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Experience in laparoscopic Roux-en-Y hepaticojejunostomy with Hepp-Couinaud tecchnique in a third level reference hospital in Mexico City.

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INTRODUCTION

The Laparoscopic cholecystectomy is one of the most frequently performed procedures worldwide in general surgery and the bile duct injury represents the most serious complication. [1]

Bile duct injury is defined as any change secondary to surgery that conditions bile leakage from the biliary tract before the duodenal papilla and results in difficult or impossible passage of bile to the duodenum or a combination of these. [2]

In Mexico, the bile duct injury continues to be a common pathology and although there are no statistics that can be generalized worldwide, it is placed within the 10 nations with the highest number of cases, Mercado MD and collaborators mention that the incidence is around 0.4%. [3]

Bile duct injuries are a surgical challenge that involves a drastic change in quality of live for patients that is associated to posoperative sequales and that can trigger legal implications. [4]

OBJECTIVE

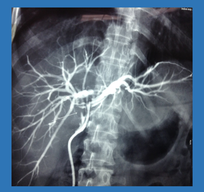
The objective of this study is to demonstrate our experience as a third level hospital in laparoscopic approach of bile duct injury repair

MATERIAL AND METHODS.

This is a retrospective, descriptive and observational study between August 2014 and September 2019.
Twenty-one patients with bile duct disruption secondary to cholecystectomy were included.
The characteristics of patients, type of surgery and BDI classification are described in Table 1.
The injuries were staged using the Strasberg classification and every patient was evaluated by a multidisciplinary team, dividing approach as "early" in those case when the procedure was made within 6 weeks of injury and "delayed" when was done 6 weeks before.

Patient characeristics. Patients (n) = 21	
Age*	45 (36-62)
Gender	
Female	16 (76.1%)
Male	5 (23.9%)
Type of initial surgery approach	
Laparoscopic	9 (35.8%)
Open surgery	12 (64.2%)
Clasification of injury (Strasberg)	
E1	3 (14.2%)
E2	3 (14.2%)
E3	12 (57.1)
E4	3 (14.2%)

Table 1. *Median, Interquartile range.



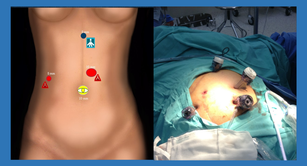


Figure 1. Trocar placement.

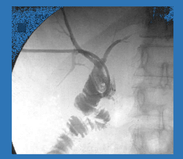
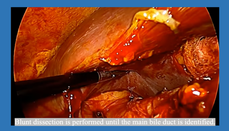


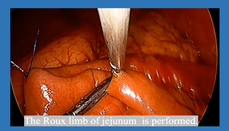
Figure 2. Transoperative cholangiogram.



Blunt dissection in peritoneal until the main bile duct is identified



Ligation of injury is identified and 40 cm are counted



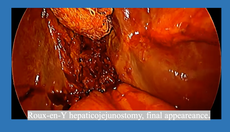
The Roux limb of jejunum is performed



Exposure of the left hepatic duct beneath the quadrate lobe



Lateral open of the left hepatic conduct



Roux-en-Y hepaticojejunostomy, final appearance.

SURGICAL TECHNIQUE

In all cases, we placed the patients in French position and were used four ports, an umbilical and left paramedian subcostal 10 mm trocars, a subxiphoid 5 and right subcostal mm trocars.
Figure 1.
The diagnostic laparoscopy was made, and systematically intraoperative cholangiogram was made to identify the intrahepatic biliary tree Figure 2.
A side-to-side anastomosis between the left hepatic duct and a jejunal Roux loop was always used for the bile duct reconstruction and we recorded videos of laparoscopic hepaticojejunostomy.
The Roux-en-Y limb jejunal was performed by transecting the jejunum around 40 cm distal from the Treitz ligament, a single-layer closure of the enterotomy was made with 2-0 monofilament non absorbable suture.
The anastomose between jejunal limb, and the bile duct were constructed with 4-0 monofilament absorbable sutures with interrupted stitches, and we recorded pictures of the surgeries. Figure 3.
Surgical time, hemorrhage, hospital stay, complications, mortality, oral intake start, evolution, and a 4-years follow up were registered.

DISCUSSION

At annual SAGES meeting 2015 Adolfo Cuendis Velazquez MD and collaborators presented a prospective study of twenty-nine patients with BDI treated with minimally invasive approach in a center with experience in hepatobiliary surgery, and they concluded that the minimally invasive treatment of biliary reconstruction is safe and feasible but requires advanced laparoscopic skills and a multidisciplinary management.

It is important to consider every patient and every specific clinical situation, the surgeons experience and the available local resources, because in case of insufficient experience in hepato-pancreato-biliary surgery its preferred to place a drain and transfer the patient to a center with experience.

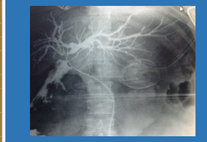
It must be considered that in our country a tertiary care center could be so distant so the most important step in this cases is to assure an optimal local management before the referral, so every general surgeon must be able to make the right decision when faced with a bile duct injury secondary to cholecystectomy.

RESULTS.

