CLINICAL CASE

SURGICAL MANAGEMENT OF CHOLANGIOCARCINOMA: CASE REPORT

MANEJO QUIRÚRGICO DE COLANGIOCARCINOMA: REPORTE DE CASO

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SUMMARY

Introduction: Cholangiocarcinoma is a malignant tumor originating in the epithelium of the intra- or extrahepatic bile ducts, rare and represents less than 2% of malignant tumors, its incidence is 1 or 2 new cases per 100,000 inhabitants each year, the techniques of hepatectomies have evolved over time, supported by the development of surgical instruments and vascular clamping methods. **Clinical case:** 28-year-old female patient with a history of cholelithiasis with a space-occupying lesion at the level of the bile duct and a previous failed diagnostic procedure, who presented extrahepatic bile duct narrowing at the level of the proximal common liver, compromising the bifurcation and right hepatic origin. Tumor. (Bismuth IIIa) with secondary obstruction, lymphadenopathy with a reactive appearance in the hepatic hilum, so hepatectomy was performed with the described technique. **Conclusions:** The surgical treatment of planned hepatectomy helps to achieve a better balance between achieving radical tumor resection of hilar cholangiocarcinoma and reasonable control of the extent of surgical damage, however it requires greater arterial reconstruction, which is technically demanding and must be performed by For experienced surgeons, the selection of the surgical strategy should be based not only on the location of the tumor (Bismuth classification) but also on vascular involvement and future liver remnant.

KEYWORDS: Cholangiocarcinoma, Hepatectomy, surgery, oncology.

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RESUMEN

Introducción: El colangiocarcinoma es un tumor maligno originado en el epitelio de los conductos biliares intra o extrahepáticos, infrecuente y representa menos del 2% de los tumores malignos, su incidencia es de 1 o 2 casos nuevos por cada 100,000 habitantes cada año, las técnicas de las hepatectomías han evolucionado con el tiempo, soportados en el desarrollo del instrumental quirúrgico y a los métodos de pinzamiento vascular. **Caso clínico:** Paciente femenina de 28 años con antecedente de colelitiasis con lesión ocupante de espacio a nivel de la vía biliar y procedimiento diagnóstico previo fallido, quien presentó estrechez de vía biliar extrahepática a nivel del hepático común proximal comprometiendo la bifurcación y hepático derecho de origen tumoral. (Bismuth IIIa) con obstrucción secundaria, adenopatías de aspecto reactivo en el hilio hepático, por lo que se realiza hepatectomía con técnica descrita. **Conclusiones:** El tratamiento quirúrgico de hepatectomía planificada ayuda a lograr un mejor equilibrio entre lograr la resección tumoral radical del colangiocarcinoma hiliar y un control razonable de la extensión del daño quirúrgico, que es técnicamente exigente y debe ser realizada por cirujanos experimentados, la selección de la estrategia quirúrgica debe basarse no sólo en la ubicación del tumor (clasificación de Bismuth) sino también en la afectación vascular y el futuro remanente hepático.

PALABRAS CLAVES: Colangiocarcinoma, Hepatectomía, cirugía, oncología.

INTRODUCTION

Cholangiocarcinoma is a malignant tumor originating in the epithelium of the intrahepatic or extrahepatic bile ducts, first described by Durand-Fardel in 1840[5], it is an uncommon entity and represents less than 2% of malignant tumors, with an incidence of 1 or 2 new cases per 100,000 inhabitants each year. It is more frequent in the sixth decade of life and slightly more common in men[6].[7], most are of the histological type ductal adenocarcinoma; however, other types such as papillary adenocarcinoma, mucinous adenocarcinoma, mucoepidermoid carcinoma, and cystadenocarcinoma are also observed [8].

anatomically, they are categorized as intrahepatic (20% to 25%), perihilar (50% to 60%), distal extrahepatic (20% to 25%), and multifocal (5%). the extrahepatic type is also classified by its location in the upper third of the bile duct (common hepatic duct, hilar confluence, or right and left hepatic ducts), middle third (common bile duct

