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ORIGINAL ARTICLE

Endoscopic Retrograd Cholangiopancreatography for Choledocolithiasis in Patients With Periampullary Diverticulum

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ABSTRACT

AIM: Periampullary diverticulum (PAD) is usually discovered incidentally during endoscopic retrograde cholangiopancreatography (ERCP). It may be a cause of difficult cannulation and can be related with morbidity, according to the size of diverticulum and position of papilla. Papilla may be localised intradiverticular or extradiverticular. In this study, we evaluated complications and success of ERCP in patients with choledocolithiasis and PAD.

MATERIALS AND METHODS: Forty patients in whom performed ERCP with the diagnosis of choledocolithiasis and discovered to be having PAD during the procedure were included in the study. Forty patients without PAD were selected as control group. Both groups were compared in terms of complications, success of cannulation, need for precut sphincterotomy, stent placement and surgery, due to residual stones. Findings were compared in terms of same parameters in diverticulum group according to position of papilla.

RESULTS: There were 21 men and 19 women in PAD group (mean age 72.9±9.9 years) and 20 men and 20 women in control group (mean age 68.1±12 years) (p>0.05). Papilla of Vater was located extradiverticular in 22 patients and intradiverticular in 18 patients. Bleeding and/or perforation associated with ERCP was not observed, in both groups. There were not significant differences between the groups in terms of success of cannulation, need for precut sphincterotomy, stent placement, surgery and post-ERCP pancreatitis (p>0.05). There were not significant differences in terms of same parameters in diverticulum group according to position of papilla (p>0.05).

CONCLUSION: PAD isn't associated with an increased risk for complications and does not affect the success of ERCP.

Key words: Endoscopic retrograd cholangiopancreatography; complication; periampullary diverticulum

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INTRODUCTION

PAD, is a diverticulum of the duodenum that can develop neighbouring the Vater of ampulla (major papilla) or enclosing the ampulla of Vater or the intramural part of the choledochus. The diverticulum surrounding the major papilla for 2-3 cm but not enclosing it, is called juxtapapillary diverticulum, whereas a papilla being located within a diverticulum is called intradiverticular papilla[1]. It has been reported that PAD frequency is increased with advanced age and has a slight female dominance[1,2]. Its prevalence has been found in postmortem studies to be approximately 5%, whereas in endoscopic evaluations in varying rates between 5-23%[3-10]. PAD is mostly

asymptomatic, but there are studies showing that choledocholithiasis and some pancreatic diseases are seen in patients with PAD more frequently[1]. In the literature, there have been various results of studies researching if the presence of PAD is a complicating factor for the choledoch cannulation during ERCP and its relationship with post-procedural complication development[4-10].

In this study, we aimed to investigate the relation between PAD presence regarding procedural success and complication development in patients in whom ERCP was performed for choledocholithiasis.

MATERIAL AND METHOD

Forty patients in whom ERCP was performed for choledocholithiasis and who were diagnosed with PAD during the procedure were included in the study. Patients, in whom ERCP was performed for different endications other than choledocholithiasis were excluded. Patients with PAD were divided into groups amongst themselves according to the fact whether papilla was inside or outside the diverticulum. Also 40 patients in whom ERCP was performed for choledocholithiasis but not having PAD, being matched in age and sex to the PAD group, were chosen as a control group. Each group and the diverticulum group within itself were compared in terms of cannulation success, precut necessity, post-ERCP complications and stent and/or surgical treatment necessity for not sufficiently removed stones.

The ERCP procedure was performed using a Fujinon ED-450XT5 (Tokyo, Japan) duodenoscope along with fluoroscopy. Before the procedure, each patient was administered 1g of ceftriaxone for prophylaxis, midazolam and/or propofol for sedation and intravenous hyoscine N-methyl bromide to reduce intestinal contractions.

The programme SPSS for Windows 16.0 was used for statistical analysis and the significance limit was chosen at $p<0,05$.

RESULTS

In our study, there have been 21 male and 19 female patients in the PAD group having an average age of 72.9±9.9 years, whereas in the control group there were 20 male, 20 female patients with an average age of 68.1±12 years ($p>0.05$) (Table 1). In the PAD group, the papilla of vater was found in 22 patients outside the diverticulum, whereas in 18 patients it was found inside the diverticulum.

Between the PAD group and the control group there were not seen any significant differences regarding cannulation success, post-ERCP pancreatitis and plastic stent and/or surgical treatment necessity for not sufficiently removed stones ($p>0.05$) (Table 2). Post-ERCP hemorrhage or perforation was not seen in either of the groups. There were also no differences found between the groups in terms of the same parameters in the comparison depending on the localisation of the papilla of vater in the PAD group ($p>0.05$) (Table 3).

In 2 patients in the diverticulum group (1 patient having the papilla within the diverticulum, 1 patient having it at the edge of the diverticulum) and 1 patient in the control group in which the cannulation failed during the first procedure, it was possible to perform the procedure in another session by cannulating the choledoch. However, in 3 patients in the diverticulum group (2 patients having the papilla within the diverticulum, 1 patient having it at the edge of the diverticulum) and in 1 patient in the control group, surgical treatment was needed because of the failure of the repeat session as well.

In 2 patients (having papilla at the edge of the diverticulum) in the diverticulum group and 3 patients in the control group that needed a plastic stent placement because of not sufficiently removed stones in the first procedure, the stones were able to be removed in the repeat session, whereas in 2 patients in the diverticulum group (1 patient having papilla within the diverticulum, 1 patient having it at the edge of the diverticulum) and again in 2 patients of the control group surgical treatment was needed.

Table 1 The comparison of the PAD and control groups according to age and gender.

