

Lithiasis of the Main Biliary Tract: Epidemiological, Diagnostic and Therapeutic Features: Case Series Report

**A. El Karouachi^{1*}, Y. Fakhri¹, M. Ouchan¹, S. R. El Jai², D. Erguibi²,
R. Boufettal³ and F. Chehab³**

¹*Department of General Surgery, University Hospital Center Ibn Rochd - Casablanca, Morocco.*

²*Service of Surgery Digestive Cancer wing III, University Hospital Center Ibn Rochd - Casablanca, Morocco.*

³*University of Hassan II Casablanca, Morocco.*

Authors' contributions

This work was carried out in collaboration among all authors. Author AE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AE and YF managed the analyses of the study. Author MO managed the literature searches. All authors read and approved the final manuscript.

Article Information

Editor(s):

- (1) Dr. Wagih Mommtaz Ghannam, Mansoura University, Egypt.
- (2) Dr. Kaushik Bhattacharya, CAPFs Composite Hospital Border Security Force, India.
- (3) Dr. Ramesh Gurunathan, Sunway Medical Center, Malaysia.

Reviewers:

- (1) Élida Mara Carneiro Da Silva, Federal University of Mineiro Triangle, Brazil.
- (2) Dr. Ajay K. Khanna, Banaras Hindu University, India.
- (3) Gustavo Andreazza Laporte, Brazil.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/60133>

Case Study

Received 22 July 2020
Accepted 28 September 2020
Published 13 October 2020

ABSTRACT

Common bile duct stones is a common condition that can regularly face any digestive surgeon. Our goal is to study the diagnostic and therapeutic aspects of the common bile duct stones in digestive surgery department at the CHU IBN ROCHD CASABLANCA, then compare them to the literature, Through a retrospective study including 81 patients with common bile duct stones, during a 4-year period between 1 January 2014 and 31 January 2018. The percentage of female was 76, while men accounted for only 23%, with an average age of 60 years with an increase in the frequency with age, reaching a max frequency between 50 and 80 years.

*Corresponding author: E-mail: dr.elkarouachi@gmail.com;

Hepatic colic, vomiting, fever, and jaundice are the most common clinical signs presented by the patients in this study. Biological cholestasis was detected in 52%, hepatic cytolysis in 38% of cases. ultrasound was performed in 76 patients and confirmed it by showing the stones in the common bile duct in 38 patients. The bili-MRI was performed in 74 patients, confirmed a common bile duct stones in 63.

52 patients received a laparotomy, while 26 received a laparoscopy, and 3 patients received an endoscopic treatment. External biliary drainage was performed in 10 patients, an internal drainage in 51 patients. Postoperative complications have been noted in 2 cases, and one case of death.

The common bile duct exposes to serious risks such as acute cholangitis and acute pancreatitis, treatment is therefore imperative and urgent in front of any common bile duct stone to avoid these complications.

Keywords: Lithiasis of the common bile duct; jaundice; surgery.

1. INTRODUCTION

Lithiasis of the main biliary tract is a frequent pathology that any digestive surgeon is regularly confronted with. It is most often associated with vesicular lithiasis. Some clinical forms of the disease are potentially serious.

The diagnosis, even if it has been enriched by increasingly efficient morphological explorations, such as echo endoscopy and MRI, is centred in the majority of cases on intraoperative cholangiography during cholecystectomy.

More than the means, the therapeutic indications seem to be evolving at present due to the advent of laparoscopy, a better knowledge of the natural history of the disease and to a lesser extent the application of evidence-based medicine by the medical community [1].

The aim of our study was to analyse the epidemiological characteristics, diagnostic, therapeutic and evolutionary aspects in the visceral surgery department of the IBN ROCHD University Hospital in CASABLANCA.

2. PATIENTS AND METHODS

Our study involved 81 patients operated for main biliary duct lithiasis from January 11th 2014 to January 31, 2018 in the visceral surgery department at the IBN ROCHD Hospital in Casablanca.

We included in this study, all patients with primary biliary tract lithiasis confirmed by surgery or endoscopic treatment. All patients with isolated vesicular lithiasis were excluded.

Among these 81 patients we distinguish: 14 cases of residual lithiasis (patients operated for

vesicular lithiasis and/or lithiasis of the main biliary tract a long time ago).

3. RESULTS

From January 1, 2014 to January 31, 2018, we operated on 986 patients with biliary lithiasis, of which 81 (8%) had primary biliary tract lithiasis.

