

GASTROINTESTINAL ENDOSCOPIC HEMOSTASIS. CLINICAL STUDY

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Abstract: Gastrointestinal bleeding is one of the diseases which often require emergency medical assistance, both for adults and children. This pathology also requires a well determined diagnosis and therapeutical strategy. Successful hemostasis is directly dependent on the applied method of treatment. The patient comfort and the quality of life after the medical care are directly dependent on the method of hemostasis, mininvasive or not. The hemostasis endoscopic access is effective in the majority of cases. The procedure success depends on bleeding characteristics, location and its degree of visibility in the endoscopic placement. We present a prospective study which included patients diagnosed with various causes of gastrointestinal bleeding and solved by endoscopic hemostasis. The most common method was the injection one, although the best definitive efficiency has been found by mechanical method (p 0,000**), by band ligation, respectively. In some clinical conditions, the combination of methods appears to be extremely effective.

Cuvinte cheie:
hemoragie digestivă,
hemostază
endoscopică, metode de
hemostază endoscopică

Rezumat: Hemoragia digestivă este una din afecțiunile pentru care se solicită frecvent asistența medicală de urgență, atât pentru populația adultă, cât și pentru cea pediatrică. Patologia în cauză necesită o strategie diagnostică și terapeutică bine determinată. Succesul hemostazei depinde direct de metoda de tratament aplicată. Confortul pacientului și calitatea vieții după efectuarea actului medical sunt direct dependente de mininvazivitatea metodei de hemostază. Accesul endoscopic cu hemostază este în majoritatea cazurilor eficient. Succesul procedurii depinde de caracteristicile sursei de hemoragie, localizarea și gradul ei de vizibilitate în câmpul endoscopic. Este prezentat un studiu prospectiv ce a cuprins pacienți diagnosticați cu hemoragie digestivă de diverse cauze rezolvate prin hemostază endoscopică. Cea mai frecventă metodă a fost cea injectabilă, deși cea mai bună eficiență definitivă a fost constatată prin metoda mecanică (p 0,000**), respectiv prin bandare. În unele situații clinice, combinarea metodelor pare să fie extrem de eficace.

INTRODUCTION

Superior and inferior gastrointestinal bleeding are considered (1) major emergencies in adult and children, arguing the necessity of intervention of the gastroenterologist, surgeon and the specialist in interventional endoscopy for the accuracy of diagnosis and, especially for the prompt and adequate therapeutic approach.

PURPOSE

1. To evaluate the endoscopic hemostasis possibilities in gastrointestinal bleeding.
2. To evaluate the efficacy of the various methods of endoscopic hemostasis related to the source and location of bleeding.
3. To evaluate the importance of the degree of visibility of endoscopic placement, for a good efficiency of hemostasis.
4. To elaborate and implement a practical algorithm of endoscopic manoeuvres based on the degree and activity of bleeding and the visibility of operating placement.

METHODS

The prospective study was performed on a batch of 128 patients, aged between 12-76 years old, treated in No. 6 Internal Diseases Clinic, Occupational Diseases Discipline, „Nicolae Testemițanu” State University of Medicine and

Pharmacy, Chișinău, between 2010-2013.

The study group has included all gastrointestinal bleeding diagnosed by the gastroenterologist and the specialist in gastrointestinal endoscopy and solved by endoscopic and surgical procedures.

The study was performed with 145 Olympus Exera and 150 Olympus equipments, GIF Q145, GIF 2T100, CF150L, JF 1T20, JF140, TJF130 endoscopes, Walleilab SSE2L electrosurgery system. Mostly, the following have been used: Saaed multi-band ligator, COOK[®] Medical, Endo-Loop and Poly-Loop (Olympus Medical Corporation), Pauldrach medium endoscopic clips, Olympus HX-200U-135 Disposable Clip fixing device, OVESCO clip, SX-ELLA Danis stent. For injection method, there have been used: 1:10.000 Epinephrine solution, autologous plasma, human Thrombin 12,5 U/mL.

