pregnancy they found that 33.5% of mothers who had abnormal babies had taken antacids compared with 34.2% of controls. On this basis it should be possible to reassure patients that antacid treatment carries no extra risk to a pregnancy after the first trimester. The advice that no medications should be taken during the first trimester unless absolutely necessary should continue.

If antacids fail to control symptoms Atlay's work would suggest a trial of dilute hydrochloric acid. In resistant cases floating antacids such as a sodium alginate/sodium bicarbonate mixture may be tried, as possibly these may be more effective than simple antacids.¹³ Metoclopramide, which raises lower oesophageal sphincter pressure is another alternative, which has been claimed to be effective in controlling heartburn in pregnancy in over 90% of cases.¹⁴ Drugs such as cimetidine have yet to establish a place in pregnancy and should not be used.

J G FEENEY

Consultant Obstetrician and Gynaecologist,
Royal Infirmary,
Huddersfield HD3 3EA

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and acute pancreatitis. In other cases stones may remain in the common duct for years without symptoms, though eventually some patients will develop evidence of long-term biliary tract obstruction and sepsis in the form of jaundice or biliary cirrhosis. Lindenauer and Child¹ found biliary cirrhosis in 8% of patients with choledocholithiasis and in 24% with stricture of the common duct.

The estimate by Glenn² that stones are left behind in 5% of patients after duct exploration and 1% of patients after cholecystectomy is probably a considerable understatement. Stones up to 7 mm diameter may pass spontaneously into the bowel³ or even undergo spontaneous dissolution.⁴ It is never possible, however, to forecast when stones in the bile duct will cause trouble, when they will remain asymptomatic, or whether they will disappear unaided. Though proof may be lacking in large series⁵ that searching out unsuspected stones in the bile duct leads to improved recovery and freedom from symptoms, most surgeons believe that every effort should be made to leave the biliary tract clear of stones and unblocked by stricture after cholecystectomy.

How can rates of detecting and removing stones from the common duct be improved? Preoperative diagnosis may be made more exact; the methods used at operation may be improved; or postoperative measures may be used against residual stones. Considerable technical improvements have been made in recent years in all these three contexts.

The traditional clinical evidence of stones in the common bile duct is Charcot's triad of severe upper abdominal pain, fever with rigors, and jaundice. Only 15% of gall stones give positive calcific shadows on plain abdominal radiographs, but modern oral cholecystography will usually delineate the common duct after the fatty meal and may show stones in it. Intravenous cholangiography with tomography will show stones in the common duct even if the gall bladder does not fill or after cholecystectomy. Addison⁶ has shown the value of grey-scale ultrasonography in demonstrating stones in cholelithiasis, and echogenic stones in a dilated duct can be shown reliably. Endoscopic retrograde cholangiopancreatography is a valuable aid in the hands of an expert, and a stone impacted in the ampulla of Vater can be removed via the mouth after duodenoscopic sphincterotomy. This procedure may be particularly valuable in high-risk patients after cholecystectomy; Cotton and Vallon⁷ reported an 87% success rate for sphincterotomy and similar success in clearing the common duct of stones. There is also a place for pre-operative percutaneous cholangiography using a "skinny" needle in patients with deep jaundice due to stones in the main bile duct, and even for preoperative drainage of the biliary tract through the needle in those severely ill with suppurative cholangitis and septicaemia.⁸

At operation the discovery of a dilated common duct, multiple small stones in the gall bladder, and a wide cystic duct suggests stones in the bile duct, though choledochostomy done on these grounds alone will have negative results in some cases. In view of the increased morbidity and mortality rates associated with choledochostomy⁹ such negative explorations must be kept to a minimum—and yet retained stones must be removed. Cassie and Kapadia¹⁰ have reported the excellent results that can follow careful extraductal palpation of stones in the common duct with a routine Kocher's manoeuvre to mobilise the duodenum and head of pancreas; of 382 patients followed up for four to 14 years, only one (0.3%) was proved to have a "missed" stone and there were only two negative duct explorations (0.5%). This series is remarkable for the low rate of choledochostomy—done in only 25 cases (6.5%).

