

# Efficacy of The Endoscopic Clip Method in Patients Treated with The Endoscopic Clip Method For Gastrointestinal Bleeding, Perforations and Fistulas : One Center Experience

Gastrointestinal Sistemde Kanama, Perforasyon ve Fistüllerde Endoskopik Klip Uygulamaları Etkinliği : Tek Merkez Deneyimi

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## Abstract

### Introduction

Gastrointestinal bleeding, perforations and fistulas are common conditions and can be treated with endoscopic procedures that are considered as minimally invasive procedures. With the introduction of ovarian thescope clips (OTSC), the success of the procedure is increasing and its use is recommended as the first step in treatment modalities. This study aims to contribute to the literature and share our experiences.

### Materials and Methods

Between 2020 and 2023, 21 patients who underwent endoscopic clip application after gastrointestinal tract perforations, anastomotic leaks, fistulas, bleeding and endomucosal resection in our clinic were evaluated.

### Results

A total of 21 patients, 13 males (61.9%), were included in our study. There were 16 patients in the bleeding group, one in the anatomical leak group, one in the fistula group and three in the endomucosal resection group. No failure was seen in any patient in the bleeding group. Antithrombotic drug use did not change the success. No surgical procedure was required. At 30-day follow-up, only one patient (6.25%) had rebleeding and required reoperation. No complications were detected in the procedures of endomucosal resection, fistula and clips applied in anastomotic leakage. There was a positive correlation between erythrocyte suspension replacement and length of hospitalization ( $p<0.001$ ;  $p=0.897$ ). However, there was no significant correlation between the number of clips used and the duration of hospitalization ( $p=0.451$ ).

### Conclusion

The use of over the scope clips is safe and successful in upper and lower gastrointestinal tract bleeding, gastrointestinal tract anastomotic leaks, fistulas and perforations after endomucosal resection.

### Keywords

Gastrointestinal tract, Bleeding, Perforation, Fistula, Clip

## Özet

### Amaç

Gastrointestinal sistem kanamaları, perforasyonları ve fistülleri sık karşılaşılan durumlar olmakla birlikte minimal invaziv işlem olarak görülen endoskopik işlemler ile tedavi edilebilmektedir. Over thescope kliplerin (OTSC) kullanıma girmesi ile birlikte işlem başarısı artmakta ve tedavi modalitelerinde ilk basamak olarak kullanımı önerilmektedir. Bu çalışma da literatüre katkı vermeyi ve deneyimlerimizi paylaşmayı amaçlamaktadır.

### Gereç ve Yöntemler

Kliniğimizde 2020 ile 2023 yılları arasında gastrointestinal sistem perforasyonları, anastomoz kaçakları, fistülleri, kanamaları ve endomukozal rezeksiyon sonrası endoskopik klip uygulaması yapılan 21 hasta değerlendirildi.

### Bulgular

Çalışmamıza 13 erkek (%61,9) olmak üzere toplam 21 hasta dahil edildi. Kanama grubunda 16, anatomoz kaçağı grubunda bir, fistül grubunda bir, endomukozal rezeksiyon grubunda üç hasta vardı. Kanama grubunda hiçbir hastada başarısızlık görülmedi. Antitrombotik ilaç kullanımı başarıyı değiştirmemekteydi. Cerrahi işlem gerekliliği olmadı. 30 günlük takipte ise sadece bir hastada (%6,25) tekrar kanama ve yeniden işlem gerekliliği oldu. Endomukozal rezeksiyon, fistül ve anastomoz kaçağında uygulanan kliplerin işlemlerinde herhangi bir komplikasyon takibimizde saptanmadı. Uygulanan eritrosit süspansiyonu replasmanı ile hastanede yatış süresi arasında pozitif yönde korelasyon mevcuttu ( $p<0.001$ ;  $p=0,897$ ). Ancak kullanılan klip sayısı ile hastanede yatış süresi arasında anlamlı ilişki saptanmadı ( $p=0,451$ ).

