

Endoscopic treatment of common bile duct lithiasis

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Efficiency

In about 90% of patients, bile duct stones can be extracted with simple endoscopic means, i.e. endoscopic biliary sphincterotomy (EBS) followed by basket and/or balloon stone extraction (1). Most (90-95%) of the remaining patients can be treated with the help of lithotripsy techniques, such as stone crushing with a basket, extracorporeal shock waves or laser (2). Reported causes of failure include Bilbroth II anastomosis and paradiverticular papilla.

Complications

Endoscopic biliary sphincterotomy is still considered by some authors as a risky procedure. This may rise from the high complication rates reported in some instances, such as EBS performed for sphincter of Oddi's dysfunction. Stone extraction is the indication for EBS that carries the lowest morbidity rate (3), this is comprised between 1.4 and 8.1% (1,3). It is noteworthy that this complication rate, unlike that for most surgical procedures, does not increase with age or the number of coexisting medical conditions, except for cirrhosis.

Late complications after EBS have been thoroughly investigated in at least 5 series totalling more than 1000 patients (4-8). Mean follow-up durations ranged from 6.2 to 15 years (mean 10.6 years). Late complications were reported in 9.7 to 24% of cases (mean 15%), a majority of these developing during the first 4 years following EBS.

Complications mainly consisted of cholecystitis, recurrent common bile duct (CBD) stones and cholangitis. Almost all of these complications were treated with antibiotics and/or endoscopic reintervention and did not require surgery. Risk factors associated with relapsing biliary symptoms were: (1) a gallbladder left in situ (complication rate: 20% compared to 11% in patients whose gallbladder had been removed), (2) a CBD diameter greater than 15 mm and (3) a peripapillary diverticulum (7). Patients with a gallbladder in situ that contained no stone did not experience cholecystitis (6).

The study by Bergman *et al.* (4) suggests that a significant proportion of recurrent CBD stones spontaneously pass into the duodenum if no stricture is present at the site of EBS: some patients with relapsing biliary symptoms had received no treatment and ERC performed later did not disclose stones. The proportion of

such patients who do not require any treatment could increase since EBS is often larger nowadays compared to what was performed in the late 80's, and the types of current used for EBS have been modified.

The low complication rate associated with EBS has led some authors to propose endoscopic stone extraction as an outpatient procedure, hospital admissions being reserved to patients with a suspected complication (9-10). This allowed to significantly decrease the costs associated with the procedure, without increasing the associated morbidity or mortality (it was reserved to selected cases, i.e. patients in relatively good health with an overnight accommodation within 30-minute driving distance).

Timing of endoscopic stone extraction

This timing, relative to a scheduled cholecystectomy, has been a matter of discussion. Peroperative endoscopic stone extraction, although the most comfortable option from the patient's point of view, has had no success. This is related to numerous practical difficulties encountered by the endoscopist in the surgical theater (e.g., move of material and personnel, quality of the X-ray equipment), as well as by the surgeon (lack of time...). Cost effectiveness of pre- and post-operative endoscopic retrograde cholangiography (ERC) have been compared using a decision-model analysis (11). In this analysis, indications for ERC were based on findings at laboratory tests and percutaneous ultrasonography or findings at intra-operative cholangiography in the pre- and post-operative ERC policy, respectively. Costs were higher in the pre- compared to the post-operative policy, because the positive predictive value of laboratory findings and percutaneous ultrasonography is as low as 40%. Therefore twice as many ERC were performed in the pre- compared to the post-operative policy, about half of these being unnecessary. New imaging techniques have made this analysis obsolete: magnetic resonance (MR) cholangiography as well as endoscopic ultrasonography (EUS) (and probably cholangioscan) present positive predictive values similar to that of intra-operative cholangiography (12-14).

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If none of these techniques is available, the decision to perform or not a pre-operative ERC (based on laboratory findings and percutaneous ultrasonography) mainly depends on the speciality of the prescribing physician : a nationwide American survey demonstrated that, when faced to individual cases, surgeons were less prone than gastroenterologists to recommend ERC (15).

Conclusion

Endoscopic stone extraction has been demonstrated to be a safe procedure, at both short and long term. The choice between endoscopic and surgical extraction techniques mainly depends on local expertise, organization of room attendance and doctor's personal preferences. Pre- and post-operative ERC present similar cost/benefit ratios provided that the patient selection method employs a highly sensitive and selective technique such as EUS or MR.

