GSC Advanced Research and Reviews

eISSN: 2582-4597 CODEN (USA): GARRC2

Cross Ref DOI: 10.30574/gscarr

Journal homepage: https://gsconlinepress.com/journals/gscarr/

(CASE REPORT)

PTCC with saline-heparin flushing as therapeutic approach in pediatric biliary stenosis: A Case Reports

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GSC Advanced Research and Reviews, 2022, 13(01), 058–061

Publication history: Received on 03 September 2022; revised on 06 October 2022; accepted on 09 October 2022

Article DOI: https://doi.org/10.30574/gscarr.2022.13.1.0261

Abstract

Introduction: Infants usually presented with jaundice in their early life, some jaundice is physiological but some are pathological, caused by abnormality in the biliary tree. PTCC is a less invasive procedure to diagnose and exclude biliary atresia from neonates with jaundice.

Case Presentation: Our patients are infants with a prolonged jaundice consulted to our department for diagnostic purpose to determine the further treatment. Cholangiography result shows a narrowed biliary duct in both patients. Saline combined with heparin flushing seems to have immediate effect on the narrowed biliary duct.

Conclusion: PTCC with saline flushing combine with heparin proved to be effective as therapeutic strategy in biliary stenosis cases.

Keywords: PTCC; Saline heparin flushing; Biliary stenosis, Jaundice; Cholangiography

1. Introduction

Jaundice in infants is a common finding in their early phase of life, some jaundice can resolve in short times in physiological manners, but some jaundice is a sign of a more complex abnormality especially in the hepatobiliary system. Jaundice in infants beyond 2 weeks of age need a more thorough investigation[1]. Because if the etiology of the jaundice is biliary atresia, then it will progress to cirrhosis and liver failure. Atresia and stenosis are both the etiologies of jaundice in infants which affect the biliary system. In atresia, biliary duct that carries the bile juice from the liver to the gallbladder is obstructed and it is a congenital condition, while in stenosis the biliary duct is become structured or narrowed causing the bile juice become difficult to pass into the small bowel, this condition is caused by several factors such as inflammations, infections, malignancy, trauma, even iatrogenics[1]. Ideally the gold standard for biliary atresia diagnosis is intraoperative cholangiography via laparotomy[2]. Infants with critical condition or have significant comorbidities may benefit from PTCC (Percutaneous Transhepatic Cholecysto-cholangiography). PTCC may be performed if a gallbladder is identifiable and present[3].

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2. Case Presentations

PTCC usually performed under general anesthesia as these cases show, several preparations, such as fasting, and intensive care unit preparation, are made after the procedure is well prepared to cover any unwanted outcomes. When the patient is already under anesthesia, an ultrasound is used as a guiding method for the operators to identify and cannulate the gallbladder through a percutaneous transhepatic approach with a small needle (21-25G). After sonographic guidance confirmed the needle placement, a contrast substance was then injected gently into the gallbladder under fluoroscopy to visualise the biliary system.

The procedure starts with ultrasonography in the procedure room to find the insertion route from the most wide intra hepatic biliary duct. The patient, of course, is under general anaesthesia and under the strict surveillance of the anesthesiologist during the whole procedure. We even prepared the Intensive Care Unit room for the patients after the procedure to closely monitor the patient's condition. After we find the insertion route, we insert the needle (Gauge needles number 22 or 25) through the right liver lobe to the gallbladder, and if the bile juice is secreted from the needle, it means we have successfully reached the biliary system. From there, we injected the iodine contrast to visualise the biliary system and find the cause of the jaundice.

In our patients presented in this case reports as seen in the first patient in picture 1 there is a stenosis in hepatic duct.