### Sonuç

Alt ve üst gastrointestinal sistem kanamalarında, anastomoz kaçaklarında, fistüllerinde ve endomukozal rezeksiyon sonrası perforasyonlarda over the scope kliplerin kullanımı güvenli ve başarılıdır.

### Anahtar Kelimeler

Gastrointestinal sistem, Kanama, Perforasyon, Fistül, Klip.

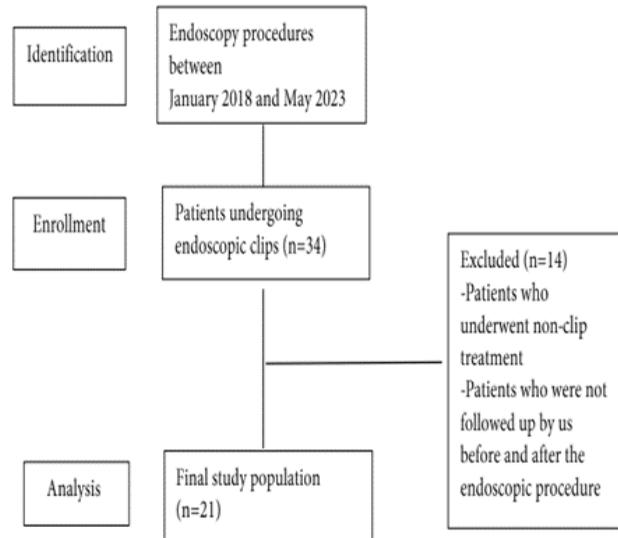
## INTRODUCTION

Hemorrhagic and septic shock may occur in gastrointestinal bleeding and perforations. Accordingly, urgent endoscopic intervention may be needed (1). In today's conditions, the use and success of endoscopic procedures in the gastrointestinal system is increasing (2). With the development of endoscopic procedures, procedures such as endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD) have started to be performed routinely in appropriate patients. An increase in complications related to advanced endoscopic procedures is inevitable (3). Non-variceal gastrointestinal bleeding, which is the leading group of endoscopic emergencies, is frequently encountered by endoscopists and urgent intervention is needed (4). The use of over-the-scope clips (OTSC) has recently become widespread in the treatment of ulcerated foci with high bleeding risk (5-7). The safety of these clips and their effect on morbidity and mortality have been proven, and they have been used as initial treatment in most centers (8). Studies on the use and success of over-the-scope clips in hemorrhages, perforations, anastomotic leaks and fistulas are ongoing (9,10).

Our aim in this study was to evaluate the effect of the use of over-the-scope clips in clinical conditions on mortality and morbidity and to present our experience in long-term follow-up.

## MATERIAL and METHODS

This study was planned as a retrospective, cross-sectional and single center experience study. In our study, 21 patients who underwent OTSC clip application for gastrointestinal tract perforations, leaks, fistulas and bleeding in the Endoscopy Unit of the Department of General Surgery, Faculty of Medicine, Bandırma Onyedi Eylül University between 2020 and 2023 were evaluated. Patients who underwent non-clip methods and patients whose preoperative and postoperative follow-ups were not performed by us were excluded from the study (Figure 1). Endoscopy was performed with single-channel endoscopes (EPX-3500 HD, Fujifilm, Singapore; EPK-i5000, Pentax, Japan) by endoscopists with five years of experience.



**Figure 1.** Planning of the study.

Mechanically applied endoclips (OlympusCorp, HX5U, Tokyo, Japan) consisted of stainless steel alloys.

In the study, demographic characteristics of the patients, location and purpose of the clip application, number and size of clips used, disease-free survival and hospitalization duration, post-procedural complications and mortality were evaluated.

### Informed Consent and Ethics Committee Decision

All patients included in the study were informed about the possible complications of the pre-procedure procedure and a written consent form was obtained. Institutional approval was obtained from Bandırma Training and Research Hospital. The study was conducted in accordance with the Declaration of Helsinki.

