this complication still occurs and prompt, skilled treatment is necessary if the mortality is to be reduced.

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Imaging procedures to diagnose gall bladder disease

The growing range of radiological techniques has increased rather than reduced the difficulty of selecting appropriate diagnostic tests, and nowhere is this better shown than in the investigation of gall stone disease. In a recent review, however, Fromhmold and Wolf declared that “Today, it must be considered accepted practice wherever biliary tree pathology is suspected, that the first differential diagnostic procedure to follow the taking of the case history, physical examination, and laboratory examinations, is ultrasonography.” The technique is safe, free from the hazard of radiation, rapidly performed, pleasant for the patient, and inexpensive. To compare ultrasonography with the other techniques available I propose to look at the use of radiological techniques in the diagnosis of two common disorders associated with stones in the gall bladder: chronic cholecystitis and acute cholecystitis. I have excluded the other conditions associated with gall stones—extrahepatic obstructive (cholestatic) jaundice and retained stones after cholecystectomy—for these entail evaluation of invasive techniques for showing stones in the common bile duct which are largely irrelevant to the diagnosis of stones in the gall bladder.

Chronic cholecystitis is usually associated with stones in the gall bladder, and these may be diagnosed by ultrasound with an accuracy of between 90% and 99%. Gall stones are recognised as echogenic foci within the gall bladder; they have a posterior acoustic shadow and move with gravity. Grey scale ultrasonography is being superseded by high resolution dynamic or real time scans, which are flexible, rapid, and enable movement to be seen. Scanning takes about 5-10 minutes compared with 20-40 minutes with the older machines. The accuracy of ultrasound in the diagnosis of gall stones compares favourably with oral cholecystography and has the advantage of allowing a more accurate assessment of the thickness of the gall bladder wall and the calibre of the hepatic and common bile ducts. Although the accuracy of a technically satisfactory oral cholecystogram is high, many apparently normal gall bladders are inadequately opacified by a single dose of contrast, so that either tomographic studies or a second cholecystogram is necessary.

Ultrasonography has considerable advantages, but there are drawbacks: the technique requires a skilled operator, and it may fail to locate the gall bladder—especially if there is overlying gas, although this problem is largely avoided by using real time ultrasonography.

If gall stones are to be dissolved successfully, it is essential to diagnose their presence and nature accurately. Treatment is appropriate only if the stones are made of cholesterol, and stopped when the gall bladder is shown to be free of stones. Current convention regards gall stones that appear radiolucent on oral cholecystography as being made of cholesterol, when medical treatment may be offered. Ultrasonography is less accurate than cholecystography for identifying gall stones containing calcium and differentiating between cholesterol and pigment stones. Stones that float in the cholecystogram are almost certainly of cholesterol, though less than one third of these are buoyant. Somerville and colleagues, however, question the use of cholecystography to assess the dissolution of gall stones and claim that small stones may be missed; in their study of 14 patients with normal cholecystograms, six had gall stones detected by ultrasonography. The British Gall Stone Study Group has shown that both techniques have limitations in the detection of recurrence of stone. Hence probably the assessment of response to treatment and the detection of recurrent stones still require an oral cholecystogram.

De Lacey and colleagues examined 500 patients by both techniques and suggest that all patients with non-acute gall bladder symptoms should have both an oral cholecystogram and an ultrasound examination. Those patients with a normal ultrasonic scan should then have compression fluoroscopic cholecystography. These two techniques detect gall stones with similar accuracy, but ultrasonography is less reliable in the diagnosis of acalculous adenomyomatosis and polyps—although the clinical importance of adenomyomatosis is uncertain. It is present in some 40-80%, of gall bladders removed at surgery, but only 5%, of oral cholecystograms show the characteristic features of the condition—intramural diverticula, which indicate Rokitansky-Aschoff sinuses. Furthermore, the management is controversial, for many surgeons dislike removing a gall bladder which does not contain stones as an elective procedure, because complaints are common after cholecystectomy.

Cholelithiasis accounts for more than 85% of all biliary tract disease, and most clinicians take steps to exclude stones before considering an alternative diagnosis. A “belt and braces” approach does seem unnecessary, and de Lacey’s
proposal needs further evaluation because, although the extra expense of performing both techniques on a single patient may be small, the number of patients with suspected gall bladder disease who pass through every radiological department is large and so the overall cost to the health service may be considerable.

There should be less difficulty in recommending the best method to confirm a clinical diagnosis of acute cholecystitis, since there has been wide acclaim for cholecintigraphy using $^{99m}$Tc labelled derivatives of iminodiacetic acid (HIDA, PIPIDA) and pyridoxylidine glutamate. This new technique is simple and has a specificity approaching 100%.

It depends on the fact that acute cholecystitis occurs in association with a blocked cystic duct, and the criteria for a positive scan are non-visualisation of the gall bladder but prompt opacification of the bile duct and duodenum. Prompt and accurate diagnosis is important, because current practice favours early cholecystectomy.26 Enthusiasm for the radionuclides is not universal, however, and false positive scans occur in alcoholic liver disease and in patients receiving parenteral nutrition.27 Nevertheless, cholecintigraphy is better than ultrasonography, for although the ultrasonogram may show gall stones and a thickened gall bladder wall it is less accurate than the cholecintgram.28 29 Radionuclide imaging is unsatisfactory for the diagnosis of chronic cholecystitis and cholelithiasis. Computed tomography has not been mentioned among the imaging options, for in Britain the procedure is expensive and not widely available. By contrast with its potential for the diagnosis of stones in the bile duct, it has no advantage over oral cholecystography, ultrasonography, or radionuclide imaging as the initial technique for the diagnosis of either acute or chronic gall bladder disease.13 22 24

In conclusion, the choice of which imaging technique to use to support a diagnosis of gall bladder disease is not always simple and requires an accurate assessment of the patient as well as familiarity with the various radiological risks.

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