Patients were divided into 19 men (23%) and 62 women (76%). The mean age was 60 years with extremes of 19 and 82 years.

The history was represented by hypertension in eleven cases (13%), diabetes in six cases (7%), heart disease in three cases (4%) and biliary surgery in 14 cases, of which 12 patients had previously had cholecystectomy for simple vesicular lithiasis or cholecystitis, and 2 patients had previously had surgery for a main biliary tract lithiasis.

Clinical signs were dominated by jaundice in 37 cases (46%) and hepatic colic in 74 cases (91%).

In biology, hyperleukocytosis greater than 10,000 elements/mm³ was noted in 26 patients (32%). A renal check-up was done in 76 patients (94%): only 5 patients had a disturbed check-up. The hepatic assessment performed in all patients showed a cholestasis syndrome in 42 cases (52%) and a hepatic cytolysis syndrome in 31 cases (38%). The haemostasis assessment was disturbed in 4 patients (5%). Lipasemia measured in 21 patients, in whom acute pancreatitis was suspected, was more than three times normal in 5 cases.

Hepatobiliary ultrasound in 76 patients showed bile duct lithiasis in 38 cases and vesicular lithiasis in 56 cases. Dilatation of the intrahepatic bile ducts was noted in 36 cases and

extrahepatic bile ducts in 63 cases. The abdominal CT scan performed in 17 patients showed suspicion of main biliary tract lithiasis (on indirect signs) in 4 cases and confirmed it (on calculation in the main biliary tract) in 13 cases.

MRI bilirubin, performed in 74 patients, showed vesicular lithiasis in 53 cases and main bile duct lithiasis in 63 cases. Endoscopic ultrasound in one patient showed primary biliary tract lithiasis.

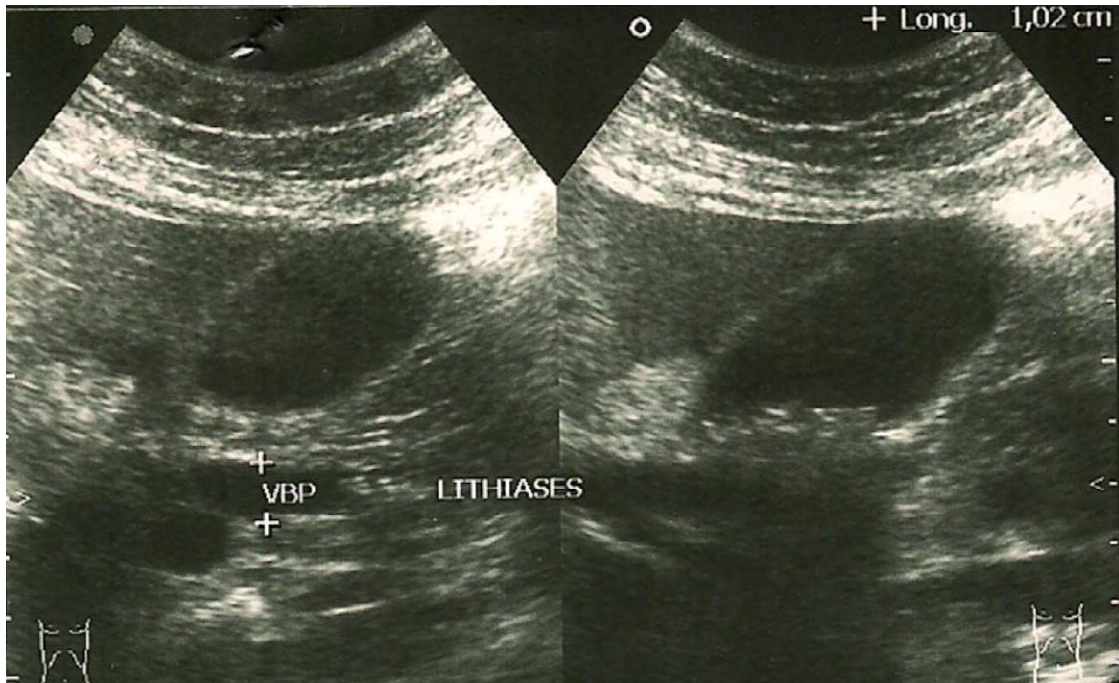


Fig. 1. Lithiasis of the lower bile duct causing dilatation of the main bile duct with a multilithiasis gallbladder

