"OVIDIUS" UNIVERSITY OF CONSTANȚA
DOCTORAL SCHOOL OF MEDICINE
CONSTANȚA 2024

DOCTORAL THESIS

ABSTRACT

MODERN PREDICTABLE BILIARY FISTULA SOLUTIONS IN THE MULTIDISCIPLINARY TREATMENT OF HEPATIC HYDATID CYST

PhD supervisor:PROF. UNIV. DR. VASILE SÂRBU PhD

student:ANA-MARIA GRIGORESCU

CONSTANȚA

Contents

Key words: hepatic hydatid cyst, laparoscopic surgery, cystobiliary fistula prediction scale, advantage of multimodal treatment.

INTRODUCTION

Hepatic hydatid cyst is a parasitosis that occurs as a result of cystic tumor development in the liver by Taenia Echinococcus.

HCH is a very special pathology, due to the lack of malignant substrate, but the aggressiveness of its complications have a dramatic influence on the whole organism, which is explained by its toxico-allergic action.

We analyzed in this paper, a group of 217 patients, who received surgical treatment between 2018-2023, in the clinics of General Surgery I and II of the County Emergency Hospital "Saint Apostle Andrew" Constanta.

The main objective of this work is to analyze and report the aggressiveness of biliary complications of CHH, as well as to standardize the therapeutic attitude, in relation to the biological status and associated defects of the patient.

Surgical treatment remains the surgical treatment of choice for biliary complications of this parasitosis, but it is a subject that has been debated for many years and is still controversial. It arises against the background of the countless methods and techniques that have or have not been adopted by surgeons and the specialized literature, but also due to the evolutionary and structural polymorphism that generates discussions among colleagues.

The thesis contains a general part in which data about the etiologic agent, the appearance and symptomatology of hepatic hydatid liver pathology, the type of paraclinical biological and imaging investigations specific to the positive diagnosis, as well as the modern multidisciplinary treatment of this zoonosis and a special part in which two studies were developed, the first one is a prospective, analytical and comparative study, based on a group of 170 patients, whose diagnosis was confirmed in the Constanța County Emergency Hospital and who subsequently received surgical treatment in the same hospital unit, in the period 2018-2023, thus laying the foundations of a predictive scale of biliary complications and the second study, aims to highlight the advantages of performing ERCP (papilosphincterotomy with or without cholangiography) preoperatively and surgical treatment in a laparoscopic manner.

The design of the two studies is based on the collection of anamnestic data, demographic data, symptomatology, cyst localization, cyst size and associated complications and associated defects, thus giving rise to a predictive imaging algorithm for biliary fistulas, and an interdisciplinary treatment approach to treat such complications.

The results of the present studies and the collection of mandatory data were performed with the support of a standard form and the use of DeepEye software, which generated information about the hepatic hydatid cyst in conjunction with its location in relation to the biliary elements, pericyst thickness, hydatid fluid density, pericyst integrity. These elements have subsequently led to the realization of a predictive imaging scale of biliary fistulas, an essential role in the approach and multimodal therapeutic management of biliary fistulas in a minimally-invasive manner of first intention or after surgery.

THE GENERAL PART

The general part of the PhD thesis provides important current details on the topographic anatomy and morphofunctionality of the liver, epidemiology and etiology of liver liver hydatid pathology, the main imaging and biological investigations to support the positive diagnosis, as well as current elements related to the current multimodal treatment of this disease.

The geopolitical spread of liver hydatid liver disease is still widespread, particularly in areas considered endemic, for which the application of all measures relating to routine hygiene, the implementation of programs aimed at breaking the parasite's biological chain by banning the slaughter of sheep and cattle on an artisanal or individual basis and the collection of community dogs in specially designated centres for them, has not proved effective.

At the same time, the tendency of today's society to use products from rural, ecologically reared and as naturally developed as possible, without applying product quality controls, may explain the high rate of hydatid disease in urban areas.

Approaching a healthy lifestyle through a rigorous diet, with products of rural origin, not chemically treated, but sometimes not respecting the rules of hygiene or preservation, leads to the development of hydatid pathology.

