



FIG. 1 Leakage from choledochotomy site after T-tube removal.

Discussion

T-tube drainage has been the standard method of management after supraduodenal choledochotomy for almost a century (3). The rationale for its use is that it minimises the risk of leakage in the early postoperative period if there is persistent distal duct obstruction. It also allows further radiological examination and may facilitate removal of residual calculi. However, it is associated with a higher incidence of wound sepsis (4), bacteraemia (5), postoperative pancreatitis and thromboembolism. There is also depletion of electrolytes and bile salts (6).

A latex T-tube is the most suitable type for short term biliary drainage (7). It is said to produce a rapid intraperitoneal reaction with good track formation, thus biliary leakage should be unlikely. However, in 7 cases in this study there was leakage into the peritoneal cavity from the choledochotomy site after removal of the T-tube. The reasons for leakage are unclear, though poor intraperitoneal reaction and duct trauma on removal are possible factors. Nevertheless, biliary leakage is a potentially life threatening complication and at the very least will delay discharge from hospital.

Bacteraemia associated with T-tube drainage is well documented. The 18% incidence in this series is only slightly higher than previous studies (8). Trauma to the ducts may

TABLE II Bacteraemia following T-tube removal

Positive blood culture	
<i>Escherichia coli</i>	2*
<i>Klebsiella</i>	1*
Staphylococcus	1
Negative blood culture but clinical bacteraemia with rigors and fever	3
Total	7

* Rigors and fever.

be implicated in the development of bacteraemia and it has been suggested that the increase in biliary pressure during T-tube cholangiography in an infected system may allow bacteria to enter the blood stream via the liver sinusoids (8). In all cases in this series bacteraemia has occurred only when infected bile has been present at the time of exploration.

Alternatives to T-tube drainage include transduodenal exploration, choledochoduodenostomy and primary closure of the choledochotomy. Transduodenal exploration removes the need for supraduodenal choledochotomy, but it has a high morbidity and mortality especially from postoperative pancreatitis (9). Choledochoduodenostomy is useful for multiple or recurrent calculi, but should only be used when the duct is dilated (10). Primary closure results in a low incidence of sepsis with a shorter hospital stay (2), but bile leakage may occur if distal obstruction due to residual stones persists. Despite combining completion cholangiography with choledochoscopy it is not possible to fully guarantee that all stones have been cleared at exploration (11).

In conclusion this study has demonstrated a high incidence of bacteraemia and bile leakage following T-tube removal. As most surgeons still favour T-tube drainage it is probable that this practice should be re-assessed. If T-tubes continue to be used antibiotic prophylaxis should be employed at the time of their removal. This can be determined by bile culture obtained at operation or in the early postoperative period.

References

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