

Pancreatic duct stones and laser treatment: A case report

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Abstract

A 62 years-old Caucasian male, who had a consumptive condition associated with recurrent episodes of abdominal pain, was evaluated in a Gastroenterology consultation.

Physical examination was quite innocent and the following imaging exams were performed. A Computed Tomography (CT) showed a thin gallbladder and chronic pancreatitis signs with pancreatic intraductal stones, dominant at tail and body, associated with pancreatic tail atrophy. An abdominal-Magnetic Resonance Imaging (MRI) showed an abnormal pancreatic parenchyma, a mild Wirsung dilatation and an unknown pancreatic head stenosis etiology. Therefore, to clarify the pancreatic stenosis, an echo-endoscopy (EUS) was performed. This exam showed a 10-mm stone associated with a focal narrowing in the head/tail transition.

A pancreatoscopy-guided holmium laser using a mini-endoscope inserted into the pancreatic duct successfully broke the impacted stone and cleared the obstruction, without complications. After that, endotherapy with plastic stents was repeatedly done, during the following 6 months.

After endoscopic treatment, the patient recovered quite well, without any symptoms, without pancreatic stenosis and higher quality of life.

Keywords: Chronic pancreatitis; Holmium laser; Pancreatic duct stone; pancreatoscopy

1. Background

Pancreatic duct stone formation is a chronic pancreatitis complication that causes recurrent episodes of pain and can be managed endoscopically.

Patients with difficult pancreatic duct stones can be treated with holmium laser, which is a safe and effective treatment. It is a promising method for experienced gastroenterologists and may replace, in a near future external lithotripsy in the management of intraductal stones.

2. Case Presentation

We report a case of a 62-year-old male with heavy alcohol consumption referred to a Gastroenterology Consultation with recurrent episodes of diffuse abdominal pain. He has also medical history of chronic pancreatitis; type 2 Diabetes Mellitus with diabetic retinopathy and diabetic foot ulcer; hypertension and Charcot syndrome. He takes sitagliptin plus metformin (50/1000 mg); insulin (20U+22U); amlodipine plus valsartan (5/160 mg); clopidogrel 75 mg; ranitidine

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150mg; nebivolol 5mg and aspirin 100mg and he had no known drug allergies. Clinical evaluation was unremarkable, and some imaging exams were performed. A Computed Tomography (CT) demonstrated a thin gallbladder and chronic pancreatitis signs with pancreatic intraductal stones, dominant at tail and body, associated with pancreatic tail atrophy. The Magnetic Resonance Cholangiopancreatography (MRCP) showed an abnormal pancreatic parenchyma, a mild Wirsung dilatation and unknown pancreas duct stenosis at head of pancreas. To clarify the pancreatic stenosis, an echo-endoscopy (EUS) illustrated a 10-mm stone associated and a focal narrowing in body/tail transition. Three months after, an ERCP was carry out to introduce a pancreatic stent (10Fr,12cm).