### Statistical analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) (version 26.0, SPSS Inc, Chicago, IL, USA) program. Besides descriptive statistical methods (median, frequency, rate), the Kruskal-Wallis test was used to compare quantitative data, and the Mann-Whitney U test was used for two-group comparisons. The Pearson's chi-squared test and Fisher's exact test were used to compare quantitative data. Spearman's correlation analysis test was applied for correlation between numerical parameters.  $P < 0.05$  was considered as statistically significant.

## RESULTS

There were a total of 21 patients, including 13 males (61.9%) who met the inclusion criteria. The median age of the patients was 67.00 years (min:21-max:85). When the localizations of clip application were evaluated, it was applied to the esophagogastric junction in two patients, cardia in one patient, acorpus in three patients, antrum in three patients, bulbus in five patients, colon in six patients and anastomosis line in one patient. Indications for clip use were bleeding in 16 patients, anastomotic leakage in one patient, fistula site in one patient, and perforation site after endoscopic mucosal resection in three patients (Figure 2) (Table 1).



Figure 2. Clipping intervention for Mallory weiss bleeding.

When we analyzed the bleeding group in detail, there were a total of 16 patients, including two patients in the esophagogastric junction, five patients in the stomach, five patients in the bulb, three patients in the colon and one patient in the anastomosis line. Six patients (37.5%) in the bleeding group were receiving antithrombotic therapy. The median length of hospitalization after the procedure was six days in the esophagogastric junction, one in the cardia, four in the corpus, four in the antrum, two in the bulb, one in the colon and three in the anastomotic line.

**Table 1.** Table of the patient's demographic characteristics, locations of clip use and indications for clip use.

Age (Median), (range), year	67,00 (21-85)
Sex, n (%)	Female 8 (38,1%) Male 13 (61,9%)
Clip applied localization, n (%)	
Esophagogastric junction	2 (9,5%)
Cardia	1 (4,8%)
Corpus	3 (14,3%)
Antrum	3 (14,3%)
Duedonal bulb	5 (23,8%)
Colon	6 (28,6%)
Esophagojejunoostomy	1 (4,8%)
Clip application indication, n (%)	16 (76,2%)
Bleeding	1 (4,8%)
Leakage	1 (4,8%)
Fistula	3 (14,3%)
EMR	

n: number, EMR: endoscopic mucosal resection.

When the number of clips used in the procedure of these patient groups were evaluated, the median number of clips used in the procedure was 1.00 (min:1.00-max:1.00) in the esophagogastric junction, 1.00 in the cardia, 2.00 in the corpus, 1.00 in the antrum (min:1.00-max:1.00), median 2.00 (min:1.00-max:4.00) in the bulbus, median 1.00 (min:1.00-max:2.00) in the colon and 2.00 clips in the anastomosis line (Table 2).

When the relationship between the amount of erythrocyte suspension replacement administered and the duration of hospitalization was examined, there was a positive correlation ( $p < 0.001$ ;  $p = 0.897$ ). However, the relationship between the number of clips used and the duration of hospitalization was examined, but no significant correlation was found ( $p = 0.451$ ) (Table 3).

**Table 2.** Table of the duration of hospitalization and the number of clips used according to the localizations where clips were used.

Localization n (%)	Hospitalization time, (Median), (range), day	Clip, (Median) (range), piece
Esophagogastric junction, 2 (12,5%)	6,00 (5,00-7,00)	1,00 (1,00-1,00)
Gastric Cardia, 1 (6,3%)	1,00	1,00
GastricCorpus, 1 (6,3%)	4,00	2,00
Gastric Antrum, 3 (18,8%)	4,00 (4,00-15,00)	1,00 (1,00-1,00)
Duedonal bulb, 5 (31,3%)	2,00 (1,00-3,00)	2,00 (1,00-4,00)
Colon, 3 (18,8%)	1,00 (1,00-1,00)	1,00 (1,00-2,00)
Esophagojejunostomy, 1 (6,3%)	3,00	2,00

n: number

In the bleeding group, no complications were detected until the time of first discharge. Antithrombotic drug use did not change the success. No surgical procedure was required. At 30-day follow-up, only one patient had rebleeding and required reoperation.

