Case Report

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A Case Report-Endoscopic Treatments of 47 Incomplete Pancreatic Divisum (IPD) Cases in our Hospital – Special Emphasis on our New Procedures: Rendezvous Pre-Cut Method and Reverse Balloon Dilation Method

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ABSTRACT

We have treated 47 cases of incomplete pancreatic divisum (IPD) in these 7 years. They were classified by the modified “Hirooka’s classification” — stenotic fusion type I / II, ansa pancreatica type, branch fusion type I / II / III, and one was unclassified. 36 cases were treated by ESWL and/or endoscopy. In difficult cases, we performed our new endoscopic procedures—rendezvous precut method and reverse balloon dilation method, with good results. The therapeutic success rate of IPD via major papilla was 100% (10/10) and via minor papilla 96% (24/25) without severe complications. After endoscopic treatment, the prognosis was good in 32, fair in 3 and one had an operation. In calcified IPD cases, endoscopic treatments were performed many times by stone and pain relapse, and EPS is still placed in 24 cases.

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Preface

In the literature, papers about the treatment of incomplete pancreatic divisum (IPD) are few, so we would like to report about the treatment methods of IPD in our hospital, especially 2 new procedures; rendezvous pre-cut method and reverse balloon dilation method.

Object

In these 7 years, we have experienced 47 cases of IPD. They consisted of 33 male and 14 female, aged 13-90 y/o (mean 63). It was 3.0% of naïve ERP cases in this period. The states of disease were 4 ARP (acute relapsing pancreatitis), 36 CH (chronic pancreatitis), and 7 asymptomatic without duct deformity. We classified them with the modified “Hirooka’s classification” (Figure 1) into stenotic fusion type I / II, ansa pancreatica type, branch fusion type I / II / III (Table 1), and each case number was 3, 1, 0, 15, 0, and 27 respectively [1]. One case was unclassified.

Figure 1: Modified Hirooka’s classification of Incomplete pancreas divisum

47 cases of Incomplete pancreas divisum			
M33 F14 13~90y/o (mean63)		(2014, 4.1~2021.5.1)	
		47/1321(naive ERCP)=3.0%	
type	stenotic fusion type I 3 type II 1		
	branch fusion type I 15 type II 0 type III 27		
	ansa pancreatica type 0		
	unclassified 1		
state	ARP 4		
	CH 36 (asympt. 3, severe 6)		
	asymptomatic(no duct deformity) 7		
diag.	ERP 34		
	MRCP 13		
treat.	ESWL+ endo.(via major 7, via minor 16)	23	
	endo.alone (via major 3, via minor 8)	11	
	ESWL alone	1	
	primarily ope (tail cyst resection)	1	
	ESWL+ endo.+ operation (PD)	1	
	no therapy	10	
prognosis of endo.therapy 36 cases			
	good course	32	
	multi endo. treatment by relapsing	3	
	operation (PD) by pain relapsing	1	

Table 1

Figure 2: (5Fr,7Fr.) 180mm,210mm,240mm,270mm,300mm

Result

34 cases were diagnosed by ERP and 13 by MRCP. The 37 symptomatic cases consisted of 29 male, 8 female (calcified 31,alcoholic 30) and the 10 asymptomatic cases consisted of 3 male, 7 female (calcified 2,alcoholic 3) (Table 2). Severe pancreatitis cases with pseudocysts were all calcified alcoholic male cases.

	pain(+) 37		pain(-) 10	
	M 29	F 8	M3	F7
alcho.(+) stone(+)	27		2	
alcho.(+) stone(-)	3		1	
alcho.(-) stone(+)	4		0	
alcho.(-) stone(-)	3		7	
	30/37=80% alcho.		7/10=70% non-alcho.	

Table 2

Treatment procedures consisted of 23 ESWL+endoscopy (via major papilla 7, via minor papilla 16), 11 endoscopy alone (via major 3, via minor 8), 1 ESWL alone, 1 primarily operation (tail pseudocyst resection) without medical treatment, 1 pancreato-duodenectomy after medical treatment and 10 no therapy. 80% of symptomatic patients had a history of alcohol intake, while 70% of asymptomatic patients had no such history.

There were no early complications such as bleeding, perforation and severe pancreatitis and no late complications ie. stent migration and re-stenosis of papilla.

At the first endoscopic treatment, a pancreatic stent (5 or 7Fr. Pig tail type) was placed (Figure 2), then 4 months and 10 months later it was removed and re-placed as necessary. 32 symptomatic cases became pain free, however another 3 calcified cases required treatments many times due to stone and pain relapsing. 1 case had an operation (PD) after medical treatment. There were no cases of cancer occurrence or death after treatment.