[5] Khan SA, Thomas HC, Davidson BR, Taylor-Robin-son SD. Colangiocarcinoma. *Lancet* 2005; 366: 1303-14.
[6] Burgos L. Colangiocarcinoma. Actualización, diagnóstico y terapia. Rev. Med Chile. 2008; 136: 240-248.
[7] Giménez M, Andreacchio A. Carcinoma de vías biliares. Tumor de Klatskin. En: Galindo F, editor. Cirugía digestiva. Buenos Aires: SACD; 2009. IV-466-, p. 1-12.
[8] Vega P, Arribas J, González M, Moreno S, Aburto JM. Colangiocarcinoma polipoideo difuso de colédoco. *CirEsp* 2004; 75: 365-8.

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up to a plane given by the upper border of the duodenum), and lower third (from the plane of the upper border of the duodenum to the ampulla of Vater). cholangiocarcinoma located at the hilar confluence is called klatskin tumor[9] with a median survival without treatment of three months from the onset of clinical presentation.

The causes of death are liver failure and cholangitis, secondary to the local progression of the disease with biliary obstruction [10], the presence of hepatolithiasis and congenital dilation of the bile duct could be linked to the occurrence of bile duct cancer.

The Bismuth-Corlette classification is used for categorizing hilar cholangiocarcinoma based on the tumor's extent along the bile duct tree, highlighting involvement of one or both hepatic ducts[11], This classification distinguishes four types: Type I. Tumor located below the confluence, Type II. Tumor located at the confluence, Type IIIa. Tumor with extension to the right hepatic, Type IIIb. Tumor with extension to the left hepatic, and Type IV. Tumor with extension to both hepatics. Refer to Figure No.1. Currently, the Union for International Cancer Control (UICC) classification considers vascular invasion and the TNM of the tumor as vital factors in diagnosis and treatment. See Figure No.2.

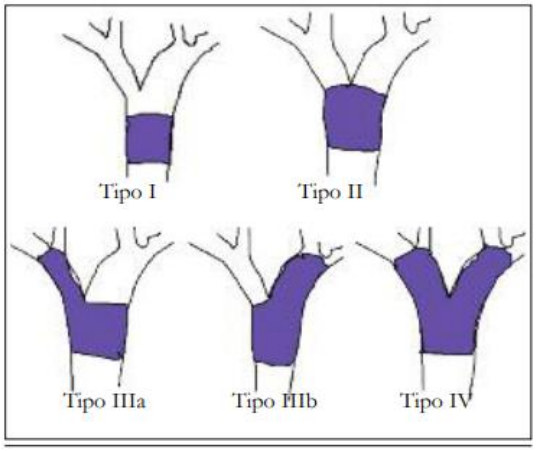

Figure No.1 Bismuth-Corlette Classification

[9] Giménez M, Ibid.
[10] Vega, Ibid.
[11] Brody La, Brown Kt, Getrajdman Gi, Kannegieter Ls, Brown Ae, Fong Y, Blumgart Lh: Clinical factors associated with positive bile cultures during primary percutaneous biliary drainage. J Vasc Interv Radiol. 1998; 9: 572-8

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	TUMOR	GANGLIOS	METASTASIS
ESTADIO I	T1	N0	M0
ESTADIO II	T2	N0	M0
ESTADIO III	T1-2	N1	M0
ESTADIO IVa	T3	N0-1	M0
ESTADIO IVb	T1-2-3	N0-1	M1

T1: Tumor limitado a la mucosa o capa muscular
T2: Tumor que invade el tejido periductal
T3: Tumor que invade estructura adyacente
N0: Sin compromiso ganglionar
N1: Metástasis en ganglios regionales
M0: Sin metástasis a distancia
M1: Metástasis a distancia

Figure No.2 TNM Staging (UICC)

Clinical features include pain in the right hypochondrium, jaundice, weight loss, anorexia, itching, and the degree of hyperbilirubinemia is usually higher than that observed in benign obstructive biliary disease. Currently, diagnosis has been facilitated by the availability of various imaging and endoscopic procedures.[12].