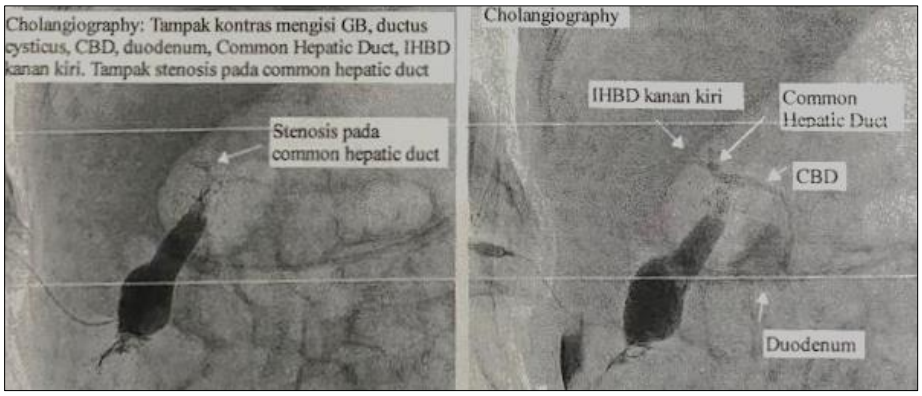

Figure 1 Stenosis in hepatic duct

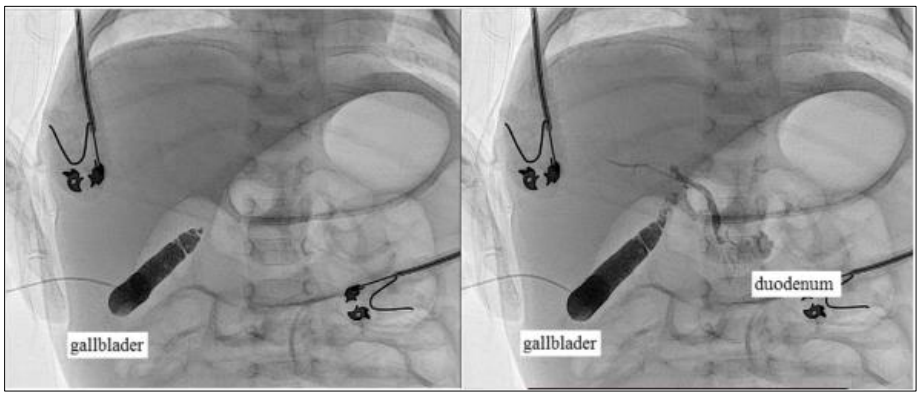

Figure 2 Stenosis in cystic duct

This patient presented to our hospital with jaundice not long after being born. Since the period of jaundice was long enough, the paediatrician suspected a biliary atresia as the cause of the jaundice and consulted our department of interventional radiology. Our cholangiography found that the hepatic duct was quite narrow. After taking the picture of the narrowed duct, we flushed in a mixture of normal saline with heparin to have a better view. Unexpectedly, we found that after a few flushes, the contrast material finally got through into the both intra hepatic bile duct, common bile duct, and even to the duodenum.

In our second patient, we can see that there is an obstruction in the cystic duct causing the contrast to not get through the biliary system. Same things as the patient before. After we managed to visualise the gallbladder and the stenosis level, we flushed the biliary duct with normal saline combined with heparin. After a few flushes, we can see that the contrast can get through and visualise both the hepatic duct and common bile duct, even getting through the duodenal part. Since the patency of the entire biliary system is finally identified, a surgical procedure can be avoided for these two patients. After the procedure, the patient can be discharged from the hospital since there are no complications following the procedure. Several weeks later, we receive reports from the parents that their children's clinical conditions have been resolved and the jaundice is slowly resolving, and their children are getting back to their normal skin tone. Also, there is an improvement in their liver function laboratory results. In our first patient, the ALT/APT values decreased from 74/56 to 62/27 and the Gamma GT values decreased from 36 to 11. While in our second patient, the ALT/APT values decreased from 70/58 to 46/46 and the Gamma GT values decreased from 558 to 27.

