reflexes, normal serum potassium, and a normal ECG. He experienced two further attacks of paralysis just after starting antithyroid treatment, and on each occasion weakness and hyporeflexia were demonstrated together with hypokalaemia (serum potassium 2.5 and 2.6 mmol/l). On each occasion he recovered completely 12 hours later with no treatment, the serum potassium reverting to normal, as did the ECG. Extensive investigations during and between the attacks showed normal results. Treatment with carbimazole and propranolol resulted in weight gain, and, apart from one mild abortive attack, no further episodes of paralysis occurred over the next seven months.

Discussion

The recurrent episodes of flaccid paralysis, spontaneous recovery, and absence of residual weakness are typical of thyrotoxic periodic paralysis,³ attacks of which may also occur without a lowering of serum potassium. Norris⁴ found a poor correlation between the decrease in the serum potassium level and the degree of paralysis, and noted the serum potassium concentration did not rise as the clinical attacks cleared. The only consistent histological finding (on muscle biopsies taken during attacks) in all cases so far studied has been some degree of vacuolation.⁵ Further investigation is needed to determine the pathophysiology of thyrotoxic periodic paralysis, but, probably because of lack of its awareness, not many cases have been reported outside Japan. The present report should alert doctors to its existence (attacks of periodic paralysis may antedate symptoms of thyrotoxicosis), with the hope of discovering similar patients with this treatable and rare complication.

¹ Okinaka, S, *et al*, *Journal of Clinical Endocrinology*, 1957, 17, 1454.

² McFadzean, A J S, and Yeung, R, *British Medical Journal*, 1967, 1, 451.

³ Ramsay, I, *Thyroid Disease and Muscle Dysfunction*. London, Heinemann Medical Books, 1974.

⁴ Norris, F H, Clarke, E C, and Biglieri, E, *Journal of the Neurological Sciences*, 1971, 13, 431.

⁵ Schutta, H S, and Armitage, J L, *Journal of Neuropathology and Experimental Neurology*, 1969, 28, 321.

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Non-absorbable cystic duct ligatures and common bile duct calculi

The use of non-absorbable ligatures on the cystic duct remnant after cholecystectomy is said to expose the patient to the risk of recurrent calculus formation. The following case is a clear example of this complication.

Case report

In November 1973 a 67-year-old woman was admitted with recurrent cholecystitis and jaundice. At operation a small, chronically inflamed gall bladder containing multiple mixed calculi was removed and the cystic duct remnant secured with a silk ligature. Three large calculi with some debris were extracted from the common bile duct. The choledochotomy was closed over T-tube drainage using extramucosal chromic catgut sutures. Her post-operative recovery was uneventful and a T-tube cholangiogram 10 days after operation showed no residual calculi and free flow of contrast medium into the duodenum. An incidental finding during this admission was a macrocytic anaemia due to vitamin B₁₂ deficiency, for which she received replacement and maintenance treatment with vitamin B₁₂.

She remained well until August 1974, when she began to suffer intermittent attacks of colicky epigastric and subcostal pain, lasting from 15 minutes to 8 hours. Transient jaundice was noted on one occasion. She was well between attacks. Examination on admission was unhelpful; there was no jaundice or signs of liver disease. The erythrocyte sedimentation rate was 99 mm in one hour, serum bilirubin 24 μ mol/l (1.4 mg/100 ml), and prothrombin time 18 seconds (control 14 seconds). Other investigations showed nothing abnormal. After admission she had a further attack of pain and tenderness in the right upper quadrant and obstructive jaundice. Investigations showed a serum bilirubin of 123 μ mol/l (7.2 mg/100 ml), alkaline phosphatase of 26 KA units/100 ml, and an aspartate transaminase of 266 IU/l. Bilirubin was present in the urine, but there was no excess of urobilinogen. An intravenous cholangiogram performed when the jaundice

subsided showed a radiolucent calculus about 1.3 cm in diameter impacted in the supraduodenal segment of the common bile duct, with proximal dilation of the hepatic ducts.

At laparotomy the calculus was identified in the supraduodenal segment of the dilated common bile duct. A soft granular calculus, about 1 cm in diameter, was removed. Two tails of black silk were hanging from the calculus and traction on these extracted a black ligature, the knot of which had clearly formed the central nidus of the stone (see fig). There was no debris or further calculus present. A choledochoduodenostomy was performed. Her postoperative course was complicated only by a mild superficial wound infection.

Calculus (top) and black silk ligature (bottom). Knot and proximal half of tails of ligature were included within the calculus.

Comment

The use of non-absorbable material for cystic duct ligature may lead to further stone formation.¹⁻⁵ How often this occurs is difficult to determine, but there are few reported cases, and the complication seems to be uncommon. Many surgeons feel that absorbable sutures are preferable, but Gunn² found that many surgeons in the Manchester region preferred to use non-absorbable cystic duct ligatures because of better tying and knot-holding properties.

Seromuscular silk sutures may be seen at sigmoidoscopy after anterior resection and at gastroscopy after partial gastrectomy. A tight ligature accompanied by local trauma and oedema may lead to necrosis and resorption of the overlying mucosa and also of the tissue included in the ligature, which would then be left unattached and free to move into the lumen or on to the serosal surface as regeneration and repair progress. A ligature through all coats seems more likely to migrate into the lumen than a true seromuscular suture, and a non-absorbable transfixion ligature may also predispose to further calculus formation. Despite the few reports of this complication the use of absorbable material for ligature of the cystic duct remnant is advisable.

¹ Ahlberg, A, *Acta Chirurgica Scandinavica*, 1959, 118, 22.

² Gunn, A, *British Journal of Surgery*, 1972, 59, 245.

³ Milbourn, E, *Acta Chirurgica Scandinavica*, 1949, 99, 285.

⁴ Mackie, D B, Haynes, S, and May, R E, *British Journal of Surgery*, 1973, 60, 23.

⁵ Sigler, L, and Sahler, C O, *Surgery*, 1969, 65, 276.

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