Surgical treatment is the preferred option for hilar cholangiocarcinoma (CCH), with obtaining clear margins (R0 resection) being the only reported prognostic factor associated with increased survival[13], when this is achieved, the average survival is eighty-three months, with a decrease to twelve months if microscopic tumor remains, and only three months with macroscopic residual tumor; the tumor could also be unresectable, for those cases, palliation is possible by placing endoprostheses endoscopically or percutaneously is the most studied option[14].

Preoperative evaluation of these tumors is performed using ultrasound, computed tomography, bile duct visualization with echo-Doppler or magnetic resonance angiography, with ultrasound being the first study to perform to evaluate jaundiced patients. Ultrasound visualization and staging should be performed before instrumentation of the bile duct, as pneumobilia and drainage placement decrease the method's utility[15].

Currently, 80% of oncological surgeries for Klatskin tumors are accompanied by extensive hepatic resections and vascular replacements. In liver resection surgery, the volume of the

[12] Nakeeb A, Pitt HA. Radioterapia, quimioterapia y quimiorradiación en el colangiocarcinoma hiliar . *HPB (Oxford)* . 2005; 7 (4): 278–282.

[13] Peña, A. M., Sánchez, A. C., Botella, E. R., & Rincón, D. (2020). Colangiocarcinoma. *Medicine-Programa de Formación Médica Continuada Acreditado*, *13*(12), 666-677.

[14] Idberg MJ. Cholangiocarcinoma. *Dis Mon.* 2004; 50: 540-4.

[15] Hann L, Greatrex K, Blumgart L y colab. Cholangiocarcinoma at the hepatic hilus: Sonographic findings. AJR 1997. 168: 985-989.

remaining hepatic parenchyma should be greater than 25% in a healthy liver[16] and 40% in a cholestatic one, hence the importance of preoperative drainage in jaundiced patients; Similarly, in selected cases, to achieve good post-resection functionality and increase the volume of residual liver tissue, portal embolization is indicated[17].

Patients with hilar cholangiocarcinoma in a low percentage are able to be treated with potentially curative surgery, mainly for three reasons: late diagnosis, neoplastic infiltration of the hepatic hilum vasculature, and limitations in the training of surgical teams for high-complexity hepatobiliary surgery required for these cases in developing countries[18].

Hepatectomy techniques have evolved over time, supported by the development of surgical instruments and vascular clamping methods, but anatomical landmarks have remained fixed; Left lobectomy begins with a section of the round ligament and the left triangular ligament; the pedicles of segments 3 and 2 are ligated at the left edge of the portal pedicle; once this vascular control is achieved, hepatic parenchyma is sectioned, ending with the sectioning of the left hepatic vein[19].

Hepaticojejunostomy with Roux-en-Y reconstruction is considered the technique of choice for treating surgical lesions of the bile duct, such as its section or resection; Loss of confluence of the right and left main hepatic ducts is one of the factors that increases the technical complexity during the procedure, and in some of these patients, a double hepaticojejunostomy is required to ensure long-term satisfactory results[20].

CLINIC CASE

Female patient, 28 years old, from Venezuela, with a history of cholelithiasis and a space-occupying lesion (SOL) in the bile duct, presenting symptoms for about a month: upper abdominal pain, generalized jaundice, weight loss, fatigue, and weakness. Previous extra-institutional endoscopic retrograde cholangiopancreatography (ERCP) failed, resulting in pancreatitis requiring 21 days of hospitalization and antibiotic management. Initial evaluation showed a soft tissue SOL of approximately 30 mm in diameter located at the common hepatic duct extending into the mid common bile

[16] Rodríguez Prieto, M. D. P., & Rodríguez Medina, R. M. (2016). Tratamiento actual de las metástasis hepáticas de origen colorrectal.

[17] Yalcin s, Diagnosis, and management of cholangiocarcinomas: a comprehensive review. Hepatogastroenterology. 2004; 51: 43-50.

[18] Hemming AW, Reed AI, Fuiita S, Foley DP, Howard RJ. Surgical management of hilar cholangiocarcinoma. *Ann Surg 2005;* 241: 693-702.

