Original Research Article

Injection adrenaline plus Heater probe coagulation or Injection adrenaline plus Argon plasma coagulation in nonvariceal upper gastrointestinal bleeding

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Abstract

Aim: To compare the effectiveness of Injection adrenaline plus Heater probe coagulation versus Injection adrenaline plus Argon plasma coagulation in the management of non variceal upper gastrointestinal bleeding.**Methods:** 115 patients admitted with gastrointestinal bleeding due to gastric, duodenal and stoma ulcers were included in the study. Upper endoscopy was performed and injection adrenaline plus HPC (group A) and injection adrenaline plus APC (group B) were chosen randomly to achieve hemostasis. Initial hemostasis and rebleeding rates were primary and secondary endpoints of this study**. Results:** Initial hemostasis was achieved in 96.6% (57/59) of group A and 96.4% (54/56) of group B patients. Among group A 7% (4/57) cases had rebleed while in group B only 1.9% (1/54) had rebleed after upper GI endoscopy within 72 hours of observation within hospital stay.**Conclusion:** Both methods are almost equally effective in achieving hemostasis and preventing future risk of rebleed in nonvariceal upper GI bleed.

Keywords: Adrenaline,plasma

Introduction

Upper gastrointestinal bleeding (UGIB) represents a substantial clinic and economic problem, with reported incidence ranging from 48-160 cases per I lakh per year and mortality generally from 10-14%[1-5].Upper gastrointestinal bleed is defined as bleeding proximal to the ligament of Treitz. The endoscopic management of gastrointestinal (GI) hemorrhage consists of injection therapy (with epinephrine or cyanoacrylate and other sclerosing agents), endoscopic thermal therapy, mechanical modalities such as hemoclips and over-the-scope-clips, and more recently, topical hemostatic sprays[6-9].Endoscopic hemostasis has significantly improved the outcome of patients with gastrointestinal bleeding. Contact thermal coagulation with heater probe and argon plasma coagulation (APC) are among the hemostatic methods for bleeding peptic ulcers. Devices are applied directly to the bleeding point to cause coagulation and thrombosis in heater probe coagulation (HPC). The heater probe is pushed firmly on to the bleeding lesion to apply tamponade and deliver defined pulses of heat energy. APC is a non-contact method of delivering high-frequency monopolar current through ionized and electrically conductive argon gas[10-12].Endoscopic hemostasis was assumed to be achieved after more than 20 seconds of stoppage of bleeding of lesions in nonvariceal upper GI bleeding. The aim of this study was to compare these two methods for UGIB due to gastric, duodenal and stomal ulcers. The primary outcome measure was achieving hemostasis and secondary outcome measure was recurrence of bleeding.

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Materials and methods

The study was conducted in the Department of Gastroenterology, Sher-i-Kashmir Institute of Medical Sciences, Srinagar, India, from July 2015 to May 2017.

Patients presenting with upper gastrointestinal bleeding were enrolled in the study. After fluid resuscitation, proton pump inhibitor in the form of pantoprazole 80mg per day intravenous for first 24 hours followed by 80mg twice daily oral for 48 hours, the patients underwent upper gastrointestinal endoscopy within 12 hours of admission. Only patients with duodenal, gastric, or stomal ulcers and stigmata of recent hemorrhage were enrolled in the study. Stigmata of recent hemorrhage were spurting vessels, active bleeding in an ulcer, a visible vessel, or a clot over the ulcer that could not be dislodged upon gentle washing with water delivered through the endoscope channel[13-15]..Patients were excluded from the study if they had terminal cancer, were moribund as a result of concomitant illnesses, coagulopathy, could not provide legal consent and age < 18 years. Patients were randomly assigned to receive Injection adrenaline plus Heater probe coagulation (Group A) or Injection Adrenaline plus Argon Plasma Coagulation (Group B). Randomization was carried out in the endoscopy laboratory using sealed opaque envelopes. Every patient was serially monitored for vital signs, hemoglobin concentration, need for blood transfusion, need for surgery, and length of hospital stay. Demographic features, comorbid illnesses, initial hemoglobin level, smoking status, and use of non steroidal anti-inflammatory drugs (NSAIDs), were recorded. Eligible patients underwent upper gastrointestinal endoscopy and received dual therapy either injection adrenaline (1: 10000) plus heater probe coagulation or injection adrenaline plus Argon Plasma Coagulation (APC). Adrenaline injection (5-6 mL, 1:10000 dilution) was injected around the ulcer in all patients

followed by coagulation either by Heater probe or APC. An Olympus HPU-20 heater probe system with 10 F probes was used with power settings of 25-30 J. The heater probe was pushed firmly on to the bleeding lesion to apply compression and to cause thrombosis followed by coagulation. Usually 3-4 pulses of 25 Joules were sufficient to achieve coagulation.