3. Discussion

Since it's the complicating nature of the body physiology, establishing a diagnosis is a priority in infants since it will affect their development. The differential diagnosis for jaundice in infants is quite broad, both acquired and inherited. Extrahepatic causes such as biliary atresia, choledochal cyst, cholelithiasis, spontaneous perforation of the common bile duct, and double duodenum. Alagille and non-syndromic bile duct paucity, neonatal sclerosing cholangitis, idiopathic neonatal hepatitis (INH), infection, parenteral nutrition cholestasis, and toxic or metabolic or endocrine disorders are among the intrahepatic causes.[7] besides, additional modalities such as ultrasound are very reliable to establish a stenosis or biliary atresia diagnosis. To establish a biliary atresia diagnosis, a liver biopsy has its cardinal features such as: expanded portal tracts with bile duct proliferation; portal fibrosis; absence of sinusoidal fibrosis; portal tract oedema and inflammation; canalicular and bile duct plugs [5,6]. Also, abnormal lab values like high levels of bilirubin are another pathology marker of metabolic disruption either within the liver or outside of the liver that causes this biliary tree anomaly. This is especially true for the newborn. Surgical approach for diagnostic purpose alone is a high-risk procedure, especially for infants. PTCC offers a more accurate and appropriate diagnostic approach. A high-risk therapeutic approach can be avoided. In conditions where PTBD is not an option, in this case, we found that several flushings of combined normal saline and heparin solutions are effective to dilate the narrowed biliary structure, as proved by the passage of contrast material into further tracts of the biliary system. We assume that the compounds inside the saline solution and heparin combined with injection speed and pressure power from the operator can somehow dilate the strictured biliary duct. This theory has actually been supported by some studies that suggest the therapeutic effect of "flushing through" a clogged bile plug.

These cases indicate that there is a possibility of resolving spasm or strictured gallbladder that caused jaundice in infants without surgery and by PTCC alone, as proven by the patients' better outcomes, both physical and laboratory-proven.

The limitation of this study is the small number of patients that consulted the interventional radiology department in order to resolve the case. Furthermore, there is a scarcity of literature and journals covering PTCC topics.

4. Conclusion

These case reports indicate that besides its role as a diagnostic tool for biliary atresia, PTCC with normal saline combined with heparin in interventional radiology also proved to be an alternative therapeutic strategy in biliary stenosis cases, especially in paediatric populations with comorbidities and the benefits of a minimal invasive and less risky approach.

Compliance with ethical standards

Acknowledgments

The authors received no specific grants from any funding agency in the public, commercial, or non-for-profit sectors

Disclosure of conflict of interest

There is no conflict of interest among the authors.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Kyle Jensen, Vincent F.B., David C.M., eet al. HIDA, percutaneous transhepatic cholecysto-cholangiography and liver biopsy in infants with persistent jaundice: can a combination of PTCC and liver biopsy reduce unnecessary laparotomy? Ped. Radiol (2012) 42:32-39

[2] Alkan M., Tutus K., Fakiogly E., et al. laparoscopy-assisted percutaneous cholangiography in biliary atresia diagnosis: comparison with open technique. Gastroenterol Res Pract. 2016; 2016:1-5

[3] Joseph S., Katrina L.W., Aswhini S.P., et al. Percutaneous transhepatic cholecysto-cholangiography (PTCC): An Alternative to Intraoperative Cholangiography in High Risk Infants Suspect for Biliary Atresia. Journal of Pediatric Surgery Case Reports 38(2018) 61-63.

[4] Singh A, Gelrud A, Agarwal B. Biliary strictures: diagnostic considerations and approach. Gastroenterol Rep (Oxf). 2015;3(1):22-31. doi:10.1093/gastro/gou07

[5] Russo P., Magee JC, Boitnott J, et al. Design and validation of the biliary atresia research consortium histologic assessment system for cholestasis in infancy. Clin Gastroenterol Assoc 2011;9

[6] Moreira RK, Cabral R, Cowles RA, Lobritto SJ. Biliary atresia: a multidisciplinary approach to diagnosis and management. Arch Pathol Lab Med. 2012;136:746-60

[7] Woodley HE. Imaging of the jaundiced child. Imaging 2004; 16:301-326.