[19] D. Castaing, C. Salloum,Técnicas de hepatectomía por laparotomía, EMC - Técnicas Quirúrgicas - Aparato Digestivo, Volume 27, Issue 2, 2011,Pages 1-17, ISSN 1282-9129

[20] Pereira Freddy, Venales Yajaira, Salazar Francisco, Detalles técnicos de la doble anastomosis hepático-yeyuno en Y de Roux, con base en la descripción de un caso, Revista Colombiana de Cirugía, vol. 34, núm. 2, pp. 179-184, 2019, Asociación Colombiana de Cirugía.

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duct, causing mass effect and compression with proximal dilation of the bile duct and intrahepatic bile ducts. Enlarged gallbladder with multiple defects inside compatible with calculi. Liver function tests on admission: Creatinine 0.27 mg/dL, Aspartate aminotransferase (AST) 214.25 U/L, Alanine aminotransferase (ALT) 127.27 U/L, total bilirubin 23.09 mg/dL, direct bilirubin 15.89 mg/dL, indirect bilirubin 7.20 mg/dL, alkaline phosphatase 2575 U/L, prolonged coagulation times. Hepatobiliary ultrasound: Hepatomegaly, gallbladder lithiasis, intra and extrahepatic bile duct dilation, distal common bile duct stones, portal vein 8mm, thin-walled gallbladder with calculi inside, no signs of pancreatitis or free fluid. Abdominal CT scan: Round hypodense lesion in the inferior right lobe of the liver, 35 x 33 mm, moderate dilation of intrahepatic bile ducts, normal common bile duct, moderate dilation of right renal pelvis, 33 mm left ovarian cyst, normal pancreas and spleen, normal-shaped and density kidneys. See figure No.3.

Figure 3. Abdominal CT scan

In her hospital stay, an institutional ERCP was performed, revealing a deformed papilla due to previous papillotomy, partially covered with fibrin, easily cannulated with a pre-curved papillotome and hydrophilic guide, directed towards the pancreatic duct (no contrast medium injected due to recent pancreatitis from previous procedure); a small septotomy was performed, gaining access to the bile duct; contrast medium injection filled the extrahepatic bile duct, approximately from the distal hepatic, which was of normal caliber and had no abnormalities inside; initially, there was no contrast medium passage proximally; with difficulty, the papillotome passed into the intrahepatic bile duct; contrast medium injection revealed a very notable dilation of the intrahepatic bile duct, up to the bifurcation, measuring 1.5 cm in diameter, without abnormalities inside and with amputation at this level, without emptying of the contrast medium; poor filling of the right intrahepatic bile duct; a long filiform stricture compromising the proximal common hepatic duct in a 3 cm trajectory, without gallbladder filling; papillotomy was completed with a pre-curved papillotome and diathermy; it was decided to insert a 7 Fr x 10 cm plastic biliary stent, which was guided under radiological and endoscopic vision and placed in position and functional, with successful conclusion of the procedure, reporting stricture of the extrahepatic bile duct at the level of the proximal common hepatic duct involving the bifurcation and probably the right hepatic duct, probably of tumor

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origin (Bismuth 3a.), and successful insertion of the plastic biliary stent.

The patient was managed multidisciplinarily by the nutrition, rehabilitation, psychology, gastrointestinal surgery, and hepatobiliary surgery services prior to right hepatectomy plus Roux-en-Y bile duct reconstruction to the left hepatic duct.

