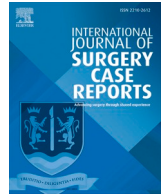




Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.elsevier.com/locate/ijscr

Case report

Fractured guide wire in the main pancreatic duct during ERCP: A case report

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ARTICLE INFO

Keywords:

Pancreatic ducts
ERCP
Pancreatitis
Lithiasis

ABSTRACT

Introduction: Endoscopic retrograde cholangiopancreatography (ERCP) is an excellent endoscopic method with a wide range of diagnostic and therapeutic utility. The most common complication is post-ERCP pancreatitis with a reported incidence of 3.5 % followed by cholangitis, cholecystitis, gastrointestinal bleeding and duodenal perforation.

Uncommon complications of the procedure reported in the literature include contrast allergy, cardio-pulmonary compromise, problems related to instruments such as impaction of a retrieval basket, fractured guidewire in the biliary or pancreatic channel, extravasation of contrast medium into the duodenal wall, splenic hemorrhage, hepatic trauma and complications related to the electrosurgical risk.

Presentation of case: We present a case of a 37-year old woman referred to the Department of Abdominal Surgery because of severe abdominal pain and jaundice. Medical personal history of the patient was normal and she denied taking any medication.

Following radiological and laboratory analysis, ERCP was completed. In our first attempt to selectively cannulate the CBD, unintentionally a guide wire passed in the main pancreatic duct. Attempting to retract the guide wire under fluoroscopy surveillance, the guide wire was fractured and fragments were left in the main pancreatic duct. Removal of the fragments was unsuccessful in several attempts. Consecutively, selective cannulation of the main pancreatic duct with placement of the pancreatic stent 5Fr/5cm was performed and careful cannulation of CBD was achieved. After the sphincterotomy, the biliary sludge and microlites were dispatched into the duodenum. The pancreatic stent was removed seven days later and patient underwent cholecystectomy four months later. No complications related to the procedure were revealed during the 24 months of follow-up.

Discussion: A fractured guide-wire during the ERCP is an uncommon event that can occur during the selective cannulation of the common bile duct or pancreatic duct as in our presented case.

However, data regarding the guidewire fracture during the ERCP are scarce since it is an uncommon occurrence. Our case is an example of rare and unusual complication during the ERCP, which was managed conservatively at our unit.

Based on our research successful retrievals of the fractured guidewire from the main pancreatic duct are rarely reported and we found only two cases in the available literature.

Concordantly with our case, acute and long-term pancreatoco-biliary complications were not reported in previously published case reports with retained guide wire during the ERCP as we found only one case report in which authors report development of cholangitis related to the fracture of the hydrophilic guidewire.

However, rare but serious life-threatening complications that can occur during the ERCP procedure should be identified in a timely manner and treated accordingly.

Conclusion: Fractured guide wire during the ERCP is very uncommon complication of the procedure with only few cases reported in the literature.

Our experience suggests that no adverse sequels were triggered by the wire pieces left in the main pancreatic duct as the patient remained asymptomatic 2 years after the guide wire fracture.

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<https://doi.org/10.1016/j.ijscr.2022.107843>

Received 13 November 2022; Received in revised form 13 December 2022; Accepted 20 December 2022

Available online 22 December 2022

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1. Introduction

The Endoscopic Retrograde Cholangiopancreatography Procedure (ERCP) is therapeutic procedure for pancreaticobiliary illnesses.

Routine use of ERCP procedure for diagnostic purposes is unusual because of other imaging modalities with high diagnostic precision such as Magnetic Resonance (MRI), especially magnetic resonance cholangiopancreatography (MRCP), abdominal sonography and endoscopic ultrasonography (EUS).

Indications for use of the ERCP procedure include choledocholithiasis, drainage of malignant biliary obstruction due to pancreatic cancer, hilar cholangiocarcinoma, acute cholangitis, surgical biliary complications, acute and chronic pancreatitis related-complications, benign stricture from primary sclerosing cholangitis, stenting of the biliary duct after the liver transplantation and stenosing papillitis [1,2].

The rate of complications associated with the ERCP procedure varies from 6.8 to 11.1 % [3–7].

According to the available literature the most frequent complication is post-ERCP pancreatitis with a reported incidence of 3.5 % followed by cholangitis, cholecystitis, gastrointestinal bleeding and duodenal perforation [8].

Prompt recognition of ERCP complications is crucial to ensure instant treatment of the patient.

Uncommon complications of the procedure which are previously reported in several studies include contrast allergy, cardio-pulmonary compromise, problems related to instruments such as impaction of a retrieval basket, fractured guidewire in the biliary or pancreatic channel, extravasation of contrast medium into the duodenal wall, splenic hemorrhage, hepatic trauma and complication related to electrosurgical risks [9]. This work has been reported in line with the SCARE criteria [10].

The aim of the current study was to analyze the incidence of unusual complications related to ERCP procedure by conducting a systematic review of the literature focused on fractured guidewire in hepatic and pancreatic duct during the ERCP and presentation of our case report.

