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Oddi's Sphincter Macrodilation or Sphincteroplasty in the Treatment of the Large Bile Duct Stone

Aomari A*, Seddik H, Benkirane A

Department of Hepato-gastroenterology II, Military Hospital Mohamed V, Rabat, Morocco

***Corresponding author:** Aomari A, Department of Hepato-gastroenterology II, Military Hospital Mohamed V, Rabat, Morocco, E-mail: Ayoub.medinterne@gmail.com

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Abstract

Introduction: Oddi's sphincter macrodilation or sphincteroplasty, is a large dilation of the papilla which complements a endoscopic sphincterotomy in case of large stones. Our aim is to clarify the results and the complications of the sphincteroplasty, as well as the factors associated.

Patients and methods: it's retrospective study of January 2008 to June 2017, including 44 patients. In whom the diagnosis of large biliary lithiasis is defined by a diameter greater than 15 mm and which required a sphincteroplasty.

Results: 44 patients (27 women and 17 men) of average age 63.5 years, with sex ratio men / women is 0.6. The average diameter of the bile duct was 18 ± 4 mm, that of the stones was 18 ± 2 mm and that of the dilatation balloon was 16.9 ± 4 mm. The success rate was obtained in 91% of the cases and the extraction was impossible in 4 patients with large stones of 19mm diameter. Two of these patients benefited from a plastic biliary prosthesis and the other two were treated surgically. The complication rate was 6.8% in the form of minimal bleeding corrected by pneumatic compression.

Conclusion: Oddi's sphincter macrodilation or sphincteroplasty is an effective solution for extracting large biliary stone, in our study the success rate was 91% and the immediate complications were rare (6.8%).

Keywords: Sphincteroplasty; Large stone; Common bile duct

Introduction

Endoscopic sphincterotomy is currently the treatment of choice for the residual stone of the common bile duct. The standard technique consists of a sphincterotomy followed by an extraction of the stones by balloon catheter or dormia basket. Several studies have shown that the endoscopic treatment makes it possible to obtain a vacuity of the biliary duct in more than 90% of the cases [1-5]. However the presence of large stone may limit its results. The sphincteroplasty or oddi's sphincter macrodilation is one of the techniques that allow the extraction of these large stones in case of failure of the sphincterotomy using a dilatation balloon of 12 to 20 mm of diameter. The objective of our study was to evaluate the success rate as well as the complications of the sphincteroplasty.

Patients and Methods

It is a retrospective study carried out in the Department of Gastroenterology II of the Mohammed V Military Hospital of Rabat Morocco, between January 2008 and June 2017. Were included 44 patients who benefited from a sphincterotomy followed by a sphincteroplasty for stone of the bile duct. Our study mainly concerns patients who have large stones of the bile duct difficult to extract by sphincterotomy and requiring macrodilatation, the other patients who have stones of small sizes <15 mm are excluded from our study.

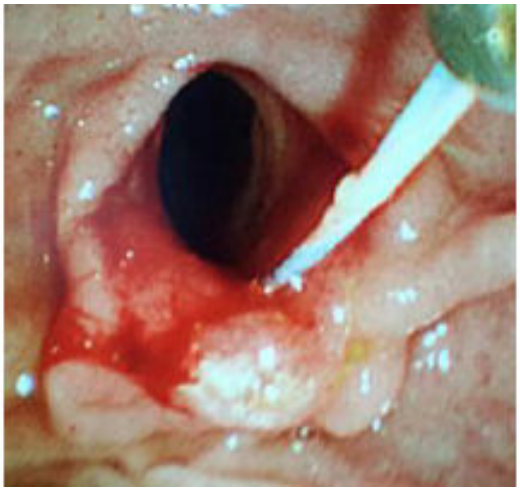

Figure 1: Endoscopic image of the papilla in post-macrodilation.

The instruments used were: duodenoscopy (Olympus®), Sphincterotome triple light, Wire guide, Balloon dilation, Balloon extraction, dormia basket, Nasobiliary drain. The size, location and number of stones were obtained on cholangiography. A large stone was defined by a stone larger than 15 mm. After failure of extraction of large stone by sphincterotomy a sphincteroplasty was performed. This technique consisted in the insertion of a dilatation balloon of variable diameter (12 to 20 mm), on guide wire in the common bile duct

underneath the stone and then gradually inflated. The choice of the diameter of dilation was according to the size of the stone and the diameter of the common bile duct. After dilation the stones are then removed by extraction balloon or basket (Dormia) (Figure 1,2). A nasobiliary drain was set up in case of incomplete extraction or in case of complication with a second attempt of extraction was carried out after 7 to 15 days, if total failure of endoscopic stone extraction a surgical treatment was indicated. A placement of plastic biliary prosthesis was performed in case of contraindication of surgical treatment. The success of endoscopic treatment was defined by a total extraction of stones from the common bile duct. The data were analyzed using SPSS software 13 (Statistical package for the social sciences). A value of $p<0.05$ was considered statistically significant.

Figure 2: Stone extraction after sphincteroplasty.

Results

Epidemiological data

The average age of patients was 63.5 years; there were 61.3% of women and 38.7% of men with a sex ratio men/women is 0.6. Among the patients included in the study; 11.3% had a history of cholecysthectomy, 6.8% had a gallstones, 57.9% had several stones >2; 29.6% had a history of endoscopic sphincterotomy; 13.6% had an angiocholitis and in 11.3% of cases there was a disparity in caliber between the stone and the distal part of the common bile duct (Figure 3).