A thorough history and the collection of all the data related to the patient's background, the activities he/she practices, habits, nationality, even data about his/her faith and religion, to which we add the constant and regular referral to specialized medical professionals can be considered the first links in the diagnosis of this pathology.

Due to the polymorphism of this pathology and the absence of symptoms during the stage of the disease, delay in diagnosis and initiation of specialized treatment leads to complications of this pathology, which have a major impact on the patient.

The diagnosis of hepatic hydatid cyst is established on the basis of the following criteria: a thorough history, paraclinical imaging investigations (abdomino-pelvic ultrasonography, abdominal CT scan with abdominal sequence, cholangio-MRI), paraclinical biological investigations, specific primary and secondary immunological tests.

The introduction of the laparoscopic approach to the entire surgical pathology represented a major evolutionary leap in the surgical treatment of hepatic hydatid cyst.

We mention the performance of the first laparoscopic cholecystectomy in Romania, an event that took place in Constanța by my mentor, Professor Vasile Sârbu on December 3, 1993. This event totally changed the perspective and approach to hepatobiliary pathology at national level. Laparoscopic surgery has brought multiple benefits such as reduced tissue trauma compared to classical surgery: reduced postoperative pain, reduced postoperative wound complications, much earlier discharge and socio-economic reintegration and compared to laparotomy the aesthetic results are clearly superior.

PERSONAL CONTRIBUTION

AIM AND OBJECTIVES

The main aim of this PhD thesis is to streamline and standardize a complex treatment adapted to biliary complications arising in liver hydatid liver disease.

At the same time, the careful study of cases with biliary complications, led to the imaging highlighting of some prognostic elements, which helped us to design a predictive scale of cystobiliary fistulas and to propose a more efficient therapeutic algorithm from the perspective of multidisciplinary management, with important benefits for the patient, but also in terms of economic efficiency (reduced hospitalization costs).

The desired aspects were highlighted by analyzing two comparative studies. The first study was designed to highlight imaging similarities essential for the realization of a scale for predicting biliary fistulas in conjunction with certain biological parameters. The second study is designed to highlight the benefit of preoperative ERCP and laparoscopic surgical treatment of biliary complications.

MATERIAL AND METHOD

The main objective of this thesis was the realization of a therapeutic algorithm for biliary complications of hepatic hydatid cyst, using all surgical, minimally invasive, medicamentous and paraclinical means, for the most rapid and effective treatment. This objective was achieved by:

- Close monitoring of patients from the time of presentation in the UPU, or in the Surgical ward, in the case of patients with known pathology.

- Specific tests for hydatid disease (Elisa test, intradermal Cassoni reaction, leukocytosis, elevated bilirubin, CRP, ESR, ESV).

- Perform paraclinical imaging investigations (Abdomino-pelvic ultrasonography, Abdominal Computed Tomography, Abdominal MRI, Cholangio-MRI).

- In the case of patients already known to have this pathology, recommendation to institute pre-operative antiparasitic treatment.

- Performing the surgical intervention, which includes informing the patient of all risks, both surgical and anesthetic, immediate and late post-surgical risks.

- Information on post-surgical recovery and specific treatment, hygienic and dietary regimen.

- Adaptation of the treatment regimen according to the patient's associated impairments.

- Investigation of risk and prognostic factors for CHH.

The first study is composed of 170 patients in the database of Constanta County Emergency Hospital "St. Apostol Apostol Andrei", selected according to the following inclusion and exclusion criteria.

Inclusion criteria

- Patients diagnosed with CHH in the Constanta County Emergency Hospital or in the specialized outpatient clinic;
- Patients with biliary complications of hydatid liver disease;
- Patients who followed preoperative or postoperative antiparasitic treatment regimen;
- Symptomatic or asymptomatic patients;
- Patients with hepatic hydatid cysts larger than 5 cm;
- Patients who have CT scans confirming the presence of hepatic hydatid cyst.

Exclusion criteria

- Calcified cysts not amenable to surgery;
- Very high cardiac and anesthetic risks, in patients who have no paraclinically detectable imaging complications;
- Simple hepatic cysts;
- Liver hydatid cysts without surgical indication.

