

Evaluation of the Efficacy of Endoscopic Hemostasis with Argon Plasma Coagulation Plus Injection Sclerotherapy and Injection Sclerotherapy Alone in Acute Non-variceal Upper Gastrointestinal Bleeding

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Abstract

Background: This study aims to evaluate the efficacy of endoscopic hemostasis with argon plasma coagulation (APC) plus injection sclerotherapy and injection sclerotherapy alone in acute non-variceal upper gastrointestinal (UGI) bleeding.

Materials and Methods: A prospective, randomized, hospital-based study of 100 subjects divided into two groups of A and B of 50 each, comprising those who received injection sclerotherapy alone and those who received APC in addition.

Results: About 94% patients in Group B had no rebleeding, compared to 76% in Group A carrying high statistical significance (Chi-square 5.563 and p 0.135). Majority of cases (6%) with rebleeding belonged to Forrest Class Ib from Group A. Mortality was more in Group A (4%) compared to Group B (2%). There were 11 (22%) patients in our study who rebled in the 1st week, 3 (6%) rebled in the 2nd week, and 1 (2%) rebled in the 3rd week. In our study, the patients who died had Rockall risk scoring system >6.

Conclusion: Injection sclerotherapy supplemented with APC is superior to injection therapy alone in the endoscopic treatments of non-variceal bleeding.

Key words: Argon plasma coagulation, Endoscopy, Hemostasis, Non-variceal bleeding, Sclerotherapy

INTRODUCTION

Upper gastrointestinal (UGI) bleeding represents a substantial clinical and economic burden, with reported incidence ranging from 48 to 160 cases/100,000 per year^[1,2] with mortality of 10–14%.^[3] The efficacy and safety of commonly used endoscopic hemostatic techniques have been reported, and early endoscopic intervention reduces the chances of rebleeding and has become the treatment

of choice.^[4-7] The injection therapy is easy to use, safe, and cheap but carries potential risk of perforation.^[8,9] This has a transient effect and may have cardiovascular risk when large volume is increased.^[10] Argon plasma coagulation (APC) is a special procedure of contact-free electrocoagulation in which energy is transmitted to the tissue through ionized conductive argon gas.^[11-16] There is little evidence that addition of other agents like sclerosants reduce the rate of rebleeding, and the use of these agents may cause life-threatening necrosis of the infectious sites.^[17,18] A single-center study from Srinagar showed that ulcer bleeding patients receiving high dose oral omeprazole therapy rebled less often and required less blood transfusions compared to controls.^[19]

We conducted the present study with the aim of evaluating efficacy of endoscopic hemostasis with APC plus injection

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sclerotherapy and injection sclerotherapy alone in acute non-variceal UGI bleeding.

MATERIALS AND METHODS

This prospective, randomized, and controlled trial was conducted in the Postgraduate Department of Medicine at the Government Medical College, Srinagar - a tertiary center of Jammu and Kashmir. The study included 100 patients. They were categorized into two groups of 50 subjects each: Those who received injection sclerotherapy and APC. All the patients admitted to the emergency department presenting with hematemesis, melena, or both were taken up for UGI endoscopy with 24 h of presentation/admission. Informed consent was obtained from each study subject for the therapeutic endoscopic intervention. Patients having variceal bleed, clearly malignant ulcers, Dieulafoy's lesion, or Mallory-Weiss tear were excluded from the study. Randomization of patients with two groups of A and B of 50 subjects each was done by sealed number envelopes. Group A received injectable epinephrine, 4–10 ml of 1:10,000 dilution around the ulcer. Subjects of the Group B received epinephrine injection as in Group A plus APC around the ulcer. Forrest classification^[20] was used for the endoscopic grading of lesions and also Rockall risk scoring system was applied.

Patients were followed weekly for next 4 weeks after initial hemostasis to monitor the bleeding. During stay at home, patients were contacted telephonically for rebleeding in the form of hematemesis, melena, or both and were advised to contact the nearest hospital for immediate resuscitation, preferable our center. The efficacy of endoscopic hemostasis in both groups was assessed.