Case presentation

A Rendezvous pre-cut method: 12 cases (Figure 3)

Figure 3: 56y/o m stenotic fusion I, pancreas stone- rendezvous precut method-EPS

Case 1 56-year old male. The guidewire, inserted through the major papilla, came out into the duodenum via the minor papilla. Along this guidewire, the minor papilla was cut by a needle type papillotome (KD-200Q-0721 Olympus) and the catheter was inserted into the minor papilla, then EPS was placed. This is our original procedure, a variant of the rendezvous method B Reverse Balloon Dilation Method: 3 cases (Figure 4,5)

Figure 4: 13y/o f branch fusion III - rendezvous precut method+reverse balloon method

Figure 5: 13y/o f branch fusion III - rendezvous precut method+reverse balloon method

Case2 13-year old female: She entered into our hospital complaining of recurrent epigastralgia. The guidewire, inserted into the major papilla, came out via Wirsung's duct, connecting branch, Santorini's duct and minor papilla into the duodenum. The minor papilla was cut by needle type papillotome (rendezvous pre-cut method), then a balloon catheter was inserted along the guidewire and the minor papilla was dilated from the reverse direction by a 4mm dilatation balloon, then EPS could be placed into the dorsal duct.

We had 3 cases combined with IPMN- in one case (dorsal main duct type IPMN), minor papilla-drainage orifice of mucin- located in the duodenal diverticulum. (Figure 6) Two young females were treated - one was case presentation 2 (below), and the other was a 13 y/o (branch fusion type III) combined with duodenal membranous occlusion.

Figure 6: 78y/o f branch fusion III IPMN,minor in duodenal dive-EPS

Discussion

In this paper, we classified 47 IPD cases by “modified Hirooka's classification.” Within them, no branch fusion type II was seen , so we imagine some deviations in our diagnosis.

Like other authors, we suppose that congenital dysfunction of the minor papilla and acquired factors (alcohol intake,obesity) cause pancreatitis [2,3].

In early stage of CPD (complete pancreatic divisum) and IPD medical conservative therapies are recommended [4-7]. Formally in the symptomatic stage, surgical therapy was performed. In these days, endoscopic therapy is preferable. In some reports, the therapeutic effects of surgery and endoscopy are almost equal, but in other reports the effect of the former is superior to that of the latter [8]. In many reports, patients of ARP stage had better results than in CH stage [9].

Recently, endoscopic procedures are the preferred choice for CPD and IPD therapies, with good results in our hospital. Cotton reported minor papilla sphincterotomy in CPD [10], and Jacob reported minor papilla sphincterotomy in CPD [11]. Since then many new techniques (wire-guided minor papilla sphincterotomy, pre cut method, needle knife cut method balloon dilatation) were developed and good results were reported by many authors [12-22]. New therapeutic procedures have also been recently reported by Chavan-; reverse sphincterotomy of the minor papilla, and by Everson ; reverse minor papilla balloon dilatation without EPS [23,24].

From 2017, we have introduced and reported about new therapeutic procedures for the PD, IPD therapy: pre-cut method, balloon dilatation method free-hand method, rendezvous method rendezvous pre-cut method and reverse balloon dilatation method. The success rate of CPD and IPD via minor papilla was 97% (131/135) and 94% (33/36) respectively without severe complications [25-27]. However we had to exchange EPS many times and still now EPS is placed in 24 cases.

Conclusions

In this paper, we reported the safety and usefulness of our new treatment methods-rendezvous precut method and reverse balloon method. Guidewire assisted cut method precut method free hand method balloon dilatation method and rendezvous method are also safe and useful endoscopic treatment for CPD and IPD.

References

1. Hirooka T, S Kataoka, H Ohchi , Takanori MARUO, Takashi TOYONAGA, et al. (1994) Branch Fusion Between the Ventral and Dorsal Pancreatic Duct. Dig. Endosc 6: 87-93.
2. Kamisawa T, Tu Y, Egawa N, Kouji Tsuruta, Aatsutake Okamoto, et al. (2006) Clinical Implications of Incomplete Pancreas Divisum J Pancreas 7: 625-630.
3. Takuma K, Kamisawa T, Tabata T, Naoto Egawa and Yoshinori Igarashi b, et al. (2010) Pancreatic Diseases Associated with Pancreas Divisum Dig. Surg 27: 144-148.
4. Warshaw AL, Richter JM, Shapiro RH (1983) the Cause and Treatment of Pancreatitis Associated with Pancreas Divisum Ann. Surg 198: 443-450.
5. Gregg JA (1977) Pa ncreas divisum: its association with pancreatitis Am J Surg 134: 539-643.
6. Blair AJ, Russel CG, Cotton PB (1984) Resection for pancreatitis in patients with pancreas divisum Ann. Surg 200: 590-594.
7. Russel RCG, Wong NW, Cotton PB (1984) Accessory sphincterotomy (endoscopic and surgical) in patients with pancreas divisum Br J Surg 71: 954-957.
8. Hafezi M, Mayschak B, Probst P, Markus W Büchler, Thilo Hackert, et al. (2017) A systematic review and quantitative analysis of different therapies for pancreas divisum -56 observational study The American Journal of Surgery 214: 525-537.
9. Liao Z, Gao R,Wang W, Z Ye, XW Lai, et al. (2007) A systemic review on endoscopic detection rate, endotherapy,