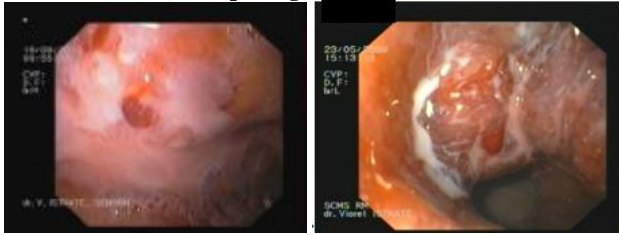
The degree of visibility (dependent on sharpness of placement field and needful for hemostasis) was assessed by Lee SH scale: (2) 1 gr. – clear endoscopic visibility; 2 gr. – slow hemorrhage, small volume, no lavage requiring; 3 gr. – significant hemorrhage, permanent lavage requiring; 4 gr. – deep hemorrhage.

The needed preventive hemostasis was performed by spraying or injecting of local 1:10.000 Epinephrine solution, to produce vasoconstriction. The hemostasis efficacy was evaluated by Maalox test (see, figure no. 1).

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Figure no. 1. Maalox test for the evaluation of the quality of local hemostasis, endophotography



RESULTS

The gastrointestinal bleeding pathology presented by the patients of the study was the following: esophageal varices (EV), gastric varices (GV), Mallory-Weiss syndrome (MWS), Dieulafoy syndrome, DS (3), postmasectomy wound (PMW), gastric/intestinal ulcer (GU), tumoral distructions (TD), Oddian sphincterotomy hemorrhage (OSH), endoscopic papillectomy hemorrhage (EPH), telangiectasia hemorrhage (TH), haemorrhoidal hemorrhage (HH).

Of 128 patients in the study, 19 finally required surgical hemostasis, in 109 patients (85,15 %) endoscopic hemostasis was considered as effective hemostatis.

The used methods of endoscopic hemostasis were the following:

- mechanical
 - o band ligation, at 35 patients (18, in EV; 5, in GV; 1, in DS; 1, in PMW; 10, in HH),
 - o ligation, at 8 patients (4, in GV and 4, in HH),
 - o clamping, at 17 patients (2, in GV; 3, in MWS; 5, in PMW; 5, in GU; 1, in OSH; 1, in EPH),
 - o OVESCO clamping, at 1 patient with PMW,
 - o stenting, at 1 patient with GV,
- injection
 - o epinephrine injection, in 20 patients (2, in MWS; 2, in DS; 16, in PMW),
 - o epinephrine spraying, in 39 patients (30, in GU; 6, in OSH; 3, in EPH),
 - o thrombin injection, in 49 patients (4, in MWS; 6, in PMW; 26, in GU; 5, in TD; 4, in OSH; 3, in EPH and 1, in TH),
- coagulation
 - o bipolar, in 22 patients (6, in MWS; 3, in PMW; 8, in GU; 3, in OSH and 2, in TH),
 - o monopolar, in 17 patients (3, in DS; 10, in GU; 4, in TD),
 - o monopolar forceps, in 12 patients (8, in PMV; 4, in OSH).

The results of endoscopic hemostasis were: definitive efficacy, temporary efficacy, ineffective.

4 hemostasis methods were used in EV (all mechanical):

- band, in 18 patients, 17 with definitive efficacy (94,44%), ineffective hemostasis for only one patient,
- ligation, in 4 patients, all with definitive efficacy,
- clamping, in 2 patients, 1 with definitive efficacy, 1 ineffective,
- stenting, in only one patient (with definitive efficacy).

Only band ligation was used in GV, with 100 % definitive efficacy (5 patients).

4 endoscopic hemostasis methods were used in MWS (mechanical, injection and coagulation):

- injection of epinephrine, in 2 patients, 50 % definitive efficacy (1 patient with definitive efficacy and 1 patient with temporary efficacy),
- injection of thrombin, in 4 patients (1 patient with

definitive efficacy, 2 with temporary efficacy and 1 ineffective),

- bipolar coagulation, in 6 patients, with 83,33 % definitive efficacy (5 patients with definitive efficacy and 1 patient ineffective),
- clamping, in 3 patients, with 100 % definitive efficacy.