Statistical Analysis

The analysis was conducted by experienced statistician using Statistical Package for the Social Sciences (SPSS, Ver. 20). Continuous data were expressed as mean ± standard deviation and categorical data as percentage. Chi-square test was used wherever necessary and $P < 0.05$ was considered statistically significant.

RESULTS

Of 100 study subjects, 88% were male. Among the subjects of Group A, 20% had comorbid illness such as chronic obstructive pulmonary disease (5%), hypertension and chronic kidney disease (5%), cardiovascular disease (7%), and hypertension (16%) and subjects of Group B had comorbid illnesses. Majority of subjects belonged to Forrest Class IIa [Table 1] carrying high statistical significance (Chi-square 2.938; $P = 0.401$). Duodenal ulcer was the most common site (Group A, 74%; Group B, 66%), followed by gastric (20% and 28%) and prepyloric ulcer (2% vs. 4%) among the two groups. In our study, in Group A, 39 (78%) patients were having Rockall's score of 3, 1 (2%) having Rockall's score of 5, 7 (14%) having Rockall's score of 6, 2 (4%) having 7 Rockall's score, 1 (2%) having 8 Rockall's score Table 3. In Group B, 40 (80%) were having Rockall's score of 3, 2 (4%) having Rockall's score of 5, 5 (10%) were having Rockall's score of 6, 1 (2%) having Rockall's score of 7, 2 (4%) having Rockall's score of 8 Figure 1. Mortality was more in Group A compared to Group B (8% vs. 2%) that was statistically high significant ($P < 0.0001$). Mortality was more observed in subjects belonging to Forrest Ib. In both groups, patients who underwent surgery had Rockall score of 3.

Table 1: Forrest classification of the study population

Forrest classification	n (%)	Group		Total
		Injection sclerotherapy	Injection sclerotherapy+APC	
I a	n (%)	1 (2.0)	2 (4.0)	3 (3.0)
I b	n (%)	20 (40.0)	21 (42.0)	41 (41.0)
II a	n (%)	19 (38.0)	12 (24.0)	31 (31.0)
II b	n (%)	10 (20.0)	15 (30.0)	25 (25.0)
Total	n (%)	50 (100.0)	50 (100.0)	100 (100.0)

Chi-square=2.938; $P=0.401$. APC: Argon plasma coagulation

Table 2: Mortality with respect to Forrest classification in both groups

Forrest classification	n (%)	Mortality			
		Group A		Group B	
		Yes	No	Yes	No
I a	n (%)	0 (0)	1 (2)	0 (0)	2 (4)
I b	n (%)	2 (4)	18 (36)	1 (2)	20 (40)
II a	n (%)	1 (2)	18 (36)	0 (0)	12 (24)
II b	n (%)	1 (2)	9 (18)	0 (0)	15 (30)
		Chi-square = 0.443; $P=0.931$		Chi-square = 1.409; $P=0.703$	

Table 2 in group A, the patients who died, 2 (4%) patients were having Forrest Ib classification, 1 (2%) patients was having Forrest IIa, 1 (2%) patient was having Forrest IIb classification. In group B, the patient who died was having Forrest Ib classification.

Table 4 in group A, the patients who died, 1 (2%) patient was having Rockall's score of 6, 2 (4%) patients were having Rockall's score of 7 and 1 (2%) patient was having Rockall's score of 8. In group B, the patient who died was having Rockall's score of 8.

Table 5 in group A, 10 (20%) patients were having comorbid illness and out of which 4 died. In group B, 8

(16%) patients were having comorbid illness out of which 1 patient died.

Table 6 in our study, 11 (22%) patients rebled in first week, 3 (6%) patients rebled in second week and 1 (2%) rebled in third week.