During surgery, a tumor-like mass involving the middle common bile duct and extending to the right hepatic duct was identified, consistent with Bismuth type IIIa cholangiocarcinoma with secondary obstruction, with reactive lymph nodes at the hepatic hilum, intrapancreatic common bile duct without lesions. After asepsis and antisepsis, placement of surgical drapes, a Makuuchi incision was made, and dissection through planes for entry into the cavity, adhesions were released, the surgical team identified the hepatic hilum, dissected the common hepatic artery, performed radical lymph node dissection, released the right hepatic artery and ligated it, dissected the intrapancreatic common bile duct, and sectioned it distally, removal of the common hepatic stent, culture sampling, suturing of the distal common bile duct, resection of the bile duct en bloc, the portal vein was identified, dissected, and repaired left portal vein, bile duct section at the level of the left hepatic, ischemic zone of the right lobe demarcated, retrohepatic vena cava released, lower right hepatic veins ligated, right suprahepatic vein identified. Dissection with ultrasonic aspirator of the hepatic parenchyma was initiated, segment IVB pedicles identified and selectively ligated, dissection and ligation of segment IVA pedicles, section with 45mm endostapler (2 reloads) of right portal vein and right suprahepatic vein pedicle, dissection continued with ultrasonic aspirator of the parenchyma until the retrohepatic vena cava. Surgical specimen excision from hepatectomy, hemostasis revision, hemostatic dressing left (hemopatch #2) with adequate bleeding control. Roux-en-Y bile duct reconstruction with two 60mm endostapler reloads (2). Jejunal loop section 30 cm from the Treitz angle, retrocolic loop raised, left hepatic anastomosis to jejunal loop with PDS 6-0. jejunojejunal anastomosis with vascular Prolene 5-0, mesos closure with vicryl, cavity lavage, right subhepatic drain left, fascia closure with Prolene® No.1, skin with Prolene® 3-0.

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Figura No.4 Surgical specimen from hepatectomy

The patient was transferred to the intermediate care unit, with an eighteen-day postoperative stay. An intraoperative culture isolated multi-sensitive Klebsiella pneumoniae, requiring satisfactory antibiotic management, leading to hospital discharge. On the ninth day after hospital discharge, the drain was removed without any complications, and the patient continues oncological management with chemotherapy.

DISCUSSION

The term cholangiocarcinoma describes a diverse group of aggressive malignant neoplasms that arise from the biliary epithelium[21], the hilar cholangiocarcinoma (HC) is the most common subtype, accounting for 60% of all cases [22]; the treatment of HC is particularly challenging given its aggressive nature and complex anatomical relationships, which have significant implications for treatment[23].

Cholangiocarcinoma is a rare cancer, with an incidence of 0.3 to 6 per 100,000 population per year and a mortality rate of 1-6 per 100,000 population per year worldwide, and it has increased in recent decades worldwide[24], in 2019, Colombia recorded a mortality rate of 1.10 deaths per 100,000 inhabitants[25].

[21] Passeri, M. J., Baimas-George, M. R., Sulzer, J. K., Iannitti, D. A., Martinie, J. B., Baker, E. H., & Vrochides, D. (2020). Prognostic impact of the Bismuth-Corlette classification: Higher rates of local unresectability in stage IIIb hilar cholangiocarcinoma. *Hepatobiliary & Pancreatic Diseases International*, *19*(2), 157-162.

[22] Klatskin, G. (1965). Adenocarcinoma of the hepatic duct at its bifurcation within the porta hepatis: an unusual tumor with distinctive clinical and pathological features. *The American journal of medicine*, *38*(2), 241-256.

[23] Soares KC, Jarnagin WR. The Landmark Series: Hilar Cholangiocarcinoma. Ann Surg Oncol. 2021 Aug;28(8):4158-4170.

[24] Banales JM, et al. Documento de consenso de expertos: colangiocarcinoma: conocimientos actuales y perspectivas futuras declaración de consenso de la Red Europea para el Estudio del Colangiocarcinoma (ENS-CCA) *Nat. Rev. Gastroenterol. Hepatol.* 2016; 13 : 261–280

[25] Bertuccio P, et al. Tendencias globales en la mortalidad por colangiocarcinoma intrahepático y extrahepático. *J. Hepatol.* 2019; 71: 104–114.

How to cite this article: Vallejo-Rosero Vanessa, Estrada-Salazar María, Carrero-Rivero Sonia, Hernández-Martínez Hender, Surgical Management of Cholangiocarcinoma: Case Report. Basic Sciences in Health Journal, 2(1): 35-46. March 2024, ISSN 2981-5800.