Data collection was initially performed by analyzing the electronic records of the imaging and radiology service, as well as the observation sheets of the Constanța Emergency Hospital.

The second study is designed and addressed to those patients who presented biliary complications since hospitalization, data obtained and confirmed by imaging explorations performed on admission and paraclinical biological investigations, which led to the development of the predictive scale of cystobiliary fistula. Forty-seven patients participated in this study, for which the following inclusion and exclusion criteria were used.

Inclusion criteria

- Patients with imaging features suggestive of biliary complications in the context of hydatid pathology;
- Patients whose paraclinical biological investigations were suggestive of biliary involvement in the context of hydatid liver disease;
- Patients who met all items of the cystobiliary fistula prediction scale;
- Patients requiring surgical treatment and ERCP(papilosphincterotomy) pre- or post-operatively.

Exclusion criteria

- Imaging-confirmed patients with biliary-type distress but outside hydatid pathology;
- Patients whose biologic investigations did not demonstrate the presence of biliary distress;
- Patients with uncomplicated hepatic hydatid cyst;
- Patients who refused any medical-surgical maneuvers and gestures.

For this study it was extremely useful for us to use the predictive scale for cystobiliary fistula, designed in the first study, in order to be able to approach in a multimodal manner the therapeutic management of biliary complications and to streamline the costs that such a patient may generate.

RESULTS

Our study spans over a period of 5 years, during which time cases of CHH suitable for the present thesis were analyzed, examined, selected and treated. Since hydatid pathology has suffered a considerable decrease in recent years, the admission criteria for the present study were initially permissive, starting from a group of 234 patients, subsequently applying the inclusion and exclusion criteria for the study, the number of patients proposed for the group remained at 170.

As Dobrogea is considered an endemic area for this pathology, it was an asset in the group of patients, due to the existence of multiple farms and pastures in this area.

Thus, the highest proportion of the 170 patients, in terms of origin, came from rural areas, or those who have direct contact with this environment through family or relatives and food that comes mainly from farms and households, noting that it is still customary to practice the slaughter of animals by hand or individually. Out of the total of 170 patients selected, 102 of these patients were from rural areas, or had been domiciled in rural areas. This percentage of 60% is closely related to the equine cycle.

The Dobrogea area presents an ethnic and national variety, due to the historical events that took place, but also due to the opening to the Black Sea and the Danube, therefore this multicultural accumulation has also led to different traditions and eating habits that may favor the increased consumption of a particular kind of animal, cattle, sheep, pig, etc.

The importance of a predictive scale for biliary complications of liver liver hydatid pathology proves its effectiveness and role in the establishment of a modern multimodal treatment that is beneficial for the patient and from a socio-economic point of view.

This first study from which the predictive scale for cysto-biliary fistulas was born was extremely useful for the therapeutic algorithm subsequently used, which we will address in the second study proposed for this thesis.

The standardization and efficiency of a therapeutic algorithm for confirmed patients with biliary fistulas was followed from 2 perspectives. The preoperative aspect with the performance of ERCP and the postoperative aspect.

We next discuss the therapeutic management of the patient with complicated biliary hepatic hydatid complicated biliary cyst who received surgical treatment. With regard to postoperative paraclinical imaging investigations, we consider it imperative as a first-line first-line procedure to use an abdominal ultrasound scan, particularly for those patients in whom no preoperative ERCP was performed preoperatively to detect the lesion, and in those patients in whom the ultrasound images are not suggestive but the exteriorization of biliary fluid at the level of the drains has been maintained, it was necessary to perform cholangio MRI.În primul rând complicațiile de tip biliar și aspecte socio-economice ale strategiilor terapeutice în vederea realizării unui algoritm modern terapeutic și eficient din punct de vedere financiar.

We considered it imperative to realize a predictive scale of cysto- biliary fistulas in order to approach a modern therapeutic algorithm. We consider this predictive scale to be of major importance in modern multimodal therapeutic management, without which the financial and therapeutic aspects could not demonstrate their effectiveness.

