Clinical audit

The role of the radiologist in surgical management: an audit of clinico-radiological conferences

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Summary

A prospective analysis of the radiological findings and final diagnoses of 342 patients discussed at joint surgical/radiological conferences over a seven-month period was undertaken in an attempt to define the role of the radiologist in the clinical management of surgical patients. Although the diagnosis had already been correctly made on clinical or radiological grounds in 38% (130/342) of patients presented at the X-ray conferences, careful review of the films resulted in an immediate firm diagnosis in a further 9% (31/342), or promoted further radiological investigations which were responsible for an eventual definitive diagnosis in 20% of the remainder (32/169). The input of the radiologist in selecting the most appropriate additional investigation was particularly valuable in the management of more complex clinical problems.

Keywords: surgery, radiology, diagnosis

Advances in diagnostic and interventional radiology have been rapid and far-reaching. In 1921, Burckhardt and Muller visualised the biliary tree by direct puncture of the gall bladder.¹ This technique was refined by the development of percutaneous transhepatic cholangiography in the late 1930s,² but it is particularly within the last decade that we have seen an explosive growth in the number of radiological options available to assist the clinician in both the diagnosis and treatment of patients. Newer, non-invasive techniques such as ultrasound, computed tomography, and magnetic resonance imaging, have great potential, however their relative merits as diagnostic^{3–5} and interventional tools^{6–9} remain uncertain. With a bewildering array of often costly options now open to the clinician, close liaison with the radiology department has become of paramount importance in ensuring that patients receive the most appropriate sequence of investigations and treatment. In the light of these changes, many clinical 'firms' are increasingly reliant on expert radiological advice and discussion at their clinico-radiological conferences. The aim of this study was to examine the effect of such conferences by means of a prospective audit of outcome.

Patients and methods

Over a seven-month period, details of all surgical cases discussed at the clinico-radiological meetings of three surgical firms were prospectively recorded. The information collected distinguished between in-patient and out-patient investigations, and recorded the provisional diagnosis before the meeting, whether or not this had been amended during the meeting, and whether further modes of investigation were proposed and by whom (surgeon or radiologist). Patients were subsequently followed up to identify the investigation which had resulted in the definitive diagnosis. In every out-patient or those in-patients without a diagnosis at discharge from hospital, the clinical notes were reviewed after

Figure 1 The method of diagnosis at the combined surgical/radiological conference in 342 patients (top). The outcome of the 169 patients who went on to further investigations (middle) and the method of subsequent diagnosis after the conference in the 107 patients who were diagnosed prior to discharge (bottom)

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Accepted 24 January 1996

six months to determine (a) whether a final diagnosis had been made, and (b) the method (radiological or nonradiological) by which it had been reached.

Results

Details of 431 sets of investigations from 342 patients were reviewed at 58 joint surgical/radiological meetings over a 30-week period. Eighty-nine (21%) of the investigations presented related to patients who had been reviewed at previous meetings. Investigations were not available for presentation in 4% of the cases discussed.

The pre-conference diagnosis (largely clinical) was confirmed in over a third of patients presented (figure 1). However, in a further 9% (31/342) of patients, a firm diagnosis was established as a result of the conference (almost invariably by a radiologist (29/31)) with these cases being either a change of a firm pre-conference diagnosis or arising *de novo* in patients previously without diagnosis. Of the remaining 169 patients, a diagnosis was made in about half (83/169) as an in-patient with this rising to 63% (107/169) by the time of their final review six months later. A breakdown of the principal method of diagnosis in these 107 patients is shown in figure 1; this confirms the importance of advice from the radiologist as the source of diagnosis in 30% (32/107) of these patients. No patient had an originally correct diagnosis altered in error as a result of the conference.

Discussion

Clinical audit is now firmly established in healthcare and applied to a wide range of activities. Although many of the data are necessarily of a routine nature, many studies applied to specific clinical areas such as peri-operative morbidity,¹⁰ open access gastroscopy,¹¹ patient satisfaction,¹² and surgical waiting lists,¹³ have revealed interesting and often unexpected results.

The aim of this study was to assess the impact of the radiologist on the management of surgical patients. Difficulty was anticipated where a number of parallel investigative routes were used in addition to radiology; however, it proved surprisingly straightforward to identify the investigation 'responsible' for the eventual diagnosis, particularly in patients who underwent further tests after the initial X-ray conference. Although it was anticipated that the impact of the radiologists would be significant, particularly with respect to their choice of the most appropriate next investigation, the frequency with which their intervention ultimately produced a definitive diagnosis was remarkable. Of the 107 patients in whom a firm diagnosis was made after further tests, radiology played a key role in 30%, and the relevant investigation had almost invariably been suggested by a radiologist. Although the choice of investigation was often fairly obvious (eg, barium enema for change in bowel habit), almost all the more complex cases (ie, the 72/

Figure 2 Suggested scheme for collaborative management in the investigation of the surgical patient. The thickened lines indicate radiological autonomy

342 patients who had been presented at more than one clinico-radiological conference) fell into this group. We were surprised to find that of the patients discussed, 18% had no firm diagnosis at six months. However, many of these patients appeared to have self-limiting nonspecific abdominal complaints, which often resolved without subsequent investigation or treatment.