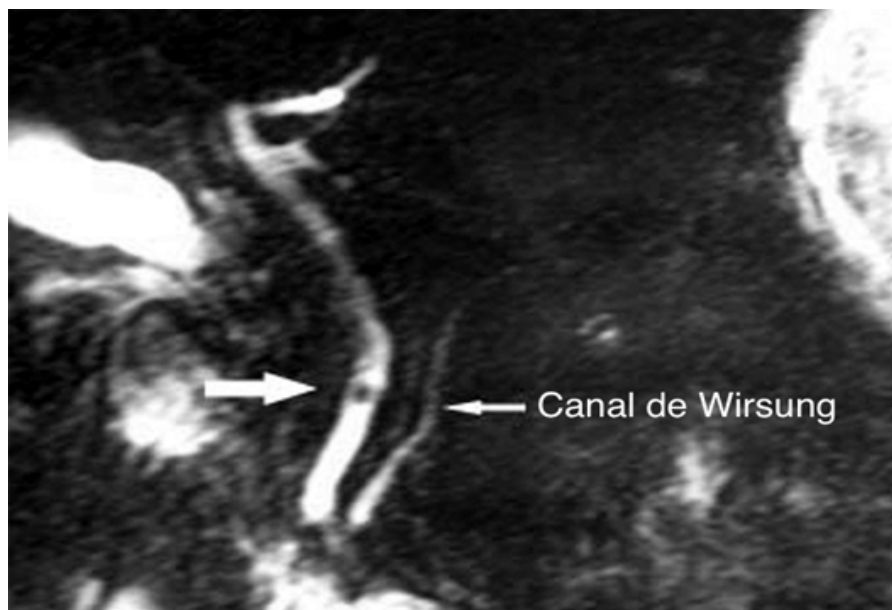


Fig. 2. Bili-MRI: Arrow on the left: Calculation (black circle) in hyposignal in white bile ducts