In order to design an imaging predictive scale for cystobiliary fistulas, we analyzed all the parameters already known from the literature, i.e. the largest possible size of the cyst at the hepatic level and its localization in the segments of the right hepatic lobe, anatomically larger than the left, thus increasing the chances of biliary fistula formation by the increased surface area, which were not statistically significant, which refuted what was previously thought.

The novelty brought by this study is the change in the parameters of analysis regarding the predictability of cystobiliary fistulas, parameters that previously did not raise curiosity or were not considered essential in the occurrence of cystobiliary fistulas.

We retain the following elements as components of the scale of prediction of cystobiliary fistulas:

- Appearance of liver parenchyma
- Thickness of cyst brush
- Presence of the biliary element in the vicinity of the hepatic hydatid cyst at less than 1 cm

Another statistically proven and studied biological parameter that we add in the composition of this predictive scale is the increased value of direct bilirubin.

For the design of the 2nd study we used as a tool the prediction scale and the statistical data related to the surgical approach applied, preoperative or postoperative completion of the surgical gesture, ERCP with papilosphincteroromies and the administration of postoperative antiparasitic treatment.

By corroborating these data and the aforementioned medical-surgical gestures, we statistically proved the efficiency of a new modern multimodal therapeutic algorithm for patients with complicated biliary liver hydatid cyst.

We emphasized the therapeutic aspect beneficial to the patient but at the same time did not omit the socio-economic and financial aspect.

As a result of this study we proved the importance of adopting this modern multimodal therapeutic algorithm for this pathology from a financial point of view, by reducing the days of hospitalization, the used pain medication, antibiotic therapy, the decrease of the risk of suppurative complications in postoperative wounds and the reduction of the days of active mobilization in the postoperative context.

CONCLUSIONS

1. Hepatic hydatid liver cyst is a parasitosis that currently occupies an important place in all liver surgical pathology worldwide.
2. Although the number of patients with hepatic hydatid liver cyst pathology has decreased in comparison with previous years, the biliary complications they have presented in hospital units have increased considerably in comparison with previous years.
3. Dobrogea is currently still considered an endemic area for this pathology due to the existence of many farms, pastures due to the pre-existing relief, but also to the customs still preserved in terms of animal husbandry and their artisanal slaughtering and subsequent commercialization of these products.
4. Hepatic hydatid liver pathology is led by patients of Roma ethnicity, leading position explained by from the low habitual hygiene, the lack of desire towards education and compliance with sanitary norms and programs that provide information about hygiene.
5. The advent and development of laparoscopic surgical techniques and their introduction in the surgical treatment of CHH has changed the view and perspective of this pathology.
6. The development of imaging prediction scales for imaging prediction of cysto biliary fistulas has been the key to establish a new modern multimodal therapeutic algorithm for complicated biliary complicated hepatic hydatid biliary pathology.
7. The newly discovered elements for the prediction of cystobiliary cystobiliary fistulas are represented by the structure of the hepatic parenchyma, the thickness of the pericyst, the presence of the biliary element in the vicinity of the hydatid cyst less than 1 cm and the increased value of direct bilirubin.
8. The statistical infirmation of the parameters considered previously important for the appearance of the cysto-biliary fistulas, respectively the increased dimension of the hydatic cyst and its belonging at the level of the hepatic lobe.
9. The approach of biliary fistulas per primam preoperatively by minimally invasive techniques, namely endoscopic papilosphincterotomy, has proven its therapeutic and financial efficiency in the study.
10. Surgical treatment of hepatic hydatitic cyst in a laparoscopic manner is clearly superior in terms of economic as well as therapeutic efficacy.
11. Antiparasitic drug treatment administered as indicated by the postoperative infectious disease specialist for prophylactic purposes.
12. These 3 treatment components, respectively minimally invasive, which comes to supplement the postoperative parasitic treatment in terms of biliary hepatic hydatic pathology, forms a modern multidisciplinary therapeutic algorithm with many socio-economic benefits to the patient but also financial efficiency.
13. The total hospitalization costs are much lower in laparoscopic surgery due to fewer days of hospitalization and less postoperative medication requirements. The efficiency of laparoscopic surgery is certified by assessing the days of hospitalization. Patients operated in laparoscopic way required fewer days of hospitalization in order to supervise and treatment.