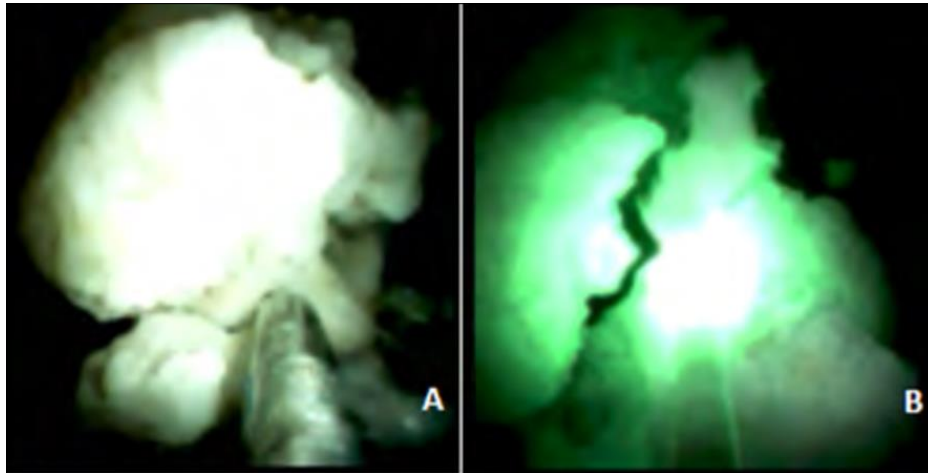


Figure 1 Visualization System (SGDS), using a single-operator four-way deflected 10-Fr Spy-Scope (Boston Scientific, Natick, MA, USA) inserted through the 4.2-mm working channel. A) Impacted pancreatic duct stone (white mass) with a median diameter of 10 mm. B) It showed the mini endoscope inserted into the pancreatic duct (black tube). Laser is bursting the stone, under intermittent saline irrigation. C) We can see the successful impacted stone destruction and a clean channel

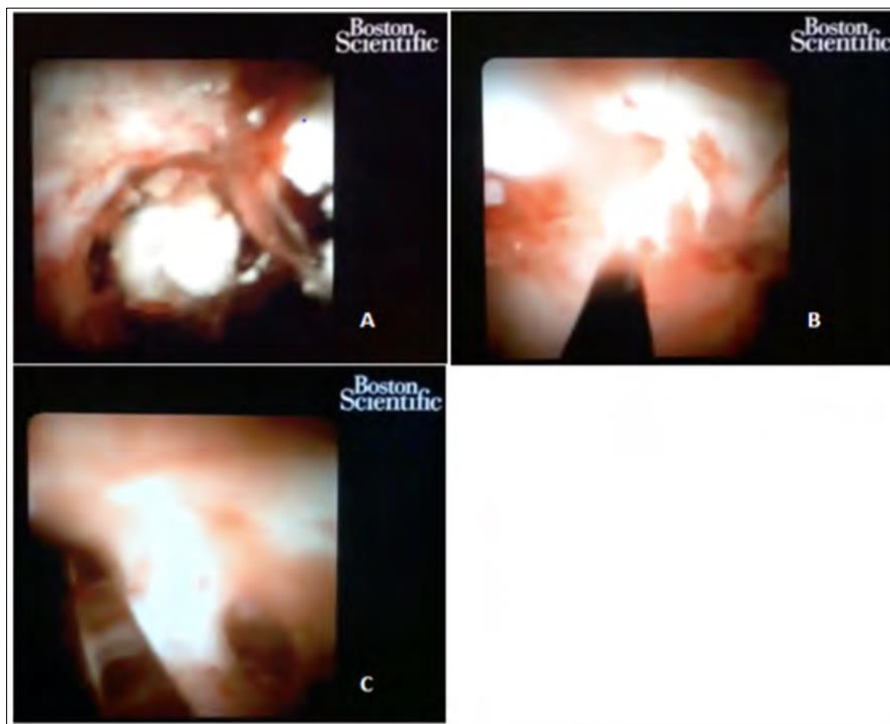


Figure 2 Example of laser lithotripsy performed under direct visualization by use of a pancreatoscope passed through the duodenoscope. (A) It shows the pancreatic duct stone (white mass) and the endoscope (silver tube); (B) It shows the tip of the laser fiber as a green aiming beam, which was used to target the stone

During follow-up, 3 months later, an additional ERCP revealed a large and functional pancreatic papillotomy, an irregular Wirsung until distal body, with two strictures, and the pancreatic stent was removed.

