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Original Article

Comparison of heater probe coagulation and argon plasma coagulation in the management of Mallory–Weiss tears and high-risk ulcer bleeding

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ABSTRACT

Background and study aims: Upper gastrointestinal (GI) bleeding is a common medical emergency. Endoscopic treatments often lead to better therapeutic outcomes than conventional conservative treatments. This study aimed to investigate and compare the use of heater probe coagulation (HPC) and argon plasma coagulation (APC) together with epinephrine injection for the treatment of Mallory–Weiss tears and high-risk ulcer bleeding.

Patients and methods: A total of 97 patients (54 in the HPC group and 43 in the APC group) who were diagnosed with upper GI bleeding secondary to a Mallory–Weiss tear or high-risk gastric or duodenal ulcers were included in the study. Lesions were classified according to the Forrest classification. The HPC and APC groups were compared in terms of initial haemostasis, re-bleeding in the early period, need for surgery, average need for transfusion, and duration of hospital stay.

Results: There were no significant differences between the HPC and APC groups in terms of ensuring initial haemostasis (98% vs. 97.5%, $p > 0.05$), re-bleeding rates (17% vs. 19%, $p > 0.05$), need for surgery (2% vs. 9%, $p > 0.05$), average need for transfusion (3.7 ± 2.11 vs. 3.4 ± 2.95 units, $p > 0.05$), and average duration of hospital stay (4.6 ± 2.24 vs. 5.3 ± 3.23 days, $p > 0.05$).

Conclusion: There was no difference between HPC and APC when used together with epinephrine injection for the treatment of Mallory–Weiss tear and high-risk ulcer bleeding.

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Introduction

Upper gastrointestinal (GI) bleeding is defined as bleeding resulting from haemorrhages proximal to the Treitz ligament. The most frequent aetiologies in non-variceal upper-GI bleeding are peptic ulcers, erosions, and Mallory–Weiss tears. In most patients, the bleeding stops spontaneously, which generally indicates good prognosis [1]. However, re-bleeding in high-risk lesions may require surgical treatment. It has been shown that endoscopic treatments such as injection of sclerosing agents, thermal coagulation through heater probe coagulation (HPC) or argon plasma coagulation (APC), and haemclip applications significantly reduce the rates of recurrent bleeding, need for surgery, and mortality when compared to conventional treatment; therefore, their standard use is suggested [2–5]. Although there are many published studies comparing endoscopic monotherapy and dual therapy, there are a few studies comparing the effectiveness of HPC and APC.

In the current study, we aimed to compare the effectiveness of HPC and APC when used together with epinephrine injection for the endoscopic treatment of patients who were diagnosed with upper GI bleeding secondary to a Mallory–Weiss tear and/or a high-risk gastric or duodenal ulcer.

Patients and methods

Patient selection

We retrospectively examined the records of patients (>18 years of age) who were monitored for upper GI bleeding and who were treated with HPC or APC together with epinephrine injection at the Department of Gastroenterology, Akdeniz University, between September 2012 and September 2015. Patients diagnosed with vascular malformation, gastric antral vascular ectasia, and malignant lesions were not included in the study. Consequently, 97 patients who were diagnosed with Mallory–Weiss tear and high-risk gastric or duodenal ulcer patients were included in the study. Lesions were classified as spurting haemorrhage, oozing

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haemorrhage, non-bleeding visible vessel, or adherent clot according to the Forrest classification. Patients who underwent HPC or APC were compared in terms of ensuring initial haemostasis, re-bleeding in the early period, need for surgery, average need for transfusion, and duration of hospital stay. Early re-bleeding was defined as the need for re-endoscopy and repeated interventions due to findings of active bleeding during the hospital stay.

Endoscopy and treatment procedures

Endoscopy was performed with a Fujinon EG-530 WR (Tokyo, Japan) gastroscopy device. The HPC operation was performed using 10F probes with an Olympus HPU-20 brand device, and the APC process was performed with an Erbe VIO 200 S brand device with the power/gas flow adjustment at 50 W and 1.8 L/min. Each patient was given a diluted epinephrine (1/10000) injection around the lesion prior to HPC or APC. All patients were monitored with a similar medical treatment protocol after undergoing endoscopy (intravenous pantoprazole [40 mg,twice/day] followed by oral pantoprazole).

Statistical analysis

Statistical analyses were performed using SPSS software version 16.0 (Chicago, IL, United States). The chi-square test and the two independent samples *t*-test were used to compare patient characteristics. Values of $p < 0.05$ were considered to be statistically significant.