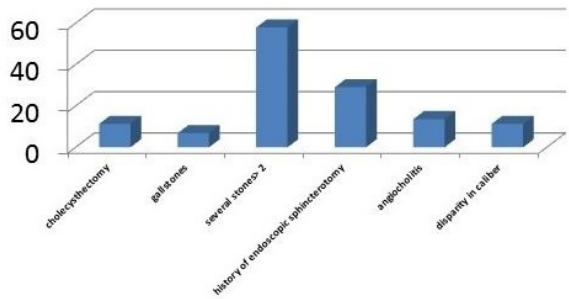

Figure 3: Percentage of patient history.

Clinical data

6 patients had angiocholitis; dissociated biliary symptoms suggestive of stone migration were present in 28 patients, 4 patients had acute pancreatitis, 6 patients had jaundice, 32 patients had abdominal pain and 12 patients had no symptoms.

Morphological data

The average number of stones was 1.86 ± 0.8 per patient with extremes ranging from 1 to 10. The average common bile duct diameter was 18 ± 4 mm, that of the stones was 18 ± 2 mm and that of the balloon of macrodilation was 16.9 ± 1.5 mm with extremes ranging from 14 to 20 mm. five patients had a disparity in caliber of the lower third of the common bile duct. All these morphological data were obtained by MRI (Magnetic resonance imaging) and cholangiography.

Success rate

The complete extraction of the stones was carried out in one session in 40 patients. Extraction was impossible in 4 patients with an average stone diameter of 18 ± 2 mm. Two of these patients had received plastic biliary prosthesis; the other two were treated surgically. Therefore the success rate of the sphincterplasty was 91%.

Complication rate

The complication rate in our study was 6.8% in the form of bleeding during sphincterotomy. The hemostasis was obtained by pneumatic compression.

Discussion

About 85-90% of common bile duct stones can be treated using an extraction balloon or a dormia basket after sphincterotomy [6,7]. The large stones of the common bile duct constitute a difficulty in endoscopic treatment [7,8], because of their diameters which remain superior to that of the sphincterotomy which does not generally exceed 12 mm. The solution is either to widen the sphincterotomy by Oddi's sphincter macrodilation (sphincteroplasty) or to reduce the diameter of the stones by fragmentation using the technique of mechanical lithotripsy. The mechanical lithotripsy allows the extraction of large stones from the common bile duct in 68 to 98% of the cases but with a risk of technical complications (Breakage of traction cables) or perforation of the common bile duct [9-12]. The sphincteroplasty or Oddi's sphincter macrodilation, consists of a large

dilation of the sphincter of oddi after having performed an endoscopic sphincterotomy. It is a technique combining the benefits of papilla dilation and sphincterotomy. It increases the efficiency of extraction of large stones while minimizing the complications of both techniques.

Technical aspects of sphincteroplasty

Time of the proceeding: The duration of the endoscopic procedure in our study was 35 ± 5 min; it is comparable to that reported in the literature. In the study of Ltoi et al the time of unrolling of the sphincteroplasty was 32 min [13].

Size of the sphincterotomy: Most endoscopists perform medium sphincterotomy before macrodilation. This step seems to reduce the rate of complications, especially the risk of bleeding [14]. However, many other studies report comparable results with complete sphincterotomy [15]. In our study, we did not limit ourselves to small sphincterotomy but were complete and adapted to the size of the stones and the type of the papilla and there was no increase in the rate of complications including the risk of bleeding.

Balloon size and inflation time: The size of the macrodilation balloons used in the studies range from 12 to 20 mm. In our study we used balloons of 14 to 20 mm in diameter. The choice of diameter depends on the size of the large stone and the diameter of the common bile duct. The balloon diameter must not exceed that of the bile duct. Some authors limit the size of the balloon to 15mm because of the fear of perforation. A large retrospective study [16] showed that dilation with balloons larger than 15 mm had complications comparable to those described in the literature with smaller balloons. The ideal time to inflate the balloon is not consensual. In general the inflation time varies between 0 s to 2 min [17-19]. A reduced inflation time does not appear to be associated with a higher risk of bleeding.

Success rate of sphincteroplasty

The complete extraction of large stones after sphincteroplasty is possible in 72.7% to 100% of cases [20]. In our study, total extraction was obtained in 91% of cases. And our results were comparable to those reported in the literature.

Complication rate of sphincteroplasty

The complications reported in the literature are: pancreatitis, bleeding and perforations. Four randomized controlled trials comparing the overall complication rates (pancreatitis, bleeding and perforation) of sphincteroplasty and sphincterotomy [21-24] found no significant difference between the two techniques. In our study, the complication rate was 6.8% only in the form of bleeding without pancreatitis or perforation. The latter remains the most severe but rare: 7 perforations (0.40%) have been reported in the literature [25]. The presence of distal stenosis of the common bile duct appears to be an independent risk factor for perforation and could be considered as a contraindication to sphincteroplasty. In our study, the sphincteroplasty allowed the extraction of large stone in five cases despite the presence of a disparity in size between the distal portion of the common bile duct and the stone. The presence of a diverticulum does not appear to be a contraindication to sphincteroplasty but should be done in a more cautious way. The most common complication of sphincteroplasty remains bleeding which is in most cases minimal and treated in most cases conservatively. Severe arterial hemorrhages sometimes delayed are possible and may require surgery [26]. In our study the bleeding was managed by mechanical hemostasis using the technique of pneumatic compression.

Conclusion

The sphincteroplasty or Oddi's sphincter macrodilation is an effective technique for extracting large stone from the common bile duct that reduces the use of mechanical lithotripsy or surgery. It is no more morbid than endoscopic sphincterotomy in terms of complications (pancreatitis, bleeding and perforation). In our study the success rate was 91% and the complication rate was 6.8%.

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