DISCUSSION

Up to 80% of duodenal ulcers and 50% gastric ulcers are due to *Helicobacter pylori*.^[21] Nonsteroidal anti-inflammatory agents are next in order. Although bleeding stops spontaneously in 80% of cases, 20% will still have

Table 3: Rockall score of the study population

Rockall score		Group		Total
		Injection sclerotherapy	Injection sclerotherapy+APC	
3	n (%)	39 (78.0)	40 (80.0)	79 (79.0)
5	n (%)	1 (2.0)	2 (4.0)	3 (3.0)
6	n (%)	7 (14.0)	5 (10.0)	12 (12.0)
7	n (%)	2 (4.0)	1 (2.0)	3 (3.0)
8	n (%)	1 (2.0)	2 (4.0)	3 (3.0)
Total	n (%)	50 (100.0)	50 (100.0)	100 (100.0)

Chi-square = 1.346; P=0.854. APC: Argon plasma coagulation

Table 4: Mortality with respect to Rockall score in studied subjects

Rockall score		Mortality			
		Group A		Group B	
		Yes	No	Yes	No.
3	n (%)	0 (0%)	39 (78)	0 (0)	40 (80)
5	n (%)	0 (0)	1 (2)	0 (0)	2 (4)
6	n (%)	1 (2)	6 (2)	0 (0)	5 (10)
7	n (%)	2 (4)	0 (0)	0 (0)	1 (2)
8	n (%)	1 (2)	0 (0)	1 (2)	1 (2)

Chi-square = 6.42; P=0.040 Chi-square = 3.42; P=0.180

Table 5: Mortality of patients in the studied groups with relation to comorbid illness

Group	Comorbid illness	Mortality	
		Yes	No
A	Yes (%)	10 (20)	4 (8)
	No (%)	40 (80)	6 (12)
B	Yes (%)	8 (16)	0 (0)
	No (%)	42 (84)	7 (14)

Chi-square = 17.39; P ≤ 0.0001 (Group A); Chi-square = 5.35; P = 0.021 (Group B)

Table 6: Profile of rebleeding

Follow-up		Group		Total
		Injection sclerotherapy	Injection sclerotherapy+APC	
Rebleeding	Number rebleeding (%)	38 (76.0)	47 (94)	85 (85.0)
Bleeding 1 st week	n (%)	8 (16.0)	3 (6.0)	11 (11.0)
Bleeding 2 nd week	n (%)	3 (6.0)	0 (0.0)	3 (3.0)
Bleeding 3 rd week	n (%)	1 (2.0)	0 (0.0)	1 (1.0)
Total	n (%)	50 (100.0)	50 (100.0)	100 (100.0)

Chi-square=5.563; P=0.135. APC: Argon plasma coagulation

continuous bleeding.^[22] Early endoscopic intervention reduces rebleeding and has become the treatment of choice.^[7] Injection is easy to use, is cheaper but carries the risk of perforation.^[8,9,23] Majority of our cases were males, in a similar way to observations of Longstretch and Feitelberg, where they found the UGI bleeding occurs more frequently with advanced age.^[24] Data suggest that early endoscopy is safe and effective for all risk groups. A systemic review by Spiegel *et al.* observed no major complications in patients triaged to outpatient care after early endoscopy.^[25] Previously, it was found that although pre-endoscopic proton-pump inhibitor therapy has not been shown to affect rebleeding surgery or mortality and has been found useful in those suspected of having high-risk stigmata.^[26]

In our study, less chances of rebleeding and mortality were found in cases of Group B; however, opposites were the findings of Skok *et al.*^[27] Chau *et al.* found that epinephrine injection plus APC is safe and effective in the treatment of patients with high risk of bleeding peptic ulcers.^[28] In a similar way, previous studies have found APC a safe, quick, and effective method of treating non-variceal UGI bleeding and concluded that it can be a powerful tool for endoscopic hemostasis.^[13,29,30] However, large sample studies are needed in future to widen the spectrum of these therapeutic modalities.

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