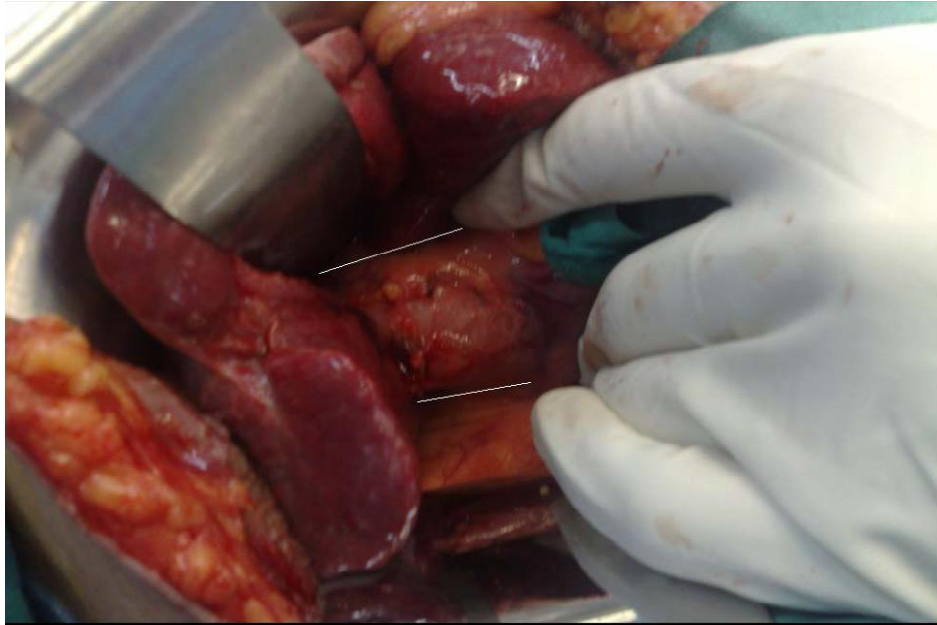


Fig. 3. Main bile duct dilated to more than 2cm

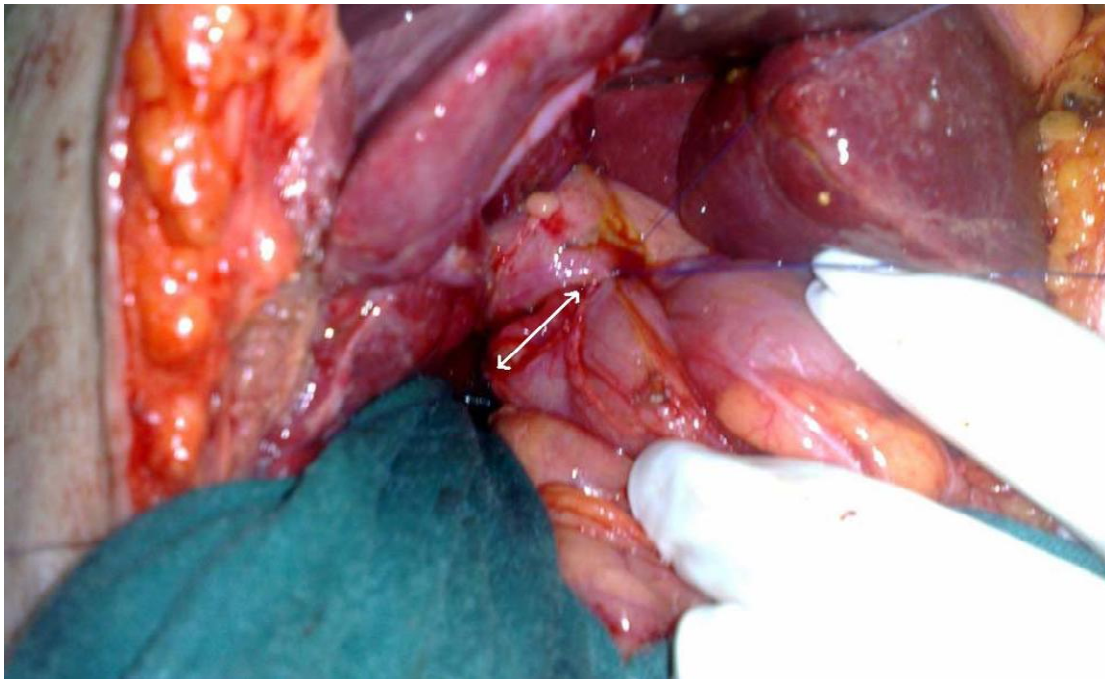


Fig. 4. Choledoco-doduodenal anastomosis LL (white arrow)

67 patients received antibiotic treatment during their hospitalizations, i.e. 83%.

3 patients benefited from endoscopic treatment, 78 of the patients benefited from surgical treatment, of which 52 or 67% of the patients benefited from open surgical treatment

(laparotomy) and 26 or 33% of the patients benefited from laparoscopic surgery.

All the patients were operated on under general anesthesia. The right subcostal route was performed in 45 patients (86%), and the middle route in seven patients (13%).

