Karolinska Institutet

Institutionen för klinisk vetenskap, intervention och teknik (CLINTEC), Enheten för kirurgi

Iatrogenic Bile Duct Injury During Cholecystectomy

AKADEMISK AVHANDLING
som för avläggande av medicine doktorsexamen vid Karolinska Institutet offentligen försvaras i föreläsningssal, R64, Karolinska Universitetssjukhuset Huddinge

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ABSTRACT

Background: Accidental injuries to the bile ducts are a rare but devastating complication to cholecystectomy, causing afflicted patients considerable morbidity, with subsequent impaired quality of life and significant health related costs. The knowledge regarding incidence, morbidity and prevention of such injuries is limited.

Objectives: To investigate the incidence of bile duct injuries (BDI) in Sweden. To evaluate the long-term morbidity pattern after BDI. To estimate the mortality rate and factors associated with increased mortality following BDI. To address prevention of BDI by the identification of risk factors and evaluation of the possible protective effect by intraoperative cholangiography (IOC).

Methods: In study I, all cholecystectomies within the Swedish Inpatient Registry between 1965 and 2005 were included. BDI were identified through International Classification of Diseases (ICD) procedure codes, pertaining to surgical reconstruction of the bile ducts, and analysed for survival, factors influencing the survival and causes of death. In study II and III, all cholecystectomies within the Swedish Registry for Gallstone Surgery, GallRiks, between 2005 and 2010, were analysed for BDI. Analyses regarding incidence, survival and risk factors for BDI were performed using multivariable Cox (Study II) and logistic regression (Study III) models. Study IV is a nested, matched case-control study of BDI patients (cases) and non-injured cholecystectomies (controls). After a review of medical records, multivariable logistic regression models were used to investigate the association between different severity-grades of acute cholecystitis and BDI.

Results: In study I, 374 042 cholecystectomised patients were identified, of which 1 386 had reconstructed BDI. Survival was significantly lower in the injured group, with a hazard ratio of 3.73 at year one, which thereafter gradually evened out. The risk of dying from liver diseases was 4-fold increased in the BDI cohort compared to the general population. In study II, 51041 cholecystectomies and 747 (1.46%) BDI were identified, ranging from minor to major injuries. Injured patients had an impaired survival compared to non-injured but early detection of BDI, during the primary operation, improved survival. The intention to use IOC reduced the risk of dying after cholecystectomy by 62% and reduced BDI rates by 29%. In study III, increased age, comorbidity and ongoing or a history of acute cholecystitis were independent risk factors of BDI. Among patients with acute cholecystitis, the intention to use IOC reduced BDI risk by 66%. For patients with a history of acute cholecystitis, the equivalent reduction in risk was 41%. Among patients with uncomplicated gallstone disease, no preventive effect of IOC was seen. In study IV, 158 BDI and 623 controls were analyzed. Mild acute cholecystitis did not increase the risk of BDI whereas moderate and severe forms gradually increased BDI risk.

Conclusions: BDI is more common than previously reported, with reduced short and long term survival, partly due to an overrepresentation of liver related diseases. Increasing age, comorbidity and moderate to severe inflammatory changes of the gallbladder are important risk factors for BDI. The intentional use of IOC reduced BDI rates and improves survival after cholecystectomy. As the protective effect of IOC seems to be confined to patients with, or with a history of acute cholecystitis, routine IOC should be recommended within this group whereas a selective IOC approach among uncomplicated gallstone disease is likewise safe.

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