American CONMED 7550 Electrosurgical unit was used for Argon plasma coagulation. which consists of an argon gas source, a high-frequency electrosurgical unit, an APC probe, and foot switches to activate the argon gas source and current generator. Operative distance between the probe and tissue was usually adjusted to 2-10 mm by sense of proportion (Technically, APC cannot be activated unless the tip of the probe is at least 2-10 mm distant from the ulcer region). Power/gas flow settings were 40 W and 2 SLPM. All endoscopists used the same settings on the instrument. Initial hemostasis was defined as cessation of active bleeding. All the patients were treated with the same protocol after the endoscopic procedure. A policy of early feeding was adopted, and intravenous Pantoprazole was prescribed at a dose of 80 mg/d.for first 24 hours followed by oral Pantoprazole 80 mg twice daily for next 48 hours Primary failure was defined as failure to stop bleeding during initial endoscopy. Recurrent bleeding was defined by one of the following: 2 g/dL drop in hemoglobin value compared to that when the patient was discharged from hospital; fresh hematemesis; hypotension (systolic blood pressure < 90 mm Hg) with tachycardia (pulse > 110 beats/min); or melena after endoscopic treatment. Patients who did not have initial hemostasis were excluded during evaluation of rebleeding rates. Patients who remained stable for 72 hours were discharged to receive Oral Pantoprazole 40 mg BD for 2 more days followed by once a day for 5 weeks.

Results

During the study period, 115 patients with duodenal, gastric, or stomal ulcers presented with upper gastrointestinal bleeding were included in the study. Randomization resulted in 57 patients in the Group A and 54 patients in Group B. 102 of those had stigmata of recent hemorrhage. In 4 patients hemostasis couldn't be achieved.3 patients needed hemoclips to stop the bleeding. 1 patient required surgery to arrest the bleeding. Arterial spurt was seen in 3 patients, active ooze of blood in 53 patients, visible vessel was seen in 31 patients and adherent clot was seen in 15 patients and 9 patients had haematin covered flat spot. Initial hemostasis was achieved in 96.6% (57/59) of group A and 96.4% (54/56) of group B patients.

Table 1: Showing initial hemostasis achieved on upper GI endoscopy in two groups

Initial Hemostasis Achieved	Group A		Group B		P-value
	No.	%age	No.	%age	
Yes	57	96.6	54	96.4	0.958
No	2	3.4	2	3.6	
Total	59	100	56	100	

Fig 1:Initial hemostasis achieved on upper GI endoscopy in two groups

In this study among group A 7% cases (4/57) had rebleed after upper GI endoscopy within 72 hours of observation within hospital while in group B only 1.9% cases (1/54) had rebleed after upper GI endoscopy within 72 hours of hospital stay.

Table 2: Showing rebleed after receiving endoscopic therapy within hospital stay or six weeks after discharge from hospital among two groups

Rebleed	Group A		Group B		P-value
	No.	%age	No.	%age	
Yes	4	7.0	1	1.9	0.364
No	53	93.0	53	98.1	
Total	57	100	54	100	

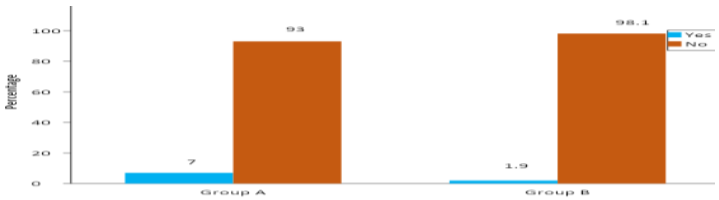

Fig 2:Rebleed after receiving endoscopic therapy within hospital stay among two groups