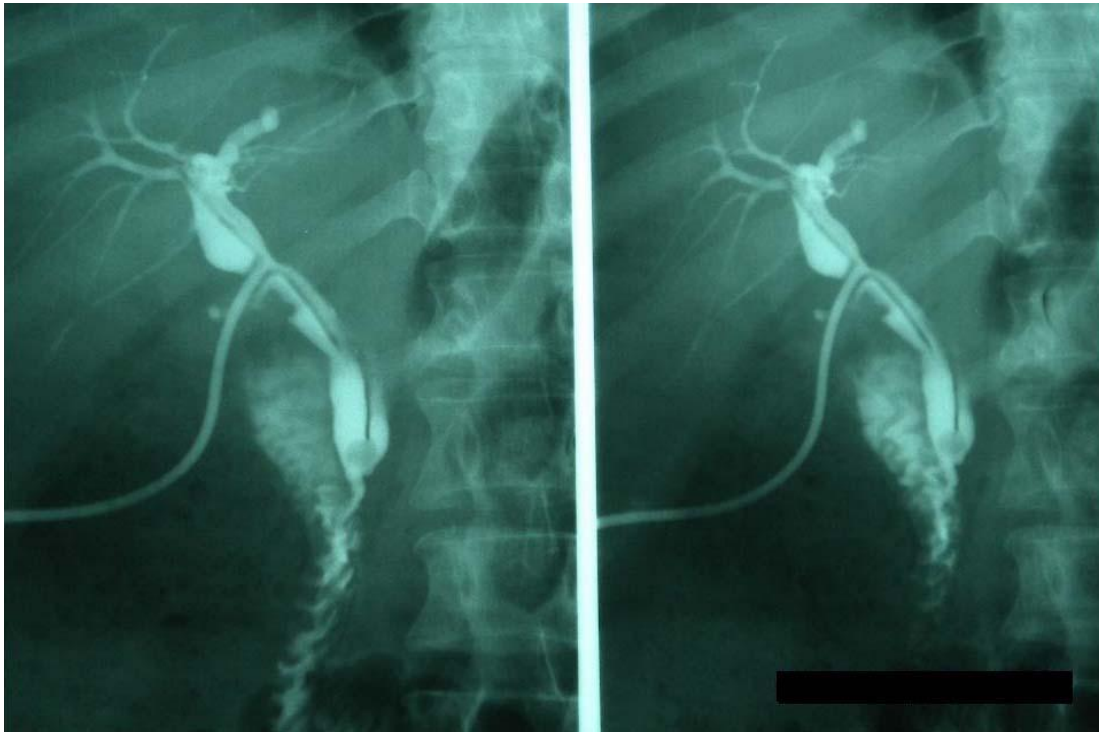


Fig. 5. Post-operative cholangiography showing residual lithiasis in the form of a very limited rounded lacunar image

Surgical procedures included cholecystectomy in 64 patients, external biliary drainage by Kehr's drain in 10 patients, and biliodigestive anastomosis in 51 patients.

Intraoperative cholangiography was not available.

The morbidity was dominated by infectious pneumopathy in one case and bile leakage from the bile duct due to poor sealing of the bile duct in one case. There was one case of death, one of which occurred on the second post-operative day in a state of shock.

In our series, 14 cases of residual lithiasis were detected: 12 cases treated by surgical treatment and 2 cases treated by endoscopic sphincterotomy.

4. DISCUSSION

Biliary lithiasis is a very common condition, as in developed countries it is one of the most common surgical problems. A main biliary tract lithiasis is found in 10-18% of lithiasis cholecystectomies [2-3].

In our series, there were 986 patients with biliary lithiasis, of which 81 (8%) had a primary biliary tract lithiasis.

Main biliary tract lithiasis can occur at any age but most frequently between 50 and 80 years of age, exceptionally before the age of 20.

We note that the average age of our patients is close to the figures reported by most authors [4-5-6].

Before the age of 50, 60-70% of women are affected by biliary lithiasis. After the age of 50, the sex ratio is 1. Framingham epidemiological studies in the United States have shown that the prevalence of biliary lithiasis is higher in women than in men, with a relative risk of 1.7 to 4 times higher depending on the study; this is explained by the essential role played by female sex hormones in the prevention of biliary lithiasis. The female predominance in our series is expressed by a sex ratio of 0.3 in line with other series [7-8].

The clinical examination is generally poor, it asserts and evaluates jaundice, it often finds a painful right hypochondrium, sometimes hepatomegaly, the gall bladder is often not palpable. This bile duct syndrome can be repeated at more or less frequent intervals [9].

For DELSANTO [10], the normality of bilirubin, PAL, GGT and transaminases is accompanied by a zero probability of LVBP; if one or two of these parameters are elevated, the probability of LVBP is 17 to 25% and 50% if 3 or 4 of these parameters are elevated.

For ERLINGER, PAL activity is almost always high. Aminotransferase activity is moderately high in 80% [11].

Abdominal ultrasonography is a non-invasive, first-line examination that should be performed urgently in patients suspected of biliary pathology. It shows vesicular lithiasis, dilatation of the main bile duct and confirms with a sensitivity of 30 to 50%, the presence of calculus(s) of the main bile duct in the form of hyperechoic images with an anechoic zone or acoustic shadow cone behind [12].

Ultrasound generally provides guidance and indirect arguments for the PLSA:

- presence of vesicular lithiasis.
- bile ducts dilatation (more than 5 mm when BV is in place, more than 7 mm in case of cholecystectomy) associated or not with dilatation of HBV [1].

A normal abdominal ultrasound does not rule out the diagnosis of LVBP [11].

Cholangiography MRI or bi-MRI is an examination dedicated to the study of the bile ducts. Today, it is the most efficient non-invasive technique for the exploration of the bile ducts, the search for obstruction and the detection of stones of the main bile duct. No injection of contrast material is required for bile duct visualization. The bile duct calculi are visualized as a more or less hypo-intense area within the bile. The main limitation of MRI cholangiomas is the diagnosis of micro and microcalculations (less than 3 mm) and the diagnosis of stones impacted at the ampulla [13].