The increasingly complex, costly, and often complimentary range of radiological techniques available for investigation of the surgical patient need to be carefully orchestrated to ensure that rapid and accurate diagnosis is achieved with minimal radiation and discomfort yet maximum efficiency. The radiologist, in collaboration with the clinician, is in an ideal position to co-ordinate and streamline the investigative pathway and certainly the results of this study suggest that radiologists have the clinical expertise required to accomplish this task. There is therefore an argument in favour of radiologists relinquishing their traditional role, and taking on a greater degree of autonomy in patient care (as is already the case in the US and Scandinavia^{13,14}). This would allow the radiologist to carry out a logical sequence of investigations during a single visit to the radiology department. A suggested scheme of collaborative management in the investigation of surgical patients is shown in figure 2. Recent developments within the NHS in which the surgical directorate would purchase services from the radiology department could form the basis for a conflict of interests, although in the clinical setting of a close working relationship this seems likely to remain a theoretical problem only.

Conclusion

Combined clinico-radiological conferences have many functions, including education, communication and a forum for discussion.

By being responsible for the choice of appropriate investigation in many cases (especially the more difficult), they help streamline the investigative pathway and thus improve efficiency and reduce patient trauma.

1 Burckhardt H, Muller W. Versuche uber die Funktion der Gallenblase und ihre Rontgendarstellung. *Dtsch Z Chirurg* 1921; **162**: 168-97.

2 Weschsler RL, Wechsler L. The first application of transhepatic cholangiography to the localisation of liver or biliary tract pathology: Hanoi 1937. *Am J Dig* 1975; **20**: 699-700.

3 Curati WL, Haterly A, Gibson RN, Carr DH, Blumgar LH, Steiner RE. Ultrasound, CT and MRI comparison in primary and secondary tumours of the liver. *Gastrointestinal Radiol* 1988; **13**: 123-8.

4 Ferrucci JT, Adson MA, Muller PR, Stanley RJ, Stewart ET. Advances in the radiology of jaundice: a symposium and review. *AJR* 1983; **141**: 1-20.

5 Koenigsberg M, Wiener SN, Walzer A. The accuracy of sonography in the differential diagnosis of obstructive jaundice: a comparison with cholangiography. *Radiology* 1979; **133**: 157-65.

6 Gibson RN, Adam A, Yeung E, et al. Percutaneous techniques in benign hilar and intrahepatic structures. *J Intervent Radiol* 1988; **3**: 125-30.

7 Illescas FF, et al. Ultrasound-guided transcholecysto-cholangiography. *Gastrointest Radiol* 1986; **11**: 77-80.

8 Clark RA, Towbin R. Abscess drainage with CT and ultrasound guidance. *Radiol Clin N Am* 1983; **21**: 445-9.

9 Bree RL, Jafri SZH, Schwab RE, Farah J, Bernacti EG, Ellwood RA. Abdominal fine needle aspiration biopsies with CT and ultrasound guidances: techniques, results and clinical applications. *Comput Radiol* 1984; **8**: 9-15.

10 Buck N, Devlin HB, Lunn JN. The report of a confidential enquiry into perioperative deaths. Nuffield Provincial Hospital Trust and King's Fund Publishing Office, 1987.

11 Kerrigan DD, Brown SR, Hutchinson GH. Open-access gastroscopy: too much to swallow. *BMJ* 1990; **300**: 374-6.

12 Abramowitz S, Cote AA, Berry E. Analysing patient satisfaction: a multianalytic approach. *Qual Rev Bull* 1987; **April**: 122-30.

13 Buttery RB, Snaith AH. Surgical provision, waiting times and waiting lists. *Health Trends* 1980; **12**: 57-61.

14 Flancbaum L, Alden SM, Trooskin SZ. Use of cholescintigraphy with morphine in critically ill patients with suspect cholecystitis. *Surgery* 1989; **106**: 668-74.

15 Picus D, Marx MV, Hicks ME, Lang EA, Edmundowicz SA. Percutaneous cholecystolithotomy: preliminary experience and technical considerations. *Radiology* 1989; **173**: 487-91.

Medical Anniversary

JOHN LOCKE, 29 AUGUST 1632

John Locke (1632–1704) was born in Wrington, Somerset, and educated at Westminster School and Christ Church, Oxford. He became personal physician to the Earl of Shaftesbury, and became FRC (1668) for his experimental studies. He declined an ambassadorship (1689) but became an influential philosopher. — DG James