Among the limitations of our study, the main ones are its retrospective nature and the use of cross-sectional data based on a single center experience. In addition, the insufficient number of patients is also among our limitations. The strength of our study is that the procedures were performed by an experienced endoscopy team and minimally invasive surgery was not considered as the first option.

**Table 3.** Correlation table between the duration of hospitalization and the number of clips used and the amount of erythrocyte suspension used.

Hospitalization time	Clip piece	Erythrocyte suspension replacement
p**	-0.203	0,897
p*	0.451	<0.001

p\*\*: Spearman'srho (CorrelationCoefficient), p\*: value.

### DISCUSSION

In this study on the experience of the endoscopy procedure unit of our clinic in the use of OTSC, no complications were observed in any patient after the use of OTSC clips in gastrointestinal bleeding, colonic fistulas and perforations after EMR. We think that the reasons for the absence of complications are the experience of the endoscopists performing the procedure and the effectiveness of OTSC clips. However, in another OTSC study on upper gastrointestinal bleeding, the safety of OTSC was confirmed (11).

Kayano H et al (12) presented OTSC as a useful method for gastrointestinal anastomotic leaks. Kähler G et al (13) and Mennigen R et al (14) also found the use of OTSCs useful in their experience. In OTSC procedures performed in EMR, fistula and anastomotic leakage, we found that the relevant areas were closed in the radiologic imaging of the patients one day after the procedure. Subsequently, no complications were detected in the long-term follow-up of the patients in our follow-up. When evaluated together with these studies, it is seen that the use of OTSCs as a minimally invasive procedure in anastomotic leaks and fistulas is highly successful.

We found a 100% success rate in the OTSC procedure we performed in the bleeding group. Lamberts R et al (17) achieved a 100% success rate like us in their study. However, rebleeding occurred in 35% of patients in the post-procedure follow-up. Jensen DM et al (7) found a 4% chance of rebleeding in the OTSC group in their study.

Meier B et al (15) found rebleeding as 8.3% in their study. In our study, we found a rate of approximately 6.25%, supporting the current literature rates. In our study, upper gastrointestinal bleeding (81.2%) constituted the majority of the study.

This suggests that lower gastrointestinal bleeding is related to the high probability of diverticular bleeding and angiodysplasia and the high probability of spontaneous remission in these cases (16). Lamberts R et al (17) found that primary success did not change with the use of antithrombotic drugs in their study. Similarly, the use of antithrombotic drugs did not change the success of the first procedure in our study.

Unlike other studies, we found that the number of clips used and the amount of erythrocyte suspension replaced due to bleeding were not compared with the duration of hospitalization in bleeding patients undergoing OTSC. In our study, we found that the duration of hospitalization was significantly prolonged as the amount of erythrocyte suspension replaced increased. Weiland T et al (18), in a meta-analysis of 457 publications on the use of OTSCs, reported that OTSCs are safe and successful in clinical use. Like this large study, we find OTSCs safe and successful in clinical use in gastrointestinal tract perforations, fistulas and bleeding.

## CONCLUSION

In conclusion, we think that the use of OTSC is safe and successful in upper and lower gastrointestinal bleeding. Since it is a minimally invasive procedure, we believe that it can be preferred as the first procedure in appropriate cases patient group.

### **Ethical Declarations**

The approval for this study was obtained from Bandırma Onyedi Eylül University Health Research Ethics Committee (Protocol no:2023-83 ).

### **Informed Consent:**

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

### **Conflict of Interest Statement:**

The authors have no conflicts of interest to declare.

### **Financial Disclosure:**

The authors declared that this study has received no financial support.

### **Author Contributions:**

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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