a much more co-ordinated approach than it is at present. It is a near certainty that we cannot continue to rely on access to unlimited numbers of investigations, and a yearly growth-rate of 6 per cent or more, for all time to come[17]. Recognition of this fact is long overdue.

The way ahead lies in the introduction of decision theory into medical education and clinical practice. This system promotes the selection of tests that are appropriate to the problem under consideration, eliminates wasteful investigations, and reduces discomfort and danger to the patient[18]. All that is required is a fundamental change in clinical attitudes, leading to rejection of the present crude methods of gathering information. The acceptance of decision analysis represents an essential stage in the progress of medicine from a craft to a science[19-22].

References
1. Editorial (1976) British Medical Journal, 2, 603.
2. Jessop, J. H. (1979) British Medical Journal, 2, 459.
3. Keats, T. E. (1974) Atlas of Normal Roentgen Variants, Chicago: Year Book Medical Publishers.
4. Squire, L. F. and Becker, J. A. (1975) Radiology, 117, 227.
5. Swinburne, K. (1978) Lancet, 1, 433.
6. Golberg, B. (1978) British Medical Journal, 2, 1017.
7. Reidy, J., Williams, J., Dilly, N. and Fraher, J. (1978) Clinical Radiology, 29, 591.
8. Pais, M., Krikun, M. E. and Squire, L. F. (1975) Radiology, 116, 79.
9. Middlemiss, J. H. (1967) Proceedings of the British Institute of Radiology, 40, 878.
10. Swinburne, K. (1976) British Institute of Radiology Bulletin, 2, 7.
11. Mackintosh, C. E. (1979) British Journal of Hospital Medicine, 1, 514.
12. Sherwood, T. (1979) Epidemiology and Community Health, 35, 59.
13. Squire, L. F., Whiteley, J. E., Robinson, T. and Twersky, N. (1974) Radiology, 110, 575.
14. Squire, L. F. and Becker, J. A. (1975) Radiology, 117, 227.
15. de Dombal, F. T., Horrocks, J. C., Staniland, J. R. and Guillou, P. J. (1972) Methods of Information in Medicine, 11, 32.
16. de Dombal, F. T. (1979) Journal of the Royal College of Physicians of London, 13, 205.
17. Abrams, M. E. (1979) ibid., p. 217.
18. Editorial (1979) ibid., p. 185.
19. Emerson, P. A. (1979) ibid., p. 185.
20. Emerson, P. A. (1979) ibid., p. 193.
21. Healy, M. J. R. (1979) ibid., p. 195.
22. Card, W. I. (1979) ibid., p. 213.