3 endoscopic hemostatic methods were used in DS (mechanical, injection and coagulation): injection of epinephrine, in 2 patients, with 50 % definitive efficacy, monopolar coagulation, in 3 patients, with 66,67 % definitive efficacy and band ligation at one only patient, with definitive efficacy.

7 endoscopic hemostasis methods were used in PMW (mechanical, injection and coagulation):

- injection of epinephrine, in 16 patients, all with temporary efficacy,
- injection of thrombin, in 6 patients, with 66,67 % definitive efficacy,
- monopolar coagulation, in 8 patients, with 100 % definitive efficacy,
- bipolar coagulation, in 3 patients, with 66,67 % definitive efficacy,
- clamping, in 5 patients, with 100 % definitive efficacy,
- OVESCO clamping and band ligation, in each 1 patient, with 100 % efficacy.

5 endoscopic hemostasis methods were used in GU (mechanical, injection and coagulation):

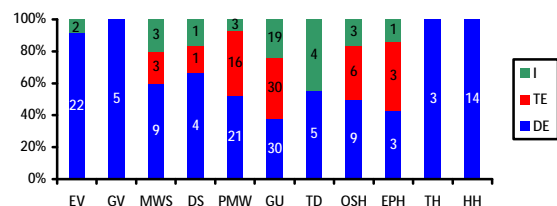
- epinephrine spraying, in 30 patients, with 100 % temporary efficacy,
- injection of thrombin, in 26 patients, with 38,46 % definitive efficacy (10 patients with definitive efficacy and 16 patients - ineffective),
- monopolar coagulation, in 10 patients, with 80 % definitive efficacy,
- bipolar coagulation, in 8 patients, with 87,5 % definitive efficacy,
- clamping, in 5 patients, with 100 % definitive efficacy.

Injection of thrombin (in 5 patients, 80 % ineffective) and monopolar coagulation (in 4 patients, with 100 % efficacy) were used in TD.

5 endoscopic hemostasis methods were used in OSH (mechanical, injection and coagulation):

- epinephrine spraying, in 6 patients (100 % ineffective),
- injection of thrombin, in 4 patients, with 50 % definitive efficacy,
- monopolar coagulation, in 4 patients, with 100 % definitive efficacy,
- bipolar coagulation, in 3 patients, with 66,67 % definitive efficacy,
- clamping, at only one patient, with definitive efficacy.

Figure no 2. Study group results regarding gastrointestinal hemorrhage causes



Epinephrine spraying (in 3 patients, 100 % ineffective), injection of thrombin (in 3 patients, with 66,67% definitive efficacy) and clamping, in only one patient, with 100

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% efficacy were used in EPH.

Injection of thrombin (in 1 patient, with 100 % definitive efficacy) and bipolar coagulation (in 2 patients, with 100 % definitive efficacy) were used in TH.

Band ligation (at 10 patients) and ligation (in 4 patients), both with 100 % definitive efficacy, were used in HH.

DISCUSSIONS

The literature data provide information about unlimited access of the modern endoscopic equipment, at any location of gastrointestinal hemorrhagic source, actually, the endoscopic maneuvers being able to create difficulties at apparatus positioning to the source of bleeding, or at endoscopic inversion in the gut, or at the selection of the hemostasis method.

According to literature, the hemostatic efficacy of local vasoconstriction consecutive to *injection technique* is debatable.(4) In addition, the hemorrhage may reoccur if the injected hemostasis agent is not supplemented with a mechanical hemostasis one. The adrenaline or epinephrine endoscopic spraying and injection are useful in order to stabilize for short time the local situation to improve the endoscopic visibility of operating filed [Lee SH, 2004].

The *monopolar endoscopic coagulation* is characterized by the deep spread of necrosis area, requiring to be done by submucosal injection lifting protection. The *bipolar coagulation* is more effective because the necrosis area is limited between the two electric poles of the applied instrument. The electrocoagulation instrument by direct tissue contact often involves the rupture of clot, thus inducing rebleeding, and repeated coagulation increases the risk of deep tissue damage and subsequent perforation. Laser and argon plasma electrocoagulation are modern and effective techniques and assume special equipment.