In the present clinical case, I address one of the diagnostic and therapeutic challenges originating from the migration experienced in the patient's place of origin with surgical history in the diagnosis, and which concludes in the well-being and outcomes of the patients. Adequate biliary drainage is fundamental before resection, given the decompressive pathophysiology of the jaundiced liver remnant that reduces the risk of subsequent morbidity and mortality following resection based on hepatic regeneration[26].

Recent studies have shown that extensive resection, mainly extended right hepatectomy, following biliary drainage and preoperative portal vein embolization can be safely performed and is more likely to result in histologically negative margins than other resection methods[27], however, the present case provides a new insight into the importance of preoperative and intraoperative evaluation and the key steps of surgical resection.

As described in Dr. Lee's retrospective study (2023), planned hepatectomy surgical treatment helps achieve a better balance between achieving radical tumor resection of hilar cholangiocarcinoma and reasonable control of the extent of surgical damage[28].

Although left-sided hepatectomy is not inferior to right-sided hepatectomy in terms of overall survival and disease-free survival[29], It requires greater arterial reconstruction, which is technically demanding and must be performed by experienced surgeons. The selection of the surgical strategy between these approaches should be based not only on the tumor location (Bismuth classification) but also on vascular involvement and the future hepatic remnant.[30].

REFERENCES

Banales JM, et al. Documento de consenso de expertos: colangiocarcinoma: conocimientos actuales y perspectivas futuras declaración de consenso de la Red Europea para el Estudio del Colangiocarcinoma (ENS-CCA) *Nat. Rev. Gastroenterol. Hepatol.* 2016; 13 : 261–280

Bertuccio P, et al. Tendencias globales en la mortalidad por colangiocarcinoma intrahepático y extrahepático. *J. Hepatol.* 2019; 71: 104–114.

[26] Mansour JC, Aloia TA, Crane CH, Heimbach JK, Nagino M, Vauthey JN. Colangiocarcinoma hiliar: declaración de consenso de expertos. *HPB (Oxford)*. 2015; 17 (8): 691–699.

[27] Jena SS, Mehta NN, Nundy S. Surgical management of hilar cholangiocarcinoma: Controversies and recommendations. Ann Hepatobiliary Pancreat Surg. 2023 Aug 31;27(3):227-240.

[28] Li B, Li Z, Qiu Z, Qin Y, Gao Q, Ao J, Ma W, Jiang X. Surgical treatment of hilar cholangiocarcinoma: retrospective analysis. BJS Open. 2023 May 5;7(3): zrad024.

[29] Xu B, Zhao W, Chang J, Yin J, Wang N, Dong Z, Zhi X, Li T, Chen Z. Comparative study on left-sided versus right-sided hepatectomy for resectable peri-hilar cholangiocarcinoma: a systematic review and meta-analysis. World J Surg Oncol. 2023 May 18;21(1):153.

[30] Sugiura T, Okamura Y, Ito T, et al. Left hepatectomy with combined resection and reconstruction of right hepatic artery for bismuth type I and II perihilar cholangiocarcinoma. *World J Surg.* 2019;**43**(3):894–901.

How to cite this article: Vallejo-Rosero Vanessa, Estrada-Salazar María, Carrero-Rivero Sonia, Hernández-Martínez Hender, Surgical Management of Cholangiocarcinoma: Case Report. Basic Sciences in Health Journal, 2(1): 35-46. March 2024, ISSN 2981-5800.

Burgos L. Colangiocarcinoma. Actualización, diagnóstico y terapia. Rev. Med Chile. 2008; 136: 240-248.

Brody La, Brown Kt, Getrajdman Gi, Kannegieter Ls, Brown Ae, Fong Y, Blumgart Lh: Clinical factors associated with positive bile cultures during primary percutaneous biliary drainage. J Vasc Interv Radiol. 1998; 9: 572-8

D. Castaing, C. Salloum,Técnicas de hepatectomía por laparotomía, EMC - Técnicas Quirúrgicas - Aparato Digestivo, Volume 27, Issue 2, 2011,Pages 1-17, ISSN 1282-9129

Galindo F, editor. Cirugía digestiva. Buenos Aires: SACD; 2009. IV-466-, p. 1-12.