The elusive stone

The stone in the common bile duct is the Scarlet Pimpernel of surgery of the biliary tract. Abdominal surgeons continue to debate methods of confirming the presence of stones in the bile duct and removing them with the lowest incidence of residual stones, and this topic has also been taken up by radiologists and physicians in recent years. The underlying assumption is that stones in the bile duct do harm and produce symptoms, either before or after cholecystectomy. Sometimes this is obvious, with the development of life-endangering complications such as cholangiohepatitis, jaundice, septicaemia,

Most biliary surgeons find peroperative cholangiography of great value in detecting stones in the common duct and avoiding negative explorations and would deny the charges of Cassie and Kapadia that it is time consuming, attended by a high failure rate even in acute cases, and unduly expensive. The technique has been well described by Le Quesne.¹¹ In a series of 422 operations for gall stones Faris *et al*¹² performed 400 successful peroperative cholangiograms; without this help 16 out of 78 patients with common duct stones would have had their stones overlooked (20.5% of the choledochostomies) and 48 of the 322 patients without stones in the duct would have required exploration (14.9%). The negative exploration rate was significantly lower in patients who had peroperative cholangiography than in those who did not. This technique has the extra advantage of showing the number of stones to be removed, congenital anomalies of the biliary tract, a stricture at the ampulla, and, most important, dilatation of the common duct (more than 12 mm diameter). It can be refined by adding radiomanometry of the bile duct as described by Daniel¹³ or using an image intensifier on the table. An additional refinement developed by Baxter-Smith and Middleton¹⁴ is the technique of contact cholangiography (first described by Slattery and Saypol¹⁵), in which a Dentech occlusal film sterilised in Cidex is inserted behind the common duct after wide mobilisation of the duodenum and head of pancreas. They had seven technical failures in a series of 86 routine cholecystectomies but claim improved radiographic definition in the successful ones. The disadvantages are the need for considerably extended dissection in all cases and the restricted view of the biliary tract available on the contact film.

Despite these refinements of operative cholangiography and the most careful palpation stones are still left in the bile duct after exploration. Most surgeons perform T-tube cholangiography on the table after exploration, but the film is always difficult to interpret owing to the impossibility of excluding air bubbles and to retention of the dye in the bile duct through ampullary oedema. When the remaining obstruction is severe a wide transduodenal sphincteroplasty is probably indicated. Claims are now being made for the value of operative choledochoscopy at this stage,¹⁶ though it prolongs the operation. Motson *et al*¹⁷ have reported on 50 operative endoscopies using the rigid choledochoscope after choledochostomy and exploration, with residual stones and debris seen in seven, a stricture in one, and a tumour in one; of the 41 common ducts seen to be clear, the postoperative cholangiogram showed stones in two. At the end of a difficult operation where obstruction or stones are still suspected after exploration of the common duct there may be a place for choledochoduodenostomy.¹⁸ This procedure is seldom necessary for the experienced surgeon using careful palpation and practising operative cholangiography; it has the disadvantage of leaving a sump of infected bile in the lower end of the common duct, which can cause cholangitis, jaundice, or pancreatitis.

Even when all these stages of the surgical hunt are completed satisfactorily the postoperative cholangiogram done via the T tube seven to 10 days later may show a residual stone, much to the mortification of the surgeon, with its increased risk of morbidity or mortality. In such cases the T tube should be kept in place, irrigated with saline or gall-stone solvents used as described by Motson,¹⁹ and the T-tube cholangiogram repeated. If the stone remains and appears to be causing, or likely to cause, obstruction, percutaneous removal of the stone may be possible through the T tube using a flexible basket carrier under radiographic control. Mason has described encouraging results in 131 such cases,²⁰

and such results provide strong grounds for always using a T tube after choledochostomy. If, however, the T tube has been removed the final hope of attaining a clear bile duct is by transduodenal sphincterostomy and extraction of the stone.

In the end, there is still no certain way of always catching this elusive pimpernel; but the nuisance can be kept to a minimum by the care and experience of the surgeon, whether he be palpater, cholangiographer, choledochoscopist, or all three.

P GILROY BEVAN

Professor of Surgery,
Dudley Road Hospital,
Birmingham B18 7QH

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The final epidemic

Just before Easter doctors from 30 countries met at Cambridge for the second congress of International Physicians for the Prevention of Nuclear War. Despite the warm sunshine and the friendly atmosphere of the meeting, its main conclusions were chilling. Nuclear war is becoming more likely every year and any nuclear war is likely to be global; the medical services cannot possibly cope with the casualties either short term or long term. These doctors have become convinced that any detailed, practical, realistic assessment of the outcome of a nuclear conflict shows that its consequences will be far worse than most people seem to realise. Not only will casualties be on a far larger scale than can easily be comprehended but the explosion of thousands of large nuclear weapons seems very likely to cause such damage to the atmosphere, to agriculture