Because of its high cost, the CT scan is not a routine examination in the diagnosis of BPL. CT has better sensitivity than ultrasound and will be particularly useful in patients with low echogenicity, where the main bile duct and lower bile duct are inaccessible to ultrasound, A recent study by Chih-wei T et al, showed that the sensitivity, specificity, positive and negative predictive value for CT scan in the diagnosis of BPL are: 77.3%, 72.8%, 81.8% AND 67.0%

respectively. The size of the stone significantly affects the diagnosis, so the CT scan is less effective in the diagnosis of PLHL [14].

Echo-endoscopy nevertheless has some limitations that we must be aware of:

- the impossibility or great difficulty of performing an examination in patients with a history of total or partial gastrectomy or gastro-jejunal anastomosis;
- the low performance in case of aerobility ;
- Difficulty visualizing the retro-pancreatic portion of the main biliary tract in cases of calcifying chronic pancreatitis and in cases of severe acute necrotizing pancreatitis ;
- the poor performance of echo-endoscopy for obstructions or stones located in the hilum or intrahepatic.

In trained hands, the performance of echo-endoscopy is excellent with a sensitivity between 95 and 100% and a specificity close to 100% [15]. In practice, echo-endoscopy has become the "gold standard" for the diagnosis of bile duct calculi [16].

The management of BPL has evolved significantly over the past 20 years due to advances in surgical techniques.

Indeed, laparotomy cholecystectomy (in which intraoperative investigation of VBP was routinely performed) has been supplanted by laparoscopic cholecystectomy with or without surgical investigation of VBP.

Parallel to this "surgical revolution", interventional endoscopy had to adapt, with more frequent indications and increased therapeutic possibilities.

Eight good quality controlled studies can be selected. They compared endoscopic sphincterotomy followed by surgery (simple cholecystectomy) with surgery alone [17-18], endoscopic sphincterotomy with surgery [19-20], and finally endoscopic sphincterotomy before or after laparoscopic cholecystectomy with laparoscopic surgery alone [21-22].

These studies took into account not only the effectiveness of the treatments but also their disadvantages in terms of morbidity, mortality and length of hospitalization. The analysis of all these studies seems to show a similarity or even a superiority of surgery whether by laparotomy or

laparoscopy compared to endoscopic sphincterotomy in terms of residual lithiasis, additional procedures and early or late biliary morbidity.

Mortality in open surgery has decreased significantly in the last ten years. Thanks to improved management methods and the rapidity with which the indication for surgery can be established.

Depending on the series, this mortality is between 0 and 4% [23].

Among the risk factors for this mortality: age [24], cirrhosis of the liver, an emergency context and an infectious context [25]. Residual lithiasis is also a risk factor with a mortality rate of 16% [26].

Surgical morbidity after open surgery is 10% [26]. This progress can be attributed to the results of resuscitation but also to antibiotic prophylaxis, the abandonment of the evisceration-generating median approach for the right subcostal approach, the delayed ablation of the external biliary drain and finally the rejection of the ideal choledochotomy [25-26].

Residual lithiasis remains the main problem in LVBP surgery despite all the technical improvements in pre- and intraoperative exploration [27].

5. CONCLUSION

Lithiasis of the main biliary tract is a frequent and potentially serious pathology requiring appropriate management.

The diagnosis of main biliary tract lithiasis is often suspected on the clinical, biology and ultrasound remaining and first-line examination. But currently, more efficient tests such as biliary MRI are used.

The choice of effective confirmatory tests should take into account the therapeutic strategy being considered.

Today the prognosis has improved significantly with the development of laparoscopic surgery and the advent of interventional endoscopy, which is an alternative to surgery in high-risk patients.