Giménez M, Andreacchio A. Carcinoma de vías biliares. Tumor de Klatskin. En:

Hann L, Greatrex K, Blumgart L y colab. Cholangiocarcinoma at the hepatic hilus: Sonographic findings. AJR 1997. 168: 985-989.

Hemming AW, Reed AI, Fuiita S, Foley DP, Howard RJ. Surgical management of hilar cholangiocarcinoma. *Ann Surg 2005;* 241: 693-702.

ldberg MJ. Cholangiocarcinoma. *Dis Mon.* 2004; 50: 540-4.

Jena SS, Mehta NN, Nundy S. Surgical management of hilar cholangiocarcinoma: Controversies and recommendations. Ann Hepatobiliary Pancreat Surg. 2023 Aug 31;27(3):227-240.

Klatskin, G. (1965). Adenocarcinoma of the hepatic duct at its bifurcation within the porta hepatis: an unusual tumor with distinctive clinical and pathological features. *The American journal of medicine*, *38*(2), 241-256.

Khan SA, Thomas HC, Davidson BR, Taylor-Robin-son SD. Colangiocarcinoma. *Lancet* 2005; 366: 1303-14.

Li B, Li Z, Qiu Z, Qin Y, Gao Q, Ao J, Ma W, Jiang X. Surgical treatment of hilar cholangiocarcinoma: retrospective analysis. BJS Open. 2023 May 5;7(3): zrad024.

Mansour JC, Aloia TA, Crane CH, Heimbach JK, Nagino M, Vauthey JN. Colangiocarcinoma hiliar: declaración de consenso de expertos. *HPB (Oxford)*. 2015; 17 (8): 691–699.

Nakeeb A, Pitt HA. Radioterapia, quimioterapia y quimiorradiación en el colangiocarcinoma hiliar . *HPB (Oxford)*. 2005; 7 (4): 278–282.

Passeri, M. J., Baimas-George, M. R., Sulzer, J. K., Iannitti, D. A., Martinie, J. B., Baker, E. H., ... & Vrochides, D. (2020). Prognostic impact of the Bismuth-Corlette classification: Higher rates of local unresectability in stage IIIb hilar cholangiocarcinoma. *Hepatobiliary & Pancreatic Diseases International*, *19*(2), 157-162.

Peña, A. M., Sánchez, A. C., Botella, E. R., & Rincón, D. (2020). Colangiocarcinoma. *Medicine-Programa de Formación Médica Continuada Acreditado*, *13*(12), 666-677.

Pereira Freddy, Venales Yajaira, Salazar Francisco, Detalles técnicos de la doble anastomosis hepático-yeyuno en Y de Roux, con base en la descripción de un caso, Revista

Colombiana de Cirugía, vol. 34, núm. 2, pp. 179-184, 2019, Asociación Colombiana de Cirugía.

Rodríguez Prieto, M. D. P., & Rodríguez Medina, R. M. (2016). Tratamiento actual de las metástasis hepáticas de origen colorrectal.

Soares KC, Jarnagin WR. The Landmark Series: Hilar Cholangiocarcinoma. Ann Surg Oncol. 2021 Aug;28(8):4158-4170.

Sugiura T, Okamura Y, Ito T, et al. Left hepatectomy with combined resection and reconstruction of right hepatic artery for bismuth type I and II perihilar cholangiocarcinoma. *World J Surg.* 2019;**43**(3):894–901.

Vega P, Arribas J, González M, Moreno S, Aburto JM. Colangiocarcinoma polipoideo difuso de colédoco. *CirEsp* 2004; 75: 365-8.

Xu B, Zhao W, Chang J, Yin J, Wang N, Dong Z, Zhi X, Li T, Chen Z. Comparative study on left-sided versus right-sided hepatectomy for resectable peri-hilar cholangiocarcinoma: a systematic review and meta-analysis. World J Surg Oncol. 2023 May 18;21(1):153.

Yalcin s, Diagnosis and management of cholangiocarcinomas: a comprehensive review. Hepatogastroenterology. 2004; 51: 43-50.

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