- and surgery pancreas divisum *Pancreas* 34: 21-46.
10. Cotton PB (1978) Duodenoscopic papillotomy at the minor papilla for recurrent dorsal pancreatitis *Endosc Diget* 3: 27-28.
11. Jacob L, Geenen JE, Catalano MF, G Kenneth Johnson, Daniel J Geenen, et al. (1999) Clinical presentation and short-term outcome of endoscopic therapy of patients with symptomatic incomplete pancreas divisum. *Gastrointest Endosc* 49: 53-57.
12. Kamisawa T (2004) Clinical Significance of the minor duodenal papilla and accessory pancreatic duct *J Gastroenterol* 39: 605-615.
13. Testoni PA, Mariani A, Aabakken L, Marianna Arvanitakis, Erwan Bories, et al. (2016) Papillary cannulation and sphincterotomy technique at ERCP: European Society of Gastrointestinal Endoscopy Clinical Guideline *Endoscopy* 48: 657-693.
14. Wilcox CM, Monkemuller KF (2001) Wire assisted minor papilla –precut papillotomy *Gastrointest Endosc* 54: 83-6.
15. Lehman GA, Sherman S, Nisi R, R H Hawes (1993) Pancreas divisum; results of minor papilla sphincterotomy. *Gastrointest. Endosc* 39: 1-8
16. Heyries L, Barthet M, Delvast C, Christophe Zamora, Jean-Paul Bernard (2002) Long term results of endoscopic management of pancreas divisum with recurrent acute pancreatitis. *Gastrointest Endosc* 53: 376-381.
17. Soehendra N, Kempeneers I, Nam VC, H Grimm (1986) Endoscopic dilation and papillotomy of the accessory papilla and internal drainage in pancreas divisum *Endoscopy* 18: 129-132.
18. Yamamoto N, Isayama H, Sasahira N, Takeshi Tsujino, Yousuke Nakai, et al. (2014) Endoscopic Minor Papilla Balloon Dilation for the Treatment of Symptomatic Pancreas Divisum *Pancreas* 43: 927-930.
19. Kamisawa T (2006) Endoscopic approach to the duodenal minor papilla; special emphasis on endoscopic management on pancreas divisum *Dig. Endosc* 18: 252-255.
20. Lans JJ, Geenen JE, Johanson JF and W J Hogan (1992) Endoscopic therapy in patient with pancreas divisum and acute pancreatitis; a prospective, randomized, controlled clinical trial *Gastrointest Endosc* 38: 430-434.
21. Gerke H, Byrne M, Stiffler HL, Jorge V Obando, Robert M Mitchell, et al. (2004) Outcome of endoscopic minor papillotomy in patients with symptomatic pancreas divisum. *JOP* 5: 122-131.
22. Kim MH, Lee SS, Kim CD, S K Lee, H J Kim, et al. (2001) Incomplete pancreas divisum: Is it merely a normal anatomic variant without clinical implications? *Endoscopy* 33: 778-785.
23. Chavan R, Kalapala R, Nabi Z, Sundeep Lakhtakia, D Nageshwar Reddy (2017) Reverse sphincterotomy of the minor papilla via the major papilla *Endoscopy* 49: E119-120.
24. Everson L A Artifon, Mariana S, V Frazao, Flavio Coelho Ferreira (2012) A Novel Endoscopic Treatment of Pancreas Divisum *Rev. Gastroenterol. PERU* 32: 184-186.
25. Tsuji T, Nyuhzuki S, Sun G, Sugiyama A, Amano Y et al. (2017) Usefulness and safety of endoscopic pancreatic duct balloon dilation (EPDBD) for treatment of pancreatic diseases-pancreatic stone, divisum and pseudocyst *Liver Pancreat Sci* 2: 1-9.
26. Tsuji T, Sun G, Sugiyama A, Y Amano, S Mano, et al. (2019) Endoscopic treatment of pancreatic diseases via duodenal minor papilla : 135 cases treated by sphincterotomy, endoscopic pancreatic duct balloon dilation and pancreatic stenting *Ann Clin Gastroenterol Hepatol* 3: 012-019.
27. Tsuji T, Sun G, Sugiyama A, Amano Y, Mano S, et al. (2020) Endoscopic Treatments of Pancreatic Incomplete Divisum (PID) in 20 cases—especially about our new procedures: Rendezvous Pre-cut method and Reverse Balloon Method *Gastro Med Res* 4: 314-316.