Discussion

Upper gastrointestinal bleeding (UGIB) represents a medical emergency where hospital mortality generally ranges from 10-14%. Bleeding stops spontaneously in around 80% of patients of nonvariceal upper GI bleed. Although epinephrine injection is sensibly less effective than other forms of endotherapy in terms of prevention of recurrent bleeding, it still is among the most popular endoscopic therapies because of its safety, low cost, and ease of application. Meta-analysis have shown that combination endoscopic hemostasis therapy (dilute epinephrine injection combined with a second hemostasis modality including injectable, thermal contact probe, or clips) is superior to injection therapy alone, but not to clips or contact thermal therapy alone. Combined injection therapy plus thermal probe coagulation treatment is increasingly being offered as the gold standard of endoscopic hemostasis in referral centers. The rationale of combination therapies is to further improve the results

obtained with individual treatments. Contact thermal coagulation with heater probe and argon plasma coagulation (APC) are among the hemostatic methods for bleeding peptic ulcers. Devices are applied directly to the bleeding point to cause coagulation and thrombosis in heater probe coagulation (HPC). The heater probe is pushed firmly on to the bleeding lesion to apply tamponade and deliver defined pulses of heat energy. APC is a non-contact method of delivering high-frequency monopolar current through ionized and electrically conductive argon gas. APC is intended for thermal coagulation of tissues and was originally developed as a thermal method, alternative to laser in open and laparoscopic surgery[13-18]. APC was adapted for use in flexible endoscopy in the early 90s APC applies high frequency (HF) current to a pre located tissue in a non-contact mode, despite other thermal coagulation methods. According to this method, argon gas is substituted for the usual electrical current. The whole device includes an argon source, an HF current source and the appropriate applying catheter. The APC catheter contains an electrode. A second neutral electrode patch is placed at the hip of the patient. As soon as sufficient HF voltage is generated between the first electrode and the tissue, argon gas flows out of the catheter and becomes ionised in the high voltage electric field that has been created. Thus, argon gas is transformed to plasma beams and HF current completes the electrical circuit via the second neutral electrode patch. The heat which is generated devitalises, coagulates, desiccates and ultimately shrinks the tissue. There are two APC systems available on the market, the ERBE Elektromedizin, Tubingen, Germany; and Conmed, Utica, N.Y. The ERBE type includes an electrosurgical unit that generates a high frequency electrical current, an argon gas cylinder and a gas flow meter. The whole APC apparatus is accompanied by a foot switch to activate both HF current source and gas. There are two types of probe catheters to deliver the argon plasma beam parallel or perpendicular to the catheter axis. These catheters are covered with teflon material and are disposable. There are two sizes available; 2.3 mm in diameter 2.2m length and 3.2 mm-2.2 m. According to the manufacturer´s manual the ERBE argon flow varies from 0.1 L/min to 9 L/min. Heater probe (HP) therapy involves the use of a probe consisting of a teflon-coated hollow aluminium cylinder with an inner electronic heating coil. It has the advantage of providing tamponade as well as heat for coagulation. Water may be simultaneously injected to clear the field. Power is computer-controlled for a precise regulation of the probe temperature . The probe must be pushed directly and firmly into the bleeding point to effectively tamponade it. Coagulation is' produced after three to four pulses. If bleeding does not stop the probe is repositioned and the procedure repeated. Its relative ease of operation, portability, and low complication rate make it a valuable technique. Kanai M, Hamada A et al concluded that APC is a safe, quick and effective method of treating various types of nonvariceal upper gastrointestinal bleeding and that it can be a powerful tool for endoscopic hemostasis. Kwan V,Bourken MJ et al concluded that APC is effective and safe in the management of gastrointestinal vascular lesions. We found no significant difference between group A who received injection adrenaline plus heater probe coagulation and group B who received injection adrenaline plus Argon plasma coagulation as a part of their upper GI endoscopic therapies. Mete Akin et al in their study also observed similar results in terms of rebleeding rates(17% vs 19%) and initial hemostasis(98% vs 97.5%) respectively in heater probe and argon plasma groups with p>0.05.Ahmet karaman et al also found similar results in their study with rebleeding rates of 2.4%(1/42) and 8.3%(3/36) in APC and HPC groups respectively with p>0.05. Cipolletta L et al in their study found similar results in terms of initial hemostasis (95.2% vs 95%) and rebleeding rate (21% vs 15%).

Conclusion

Both methods are almost equally effective in achieving hemostasis and preventing future risk of rebleed in nonvariceal upper GI bleed.

Conflict of Interest: Nil Source of support:Nil

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