



Original research

Risk factors of postoperative morbidity in patients with uncomplicated liver hydatid cyst



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ABSTRACT

Purpose: To determine postoperative morbidity (POM) in patients undergoing surgery for uncomplicated hepatic echinococcosis (HE) and determine associations with the variable POM looking for possible risk factors for POM.

Methods: Nested case-control study. We included patients undergoing surgery for uncomplicated HE in two hospitals in Temuco between 2000 and 2012. The main outcome variable was development of POM. Other variables of interest were hospital stay, mortality and recurrence. Surgical techniques used were pericystectomy and liver resection. Descriptive statistics and analytical statistics were applied using *T*-test, ANOVA and Kruskal–Wallis test to compare continuous variables; Chi² and Fisher's exact test for categorical variables, and logistic regression models were used, estimating OR.

Results: 126 patients, median age 41 years, 61% female. The incidence of POM was 10.3%, with 76.9% Clavien grade I or II. The etiology was 6.5% and 4.1% of medical and surgical complications, respectively. There was no mortality and with a median follow-up of 83 months, recurrence incidence was 0.8%. Association was found between cases and controls and the variables age, alkaline phosphatase, cyst location and hospital stay. Applying regression models age ($p = 0.002$ and OR 1.07) and cyst location ($p = 0.003$ and OR 3.94) were found to be risk factors.

Conclusions: Observed POM is lower and of less severity than those previously published. Risk factors were determined.

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1. Introduction

Echinococcosis is a zoonotic disease endemic in southern Chile, which is associated with the need to treat a considerable number of new cases of hepatic echinococcosis (HE) per year promptly and effectively.

While still a prevalent health problem in some areas of the world, the scientific literature on HE surgery is not as large, with some confusion and controversy persisting concerning morbidity of surgery for HE. Reports of this variable did not change substantially over time regardless of where the data were generated. In articles from the 1990s postoperative morbidity (POM) values of 34.7%–62.5% were reported [1–3]. After 2000, the situation did not

seem to improve substantially because POM values from 21.3% to 53.8% were still being published [4–12], and in the last five years from 1.2% to 79.9% [13–17], with a median value of 33.0%. This situation could be explained by the heterogeneity of the populations analyzed in the different studies, which included patients with complicated and non-complicated HE, and different forms of assessment of the variable POM.

A few years ago, we reported the POM of a series of patients with non-complicated HE using the proposal by Dindo and Clavien [18,19], and with a median follow up of 96 months we verified 8.6% overall POM [20]. Therefore, we proposed that potential associations between POM and other clinical variables be measured and that possible risk factors be examined.

The aim of this study was to determine POM in patients undergoing surgery for uncomplicated HE and determine associations with the variable POM looking for possible risk factors for POM.

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This manuscript was prepared according to the STROBE statement for reporting observational studies [21].

2. Methods

2.1. Study design

Nested case–control study.

2.2. Setting

The study was performed in the Surgery Department of the Universidad de La Frontera (Temuco, Chile). Patients undergoing surgery by the surgical services of Hernán Henríquez Aravena hospital and the Universidad Mayor Clinic in Temuco, Chile from April 2000 to April 2012 were recruited.

2.3. Participants

Patients undergoing surgery for non-complicated HE by the first author were included (Fig. 1). Laparoscopically operated patients, subjects with concomitant echinococcosis in another location, patients with previous surgery for HE and those with evolutionary complications were excluded. "Cases" were defined as those patients operated on for non-complicated HE who developed POM and "controls" as those patients operated on for HE who did not develop POM during the follow-up period.

2.4. Variables

The main outcome variable was overall POM. Other variables of interest were age, gender, morbid antecedents, laboratory tests, ultrasonography findings, location, number and diameter cysts, presence of bile communications, type of surgery performed, hospital stay, reoperation rate, mortality and recurrence.

2.5. Data sources/measurements

Overall POM was seen as a dichotomous variable (no/yes), then categorized by source (none/medical/surgical) and finally by its severity applying Dindo and Clavien [18,19] for which a minimum of 12 months' follow-up is required.

2.6. Definitions

Non-complicated HE was defined as pure HE, i.e., not associated with evolutionary complications such as liver abscess [22,23],



Fig. 1. Image of non-complicated HE located in the center of the liver.

hepatothoracic transit [24], colangiohidatidosis [25,26], hydatid peritonitis [27], anaphylaxis, fistulization of the cyst to some digestive structure and the existence of concomitant locations of the disease [27].

2.7. Study protocol

A data collection sheet was drawn up and in it biodemographic and clinical characteristics of the patients, laboratory and imaging findings, characteristics of the cysts, surgical aspects and post-operative course in terms of POM, need for reoperations, mortality and recurrence were recorded.

2.8. Follow-up protocol

A clinical check was made with general laboratory tests, determination of specific immunoglobulins (ELISA-IgG and ELISA-IgE) [28,29], thoracic x-ray and abdominal ultrasound at 1, 6 and 12 month, and from then one a year postoperatively for a minimum of 5 years.

2.9. Bias

Efforts to address potential sources of bias were the following: The complete follow-up of the cohort allowed us to work with incident cases and controls. Controls also came from the same population from which the cases were selected, so they had the same potential for exposure as the cases. Finally, data were collected by researchers other than the one who performed the surgeries (TO, SU).

2.10. Study size

This was not considered because the entire target population was included.

2.11. Statistical methods

We performed an exploratory analysis of the data, after which descriptive statistics were used to calculate percentages and measures of central tendency and dispersion (mean \pm standard deviation, median and extreme values). Then the incidence or absolute risk (AR) of POM was determined, and then statistical analysis was conducted, using *t*-test, ANOVA and the Kruskal–Wallis test for comparison of continuous variables, and Chi² and Fisher's exact test for categorical variables. Finally, logistic regression models estimating OR and their respective 95% confidence intervals (CI 95%) were applied.

2.12. Ethics

The study was approved by the ethics committee of the Faculty of Medicine at the Universidad de La Frontera and every patient signed an informed consent.

3. Results

In the study period a total of 276 patients with HE were operated on and treated according to this scheme, of which, when the selection criteria were applied, 126 patients remained (Fig. 2), with no losses of follow-up.

The average age of the participants was 41 (15–84 years); and 60.3% of them (76 cases) were female. Thirty-nine patients (30.9%) were carriers of some associated pathology, of which cholelithiasis was predominant (21 cases; 16.7%). See Table 1.

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