2. Presentation of case

A 37-year-old female without known comorbidities was admitted to the Abdominal Surgery unit due to the severe abdominal pain followed by jaundice. The patient was not on any medication.

Blood samples were analyzed on admission day and results are detailed in the Table 1.

Ultrasound examination showed presence of multiple calculi inside the gallbladder and dilated CBD with the presence of one calculus with a

diameter of 6,8 mm.

Coronal magnetic resonance cholangiopancreatography (MRCP) projection image showed intrahepatic bile duct (IHBD) dilatation and common bile dilatation (CBD) around 10-11 mm with presence of lithiasis (4 × 3 mm) in CBD and in the gallbladder (Fig. 1).

Based on the bilirubin levels, GGT levels and recommendation after MRCP, a decision to perform ERCP procedure was made. 30 min prior to the intervention, 2 g ceftriaxone were administered intravenously to the patient followed by a dose of 100 mg Indomethacin suppository as per internal hospital protocol. With the patient placed in the prone position and under short intravenous anesthesia the procedure was performed using the Olympus CV/170 device, VisiGlide Guidewires 0.0035 mm and sphincterotome. The whole procedure was completed within 45 min.

During the ERCP procedure, selective cannulation of the CBD was attempted. The guidewire unintentionally passed into the main pancreatic duct on the second attempt. The fractured guidewire was left behind in the main pancreatic duct, during the retrieval procedure.

After a several failed attempts to retrieve the remaining parts from the main pancreatic duct, a pancreatic stent of 5 × 5 cm dimensions was placed in the main pancreatic duct which was successively followed by selective cannulation of CBD and sphincterotomy.

The calculus was located at the level of papilla Vateri and following sphincterotomy, calculus passed in the duodenum. After the procedure the patient was closely monitored in our unit. No complaints or clinical manifestations were noted and vital parameters were within normal range.

Parenteral therapy with PPI, antibiotics and intravenous fluids was initiated during her stay in our unit. The following day, complete blood count (CBC), metabolic panel and C-reactive protein (CRP) were performed and laboratory results are detailed in the Table 2.

No signs of free fluid or pancreatitis were noted with abdominal sonography. The diameter of CBD was within normal ranges, while in the gallbladder, sonography showed the presence of calculi.

Seven days after the first ERCP procedure, we have performed a second ERCP for extraction of pancreatic stent.

During the fluoroscopy, fractured pieces of guide-wire were detected in the main pancreatic duct (Figs. 2–3).

Our patient was discharged ten days after the last ERCP in good health condition without any complaints. Cholecystectomy was performed two months after the first ERCP. We have followed this patient 24 months after the first intervention. No health issues were noticed related to the fractured guide wire in the main pancreatic duct. The patient reported a significant decrease in pain and distress a day after the surgery. Adherence of our patient in terms of taking medication, following a diet, modifying habits, and attending regular visits to the Clinic was complete.

Table 1

Complete blood count (CBC), metabolic panel and C-reactive protein (CRP).

Days	I Before ERCP
RBC (1012/l)	4.53
HGB(g/l)	11.8
HCT (%)	34.2
WBC (109/l)	4.0
CRP (mg/l)	
Glucose(mmol/l)	5.31
BUN (mmol/l)	6.74
Creatinine (umol/l)	84.9
AST (u/l)	73
ALT (u/l)	175
S-Amylase (u/l)	59
Lipase	
GGT (u/l)	178.8
T-Bilirubin (umol/l)	70.5
D-Bilirubin (umol/l)	20.4
U-amylase	1139

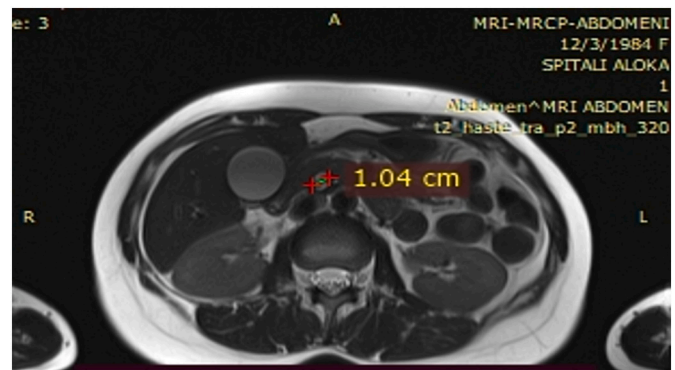


Fig. 1. MRCP image showing intrahepatic bile duct dilatation and common bile duct dilatation with presence of lithiasis.

Table 2
Complete blood count (CBC), metabolic panel and C-reactive protein (CRP).