References

- HINTZE R.E., ADLER A., VELTZKE W. Outcome of mechanical lithotripsy of bile duct stones in an unselected series of 704 patients. *Hepato-gastroenterology*, 1996, **43** (9) : 473-476.
- HOCHBERGER J., BAYER J., MAY A., MUHLDOERFER S., MAISS J., HAHN E.G., ELL C. Laser lithotripsy of difficult bile duct stones : results in 60 patients using a rhodamine 6G dye laser with optical stone tissue detection system. *Gut*, 1998, **43** (6) : 823-829.
- FREEMAN M.L., NELSON D.B., SHERMAN S., HABER G.B., HERMAN M.E., DORSHER P.J., MOORE J.P., FENNERTY M.B., RYAN M.E., SHAW M.J., LANDE J.D., PHELEY A.M. Complications of endoscopic biliary sphincterotomy. *New Engl. J. Medicine*, 1996, **335** (13) : 909-918.
- BERGMAN J.J.G.H.M., VAN DER MEY S., RAUWS E.A.J., TIJSSEN J.G.P., GOUMA D.-J., TYTGAT G.N.J., HUIBREGTSE K. Long-term follow-up after endoscopic sphincterotomy for bile duct stones in patients younger than 60 years of age. *Gastrointest. Endosc.*, 1996, **44** : 643-649.
- SAITO M., TSUYUGUCHI T., YAMAGUCHI T., ISHIHARA T., SAISHO H. Long-term outcome of endoscopic papillotomy for choledocholithiasis with cholecystolithiasis. *Gastrointest. Endosc.*, 2000, **51** (5) : 540-545.
- TANAKA M., TAKAHATA S., KONOMI H., MATSUNAGA H., YOKOHATA K., TAKEDA T., UTSUNOMIYA N., IKEDA S. Long-term consequence of endoscopic sphincterotomy for bile duct stones. *Gastrointest. Endosc.*, 1998, **48** (5) : 464-469.
- PEREIRA-LIMA J.C., JAKOBS R., WINTER U.H., BENZ C., MARTIN W.R., ADAMEK H.E., RIEMANN J.F. Long-term results (7 to 10 years) of endoscopic papillotomy for choledocholithiasis. Multivariate analysis of prognostic factors for the recurrence of biliary symptoms. *Gastrointest. Endosc.*, 1998, **48** (5) : 457-464.
- SUGIYAMA M., ATOMI Y. Follow-up of more than 10 years after endoscopic sphincterotomy for choledocholithiasis in young patients. *Br. J. Surg.*, 1998, **85** (7) : 917-921.
- ELFANT A.B., BOURKE M.J., ALHALEL R., KORTAN P.P., HABER G.B. A prospective study of the safety of endoscopic therapy for choledocholithiasis in an outpatient population. *Am. J. Gastroenterol.*, 1996, **91** (8) : 1499-1502.
- THAM T.C.K., VANDERVOORT J., WONG R.C.K., LICHTENSTEIN D.R., VAN DAM J., RUYMANN F., FARRAYE F., CARR-LOCKE D.L. Therapeutic ERCP in outpatients. *Gastrointest. Endosc.*, 1997, **45** : 225-230.
- ERICKSON R.A., CARLSON B. The role of endoscopic retrograde cholangiopancreatography in patients with laparoscopic cholecystectomies. *Gastroenterology*, 1995, **109** (1) : 252-263.
- POLKOWSKI M., PALUCKI J., REGULA J., TILSZER A., BUTRUK E. Helical computed tomographic cholangiography versus endosonography for suspected bile duct stones : a prospective blinded study in non-jaundiced patients. *Gut*, 1999, **45** (5) : 744-749.
- DEVIERE J., MATOS C. Which test for common bile duct stones ? Magnetic resonance cholangiopancreatography. *Endoscopy*, 1997, **29** (7) : 666-668.
- SUGIYAMA M., ATOMI Y. Endoscopic ultrasonography for diagnosing choledocholithiasis : a prospective comparative study with ultrasonography and computed tomography. *Gastrointest. Endosc.*, 1997, **45** : 143-146.
- SHEA J.A., ASCH D.A., JOHNSON R.F., STAROSCIK R.N., MALET P.F., POLLACK B.J., CLARKE J.R., GREEN P.E., SCHWARTZ J.S., WILLIAMS S.V. What predicts gastroenterologists' and surgeons' diagnosis and management of common bile duct stones ? *Gastrointest. Endosc.*, 1997, **46** : 40-47.