	Diverticulum group	Control group
Number of patients (*n*)	40	40
Localisation of papilla		
Inside diverticulum	22	
Outside diverticulum	18	
Age (average ± SD) *	72.9 ± 9.9	68.1 ± 12
Gender		
Female (n)	19	20
Male (n)	21	20

* $p>0.05$

Table 2 Comparison of PAD and control groups in terms of cannulation failure, post-ERCP pancreatitis , stent, precut and surgical need.

	Diverticulum group		Control group		*P*
	n	%	*n*	%	
Cannulation failure	5	12.5	2	5	> 0.05
Precut necessity	7	17.5	5	12.5	> 0.05
Pancreatitis	7	17.5	4	10	> 0.05
Stent necessity	4	10	5	12.5	> 0.05
Surgical need	5	12.5	3	7.5	> 0.05

Table 3 Comparison regarding cannulation failure, post-ERCP pancreatitis, stent, precut and surgical need depending on the position of papilla.

	Inside diverticulum		Outside diverticulum		*P*
	n	%	*n*	%	
Cannulation failure	3	16.6	2	9	> 0.05
Precut necessity	5	27.7	2	9	> 0.05
Pancreatitis	4	22.2	3	13.6	> 0.05
Stent necessity	1	5.5	3	13.6	> 0.05
Surgical need	3	16.6	2	9	> 0.05

DISCUSSION

The PAD prevalence in the ERCP series was reported between 5,6-23% and its frequency increases with advanced age[4-10]. Although in some studies it is reported to be female dominant, there are also studies with no differences in terms of gender dominance[1,2]. The papilla of Vater can be located inside or outside of the diverticulum[1,6]. The patients diagnosed with diverticulum in our study were mostly in advanced age (average age 72,9 years) as well, but there were not any differences in terms of sex (Male/female ratio: 1.1). The PAD group in our study was divided into groups depending on the papilla being inside or outside the diverticulum, in a similar way as Tyagi *et al*[6], and the papilla was determined to be outside the diverticulum in 55% (22/40) and inside the diverticulum in 45% (18/40) of the patients.

Generally, in studies evaluating ERCP results of patients diagnosed with PAD all indications have been taken into consideration. However, in our study, relationship between PAD presence and procedural success and complication risk has been investigated only in patients with choledocholithiasis. Although it can vary depending on the size of the diverticulum and the position of the papilla, it is thought that the PAD presence can complicate the ERCP procedure and increase the complication rate, however there have been reported

various results in studies on this subject. In the retrospective study of Rajnakova *et al*[4] researching on ERCP results of patients with PAD, cannulation difficulty rates in patients with diverticulum were reported as 79.2% and cannulation failure as 11,1% and these results were found to be significantly higher in relation to the non-diverticulum group. In a similar way, the cannulation failure in the PAD group in our study was 12.5% but this rate was not significantly different from the control group. Also in this study, the rate of remaining stones in the choledoch was reported to be 1.8 times more in the diverticulum group, whereas in our study the rates of plastic stent placement and surgical treatment for not sufficiently removed stones were not found to be different than in the control group. Whereas the post-ERCP complication risk has been reported, in a similar way to our study, at a similar rate to the non-diverticulum group.

In the study reported by Tham and Keeley, it has been determined that the presence of diverticulum is related to the increase in stone incidence in the bile duct, however there were not found any differences in these patients regarding the cannulation success, sphincterotomy, stone removal and complication rates when compared to the control group[5]. Similarly in the study reported by Panteris et al. it has been found that the presence of PAD does not complicate the cannulation and is not associated with an increase in complication risk[6].

Tyagi *et al* have found the PAD incidence as 7,5% in their study, in which they compared 600 patients in whom ERCP was performed with different indications to the control group of 100 patients. They reported that the precut necessity with a needle sphincterotome was significantly higher in the non-diverticulum group. However in our study the precut necessity has not been found to be different than in the control group. Similarly to our results, in this study there have not been found any differences between the groups in terms of complete removal of gallstones, post-ERCP pancreatitis and hemorrhage. Also in this study, the diverticulum group has been divided into groups according to the size of the diverticulum and whether the papilla was inside or outside the diverticulum. However, the diverticulum group in this study was not compared within itself in terms of procedure success and complication rate[7]. Whereas in our study, the diverticulum group is compared on similar parameters based on the position of the papilla and yet there have not been found any significant differences.

In the study from Sökmen *et al*, which evaluated 216 patients retrospectively, the PAD frequency was reported as 14,6% and it was stated that it was seen more with advanced age and in females. Also in this study, the patients were compared to the control group in terms of complications, while no significant differences in hemorrhage and perforation were found, post-ERCP pancreatitis was found to be significantly higher in the diverticulum group (18% and 6,8% respectively)[8].

In the recent study reported by Geraci et al. it was also stated that the presence of PAD does not change the cannulation success and does not increase the complication rate. However, in this study the temporary increase in amylase in the PAD group has been found to be higher in comparison to the control group[9]. In the study reported by Alizadeh *et al* the PAD frequency was found to be 5.6% and it was stated that the presence of PAD was associated with the increase in stone frequency in the bile duct. In this study, the cannulation failure was found to be significantly more in the diverticulum group in comparison to the control group (35.5% and 11.5% respectively). However, similarly to our study and other studies in the literature, there have not been observed any differences regarding post-ERCP complication risk between the two groups[10].

Although as seen in the literature, there have been reported different results in terms of difficulty and success of the ERCP procedure in patients with PAD, there is no increase in the risk of complication in general. In conclusion, on the basis of the results of our study it can be said that the presence of PAD in patients, in whom ERCP is performed for choledocholithiasis, is not affecting the procedure‘s success at a significant rate and is not associated with the increase in risk of complication.

CONFLICT OF INTERESTS

There are no conflicts of interest with regard to the present study.

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