Twenty-one patients were operated, and the most frequent lesion was Strasberg E3 type. The median operative time was 180 minutes (range 150 – 300 minutes) and bleeding 150 ml (range 50 – 400 ml), the most common complication was biliary fistula in 3 patients (14%), oral intake was started in the first 72 hours, one patient required reintervention (4.5%) while other patient developed stenosis (4.5%). the maximum follow-up was for four years. No mortality was recorded as described in Table 2.
We recorded pictures of pre-operative vs postoperative cholangiogram Figure 4. and the final appearance vs a picture before the surgery. Figure 5.

Results (n) = 21	
Type of bile duct repair surgery.	
Laparoscopic	21 (100%)
Operative time* (minutes)	180 (150-300)
Hemorrhage* (ml)	150 (50 – 400)
Diameter of common bile duct (mm)	8(4-12)
Oral feeding start after surgery (days)	3 (2-5)
Hospital stay (days)	6 (4-15)
Use of T tube or tutor	4 (19%)
Complications	
Biliary Fistula	3 (14%)
Reintervention	1 (4.5 %)
Stenosis	1 (4.5)
Acute cholangitis (mild to moderate)	1 (4.5%)
Acute cholangitis (severe)	0%
Mortality	0%
Follow-up	4 years

Table 2. *Median, Interquartile range.



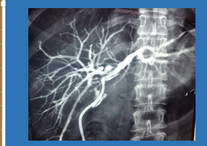


Figure 4. Pre operative vs postoperative cholangiogram.





Figure 5. Before surgery vs Final appearance.

CONCLUSIONS

Benefits of minimally invasive approach seem to be safe, and it is important to consider that is a complex procedure that represents a great challenge for the surgical team.
The BDI during cholecystectomy requires prompt diagnosis and adequate treatment to avoid morbidity and mortality, at the present time practice guidelines are available, key aspect of BDI detection and treatment strategies were summarized as a result of an international and multidisciplinary work promoted by the World Society of Emergency Surgery, and as they described we are committed to guarantee the best treatment option for any patient in the world because it impacts in a good quality of life for each patient after surgery.
Now a days the robotic surgery seems to promise potential benefits like better delivery of energy, better manipulation of tissues, 3D visualization and precision control of instruments.
The literature reports the first case series of groups and case reports of robotic surgery bile duct repair but the follow up is still lacking, so studies with a longer follow-up are necessaries to evaluate advantages and complications in comparison to laparoscopic surgery, and surely the additional costs of this already costing disease.

REFERENCES

1. Pesce, A., Palmucci, S., La Greca, G., & Puleo, S. (2019). Iatrogenic bile duct injury: impact and management challenges. *Clinical and experimental gastroenterology*, *12*, 121.
2. Schreuder, A. M., Busch, O. R., Besselink, M. G., Ignatavicius, P., Gulbinas, A., Barauskas, G., ... & van Gulik, T. M. (2020). Long-term impact of iatrogenic bile duct injury. *Digestive surgery*, *37*(1), 10-21.
3. Díaz, M. Á. M., & Camilli, C. X. Actualidades en disrupción de vía biliar. *ECOS InIErnaCIOnalES dE CIrugía 2020*, 8.
4. de'Angelis, N., Catena, F., Memeo, R., Coccolini, F., Martínez-Pérez, A., Romeo, O. M., ... & Sommacale, D. (2021). 2020 WSES guidelines for the detection and management of bile duct injury during cholecystectomy. *World Journal of Emergency Surgery*, *16*(1), 1-27.
5. Cuendis-Velázquez, A., Morales-Chávez, C., Aguirre-Olmedo, I., Torres-Ruiz, F., Rojano-Rodríguez, M., Fernández-Alvarez, L., ... & Moreno-Portillo, M. (2016). Laparoscopic hepaticojejunostomy after bile duct injury. *Surgical endoscopy*, *30*(3), 876-882.
6. Chun, K. (2014). Recent classifications of the common bile duct injury. *Korean journal of hepato-biliary-pancreatic surgery*, *18*(3), 69-72.
7. Salazar-Gutiérrez, J. H., Dávila-Flores, S., Araiza-Hernández, R., Tijerina-González, R. B., Medina-Lira, A. K., Muruato-Araiza, J. S., & Frigerio, P. (2016). Colecistectomía segura como un método de enseñanza. *Revista Mexicana de Cirugía Endoscópica*, *17*(1), 17-20.
8. Dominguez-Rosado, I., Sanford, D. E., Liu, J., Hawkins, W. G., & Mercado, M. A. (2016). Timing of surgical repair after bile duct injury impacts postoperative complications but not anastomotic patency. *Annals of surgery*, *264*(3), 544-553.
9. Marino, M. V., Mirabella, A., Guarrasi, D., Lupo, M., & Komorowski, A. L. (2019). Cuendis-Velázquez, A., Trejo-Ávila, M., Bada-Yllán, O., Cárdenas-Lailson, E., Morales-Chávez, C., Fernández-Álvarez, L., ... & Moreno-Portillo, M. (2019). A new era of bile duct repair: robotic-assisted versus laparoscopic hepaticojejunostomy. *Journal of Gastrointestinal Surgery*, *23*(3), 451-459.