CONSENT

As per international standard or university standard, patient's consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Muscari F, Delebecq T, Foppa B, Suc B. Management of choledocholithiasis. *J Chir (Paris)*. 2006;143(3):148-54.
2. Martin DJ, Vernon DR, Toouli J. Surgical versus endoscopic treatment of bile duct stones. *Cochrane Database Syst Rev*; 2006.
3. Dasari BV, Tan CJ, Gurusamy KS, Martin DJ, Kirk G, McKie L, Diamond T, Taylor MA. Surgical versus endoscopic treatment of bile duct stones. *Cochrane Database Syst Rev*; 2013.
4. Hugier M, Bornet P, Charpak Y, Houry S. Selective contraindications based on multivariate analysis for operative cholangiography in biliary lithiasis. *Surg Gynecol Obstet*. 1991;172:470-74.
5. Abarrah Khalid. LVBP à l'hôpital AL Ghassani de Fés (66 cas opérés). Thèse de Médecine, rabat. 1994;243.
6. Moumen et Coll. Elfares F. LVBP à propos de 329 observations. *Lyon chirurgical*. 1997;87(3):280-282.
7. Buffet C, Jacquemin E, Erlinger S. Physiopathologie, épidémiologie et histoire naturelle de la lithiase de la lithiase biliaire. *EMC Hépatologie*. 2008;47:1-7.
8. Erlinger S. Physiopathologie et épidémiologie de la lithiase biliaire. *EMC Hépatologie*. 1996;4:10.
9. Franck Z. Angiocholite aiguë. *Revue du praticien*. 2007;57:2129-33.
10. Delsanto P, Kzarian K, Forbes J, Rogers P et al. Prediction of operative cholangiography in patients undergoing elective cholecystectomy with routine liver function chemistries. *Surgery*. 1995;98(1): 7-11.
11. Erlinger S. Biliary lithiasis. *Gastro-entérologie Clinique et Biologique*. 2002; 26:1018-25.
12. Grotemeyer KC, Lammert F. Gallstones – Causes, Consequences. *Dtsch Med Wochenschr*. 2016;141(23):1677-82.
13. Gallix B, Anfort S, Pierredon M, Garibaldi F. Une angiocholite: Comment la

- reconnaitre? quelles conduite à tenir ?J radiol. 2006;87(4):430-40.
14. Chih-Wei. Can CT with coronal reconstruction improve the diagnostic of choledocolithiasis? Journal of Gastroenterology and Hepatology. 2008; 23:1586-89.
 15. Filali A, et Coll. Profil épidémiologique et évolutif de la lithiase biliaire. Tunisie Méd. 1985;63:121-4.
 16. Godchaux J. L'écho-endoscopie dans le diagnostic de la lithiase cholédocienne. Acta endoscopica. 2008;30(2):301-4.
 17. Stiegmann GV, Goff JS, Mansour A, Pearlmann N. Precholecystectomy endoscopic cholangiography and stone removal is not superior tocholecystectomy, cholangiography and common bile duct exploration. Am J Surg. 1992;163:227-30.
 18. Stain SC, Cohen H, Tsuishoysa M, Donovan AJ. Choledocholithiasis: Endoscopic sphincterotomy or common bile duct exploration. Ann Surg. 1991;213:627-34.
 19. Hammarström LE, Holmin T, Stridbeck H, Ihse I, Long term follow-up of a prospective randomized study of endoscopic versus surgical treatment of bile duct calculi in patients with gallbladder in situ. Br J Surg. 1995;82:1516-21.
 20. Suc B, Escat J, Cherqui D, Surgery versus endoscopy as primary treatment in symptomatic patients with suspected common bile duct stones. A multicenter prospective randomized trial. Arch Surg. 1998;133:702-8.
 21. Cuschieri A, Lezoche E, Morino M. E.A.E.S. multicenter prospective randomized trial comparing two stage versus single-stage management of patients with gallstone disease and ductal calculi. Surg Endos. 1999;13:952-7.
 22. Nathanson LK, O'Rourke NA, Martin IJ, Fielding GA. Postoperative ERCP versus Laparoscopic choledocotomy for clearance of selected bile duct calculi. A randomized trial. Ann Surg. 2005;242:188-92.
 23. Rat P, Bernard A, Rousselet J, Favre J. La lithiase de la voie biliaire principale: Résultats de la chirurgie ouverte. Lyon chir. 1997;93:1-2.
 24. Nardi et Coll. Lithiase de la voie biliaire principale. Traitement chirurgical reste licite chez le sujet âgé. Lyon Chir. 1992;88:381-84.
 25. Houdart T, Lecomte P, Perniceni T, Salmeron M. Cent vingt-cinq cholécotomies consécutives. Etat actuel des complications de la chirurgie de la voie biliaire principale. Ann Chir. 1992;10:928-31.
 26. Meyer C, Thiry L, Firtion O, Rohr S. Résultats de la chirurgie traditionnelle dans le traitement de la lithiase de la VBP: A propos de 670 cas. Lyon Chir. 1997;93:12-27.
 27. Aube C. Apport de la radiologie dans le diagnostic de la LVBP. Revue française de gastroenterologie. 1994 ;30(296):391-93.

© 2020 El Karouachi et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/60133>