Pancreatography suggested two pancreatic head stenosis and one body stenosis. At the pancreatic isthmus there was a calculus with a median diameter of 10 mm (Figure 1). The patient underwent retrograde endoscopic stone fragmentation with a holmium laser with the SpyGlass DS system (Table 1). A Visualization System (SGDS), using a single-operator four-way deflected 10-Fr Spy- Scope inserted through the 4.2-mm working channel was achieved. The tip of the laser fiber had a green aiming beam (brightening regulated), which was used to target the stone under direct vision (Figure 2). Therefore, with the probe tip 1–2 mm away from the stone, and under intermittent saline irrigation, laser bursts were delivered through the aqueous medium until stone fragmentation was deemed complete. To summarize, pancreatoscopy-guided holmium laser, using a mini-endoscope inserted into the pancreatic duct successfully broken the impacted stone and cleared the obstruction, without complications. After successful treatment of the stone in 1 session, the stricture was further submitted to an increased number of plastic stents. At the end of endotherapy the patient remained asymptomatic during follow-up (6 months) without any symptoms, without pancreatic stenosis, without further interventions, and with higher quality of life.

Table 1 Patient medical history with imaging exams results and subsequent treatment

March 2017	CT	Demonstrated a thin gallbladder and chronic pancreatitis's signs with impacted pancreatic intraductal stones.
	MRCP	Showed abnormal pancreatic parenchyma, a mild Wirsung dilatation and an unknown stenosis at head of pancreas. To clarify, an echo-endoscopy illustrated a 10-mm stone associated and a focal narrowing in body-tail transition.
April 2017	ERCP	Was carry out to introduce a pancreatic stent (10Fr, 12 cm).
July 2017	ERCP	Revealed a large and functional pancreatic papillotomy and irregular Wirsung until distal body, with two strictures, and the pancreatic stent was removed
September 2017	Pancreatography	Suggested two pancreatic head stenosis and one body stenosis. Before pancreatic isthm there was a calculi with a median diameter of 10-mm.
	Holmium Laser ERCP	Mini endoscope inserted into the pancreatic duct successfully broken the impacted stone and cleared the obstruction.
March 2018	Without any symptoms.	

3. Discussion

We report a case of a patient with difficult pancreatic duct stones that could be treated with HL, which was a safe and effective treatment. It is a promising method for experienced gastroenterologists and can replace, in a near future external lithotripsy in the management of intraductal and pancreatic stones.

The technique enables a high-resolution imaging with a 60% wider field of view; a larger working channel (1.2 mm); a simplified procedure; a rescue therapy after failure of ESWL in endoscopic centers that have SpyGlass technology for bile duct/pancreas interventions available with success rates and transient complications.

However, few data are available [5], with high costs (but one-session treatment might be cost-effective) [3,6] and it's necessary to have centers that have the equipment and expertise on cholangioscopy and laser lithotripsy or EHL in CBD stones [3]. On other hand, there is no reported experience in Portugal with the second-generation digital cholangioscopy-guided lithotripsy system using HL. Development of single operator pancreatoscopy in contrast to conventional POP technology simplified POP procedure may lead to an increased use, mainly as a rescue therapy after failure of ESWL in endoscopic centers that have SpyGlass technology [3,6]. Fragmentation by holmium laser occurs primarily by a photothermal mechanism whereby there is direct transmittance of energy from the laser to the stone. This mechanism is fundamentally different from other laser lithotripsy modalities and depends on laser energy absorption of light with a longer wavelength of about 2100 nm on the surface of the stone as well as in the surrounding fluid. At the stone surface, melting and ejection of stone material occurs. This is then swept away by a vapor bubble that is created by water absorption of the laser energy. Because the holmium laser produces a high effective energy level,

clear ductal vision is important to prevent inadvertent bile duct injury. When done under direct cholangioscopic or pancreatoscopic vision it has a good safety profile [7].

4. Learning Points/Take Home Messages

- Pancreatic duct stone formation is a chronic pancreatitis complication that causes recurrent episodes of pain and can be managed endoscopically.
- Patients with difficult pancreatic duct stones can be treated with holmium laser, which is a safe and effective treatment.
- Holmium Laser is a promising method for experienced gastroenterologists and may replace, in a near future external lithotripsy in the management of intraductal stones.

5. Conclusion

This method promotes disintegration and extraction of complex pancreatic calculi in one session and the possibility of management pancreatic calculi under direct vision, however, further studies should attempt to clarify the effectiveness in intrapancreatic duct stones.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

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

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