Results

Fifty-four of the patients included in the study underwent HPC and 43 underwent APC. Females were more dominant in the APC group; however, there were no other differences between the two groups in terms of average age, presence of comorbidities (having one or more diseases such as coronary artery disease, diabetes mellitus, hypertension, chronic renal failure, non-GI malignancy, and cerebrovascular accident), and the use of antiplatelets (e.g., acetylsalicylic acid or clopidogrel) and/or anticoagulants ($p > 0.05$). Patient demographic data are shown in Table 1. There were no differences between the groups in terms of endoscopic diagnosis and lesion classification ($p > 0.05$) (Table 2). Further, there were no significant differences between the two groups in terms of ensuring initial hemostasis, re-bleeding in the early period, need for re-endoscopy, need for surgical treatment, average

Table 1
Demographic data of the patients who underwent HPC and APC.

	HPC (n = 54)	APC (n = 43)	P value
Age, years (avg ± SD)	61.7 ± 18.3	56.8 ± 20.4	0.22
Gender (n)			
Male	34	37	0.01
Female	20	6	
Comorbidity (n)			
Yes	32	28	0.55
No	22	15	
Medication (n)			
Nonsteroidal anti-inflammatory drugs	12	6	
Antiaggregant	11	12	
Anticoagulant	5	4	0.8
Antiaggregant + anticoagulant	1	0	
None	25	21	

HPC: Heater probe coagulation; APC: Argon plasma coagulation; avg: Average; SD: Standard deviation.

Table 2
Distribution of the patients who underwent HPC and APC according to the diagnosis and classification of the lesion.

	HPC (n = 54)	APC (n = 43)	P value
Diagnosis (n)			
Mallory-Weiss	5	4	
Gastric ulcer	19	15	0.98
Duodenum ulcer	30	24	
Classification (n)			
Spurting hemorrhage	4	2	
Oozing hemorrhage	15	17	0.65
Non-bleeding visible vessel	23	16	
Adherent clot	12	8	

HPC: Heater probe coagulation; APC: Argon plasma coagulation.

need for transfusion, and duration of hospital stay ($p > 0.05$) (Table 3). No complications were observed in the APC or HPC groups with regard to the procedure. However, a hemoclip was applied to one patient in the HPC group because that patient could not reach initial hemostasis. Further, a 75-year-old female patient in the HPC group passed away; she had suffered from cerebrovascular accident, coronary artery disease, and hypertension. Urgent surgical treatment was provided to a patient in the APC group due to a spurting bleeding duodenal ulcer, because initial haemostasis could not be ensured; this patient passed away due to sepsis during the follow-up period after the operation. Table 4 lists cases with recurrent bleeding and need for surgery according to their diagnosis and classification of lesions.

Discussion

Upper GI lesions which actively bleed or have high-risk bleeding indicators are good candidates for endoscopic treatment, which is quite effective for the control of active bleeding and reducing bleeding recurrence, need for surgery, and mortality [2–4]. Several studies have shown that in endoscopic treatment, the use of thermal coagulation and mechanical treatment together with epinephrine injection is more effective than epinephrine injection alone [6,7]. In contrast, a meta-analysis by Marmo et al. that studied the effectiveness of endoscopic dual therapy and monotherapy in high-risk bleeding ulcers reported that the combined treatment provided no benefit over thermal coagulation or mechanical treatment alone [8]. The European Society of Gastrointestinal Endoscopy recently issued new guidelines for the diagnosis and

Table 3
Comparison of the groups by initial hemostasis, recurrent bleeding, need for surgery, average need for transfusion, and duration of hospital stay.

	HPC (n = 54)	APC (n = 43)	P value
Initial hemostasis (n,%)			
Yes	53 (98%)	42 (97.5%)	0.7
No	1 (2%)	1 (2.5%)	
Recurrent bleeding (n,%)			
Yes	9 (17%)	8 (19%)	0.8
No	45 (83%)	35 (81%)	
Need for surgical treatment (n,%)			
Yes	1 (2%)	4 (9%)	0.099
No	53 (98%)	39 (91%)	
Need for transfusion, unit (avg ± SD)	3.7 ± 2.11	3.4 ± 2.95	0.62
Duration of hospitalization, day (avg ± SD)	4.6 ± 2.24	5.3 ± 3.23	0.21

HPC: Heater probe coagulation; APC: Argon plasma coagulation; avg: Average; SD: Standard deviation.

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