Days	II after ERCP	V after ERCP
RBC (1012/l)	4.3	4.4
HGB (g/l)	13.5	13.8
HCT (%)	40	
WBC (109/l)	9.2	8.9
CRP (mg/l)	140	76.6
Glucose (mmol/l)	6.2	5.5
BUN (mmol/l)	7.6	1.61
Creatinine (umol/l)	88.2	61.5
AST (u/l)	62	10
ALT (u/l)	101	31
S-Amylase (u/l)	296	178
Lipase		
GGT (u/l)	156	85
T-Bilirubin (umol/l)	24.5	13.7
D-Bilirubin (umol/l)	7.0	3.7
U-amylase		6752

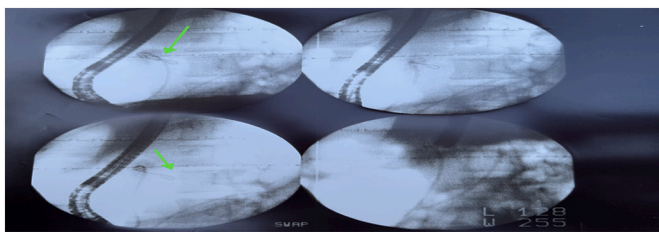


Fig. 2. Fluoroscopy image showing the retained fragment of the fractured guidewire in the main pancreatic duct.

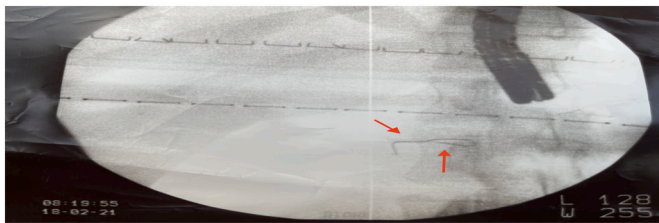


Fig. 3. Image of retained fragment after stent removal seven days following the first ERCP.

3. Discussion

Endoscopic retrograde cholangiopancreatography (ERCP) is an excellent endoscopic method with a wide range of diagnostic and therapeutic utility.

Data regarding the guidewire fracture during the ERCP are scarce since it is an uncommon occurrence. Described mechanism of guidewire fracture reported in the available literature include forced traction, imperfection in the painted Teflon guidewire coating, electrical short circuits between cutting wire and guidewire, detachment of the floppy tip from the shaft [11,12]. Case-series reported by Pruitt et al., revealed four cases of the fractured guidewire in the biliary tree, pancreatic duct and duodenal wall [11].

Another case of a fractured guidewire in the main pancreatic duct was described by Heinerman et al., as unusual complication during the attempt to treat the presence of calculi inside the pancreatic duct in the patient with chronic pancreatitis. The final treatment was the Whipple procedure [13].

In a case report by Burdick et al., guidewire fracture occurred during the endoscopic sphincterotomy related to the defective sphincterotome and heat was regarded as a contributing factor for guidewire fracture in this case [14].

Knot formation in a floppy-tipped guide wire in the common bile duct was also reported by Bhasin et al., also as an uncommon complication of ERCP [15].

A fractured guide-wire during the ERCP is an uncommon event that can occur during the selective cannulation of the common bile duct or pancreatic duct as in our presented case.

We speculate that the contributing factor for guidewire fracture in our case was repeated use of the same guide wire several times as well as anatomic configuration of pancreatic duct in our patient. In our reported case, the fractured guide wire was left in the main pancreatic duct. No complications related to the procedure were revealed during the 24 months of follow-up.

Similar to our case, Nejari et al., reported a fragmentation of the guide wire and retained fragment in the main pancreatic duct (MPD) without any complications one year after the procedure [16].

Based on our research successful retrievals of the fractured guidewire from the main pancreatic duct are rarely reported.

In an article published by Kitagawa, a successful retrieval of the fractured guidewire from the main pancreatic duct was achieved using forceps biopsy [17]. Burdick and coauthors also reported retrieval of fractured guidewire with endoscopic techniques [14].

Acute and long-term pancreato-biliary complications were not reported in published case reports with retained guide wire during the ERCP. We found only one case report in which authors report a case of cholangitis related to the fracture of the hydrophilic guidewire [18].

However, complications that should not be underestimated during the ERCP procedure are uncommon complications that can be life-threatening if not identified in time.

In this regard, Pomeranz et al., reported a case of fractured hydrophilic guidewire with consequent migration in the retroperitoneal and lower extremity soft tissues as extremely rare but serious complication after the ERCP procedure [19].

Therefore, identifying complications during or after the procedure and treating the patient instantly remains a cornerstone for the patient outcomes.

4. Conclusion

Fractured guide wire during the ERCP is very uncommon complication of the procedure with only few cases reported in the literature.

Our experience suggests that no adverse sequels were triggered by the wire pieces left in the main pancreatic duct as the patient remained asymptomatic 2 years after the guidewire fracture.

CRedit authorship contribution statement

Valon A. Zejnnullahu: Conceptualization, Methodology, Writing-Original draft preparation. Vjosa A. Zejnnullahu: Writing-Reviewing and Editing.

Informed consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Ethical approval is exempt/waived at our institution.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Guarantor of submission

The corresponding author is the guarantor of submission.

Declaration of competing interest

None.

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