Endoscopic techniques which offer a definitive hemostasis are band ligation with special rubber rings, Endo-Loop or Poly-Loop ligation, endoscopic clamping, stenting compressive hemostasis. The hemostatic rings are very effective in hemorrhagic EV, PMW, EPH, DS (under protection) and HH. In cases which require a single band ligation, Endo-Loop and Poly-Loop ligations are very effective. The advantage of Poly-Loop ligation consists on possibility to be applied before removing of a pedunculate polyp, by base ligation of polyp, for hemorrhage prevention purpose. A very effective method to stop a deep hemorrhagic esophageal varices seems to be temporary applied of Danbis stent. In addition, Danbis stent offers a deeper hemostasis by local injection of sclerosant and embolization substances through endoscopy.

The *endoscopic clamping* is a safe method of *endoscopic hemostasis*, ineffective in rigid, tumoral, infiltrate and edematous tissues, in chronic ulcer hemorrhage, but very effective in acute ulcer hemorrhage, PMW, DS and hemorrhagic varices. The OVESCO clip is very expensive, but very useful in continuous hemorrhage. The OTSC OVESCO system is contraindicated in EV.(5)

Concluding on literature data related to selection of hemostasis method, seems that the most common method to induce definitive efficacy is the mechanical one, followed by injection method (if is supplemented by a mechanic factor), while the coagulation method can induce redoubtable complications (in absence of modern equipment).

In study lot, the most common used method was the injection one (108 patients, compared to 51 with coagulation method and 62 with mechanic method), because of its accessibility. Regarding the efficacy of the used techniques, the results are similar with literature: mechanical technique had

induced significant much more definitive effectiveness than the two other techniques (p 0,000**). Regarding mechanical method, band ligation was the most common procedure, but this procedure did not induce significant more definitive efficacy than two other mechanical procedures (p 0,59).

Within the injection method, the vasoconstriction duet o epinephrine injection has produced significant much more recurrences than thrombin (p 0,000**).

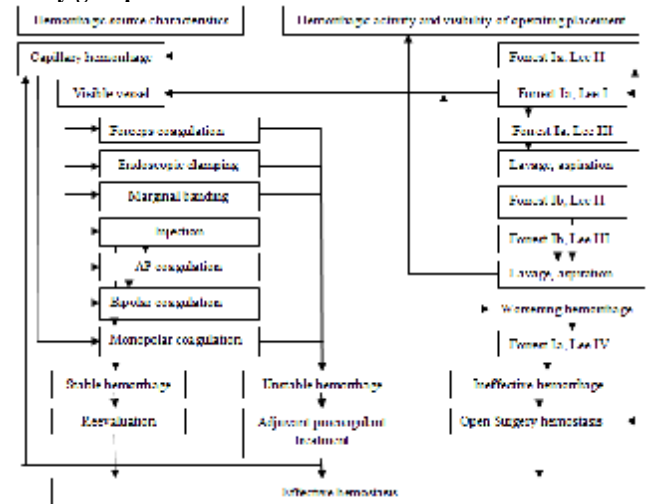
Within coagulation method, the definitive efficacy was induced more frequent after monopolar than bipolar coagulation, however the results not having statistical significance (p 0,44).

Remembering the difficulties encountered by the clinician in selecting the hemostasis method in the various clinical situation, the study revealed the same results like literature:

- none of the methods does not appear to be more effective in MWS (p 0,33),
- coagulation was by far the most effective method in PMW (p 0,003),
- the efficacy was significant definitive after coagulation method in GU (p 0,00001),
- no statistical significance between methods in OSH (p 0,04); in fact, the most recent literature data call attention about combination of methods: temporary hemostasis due to local spraying/injection, followed by definitive hemostasis due to coagulation, clamping or endoscopic stenting.

Base on the hemorrhage degree and activity and the visibility of operating placement, according to Lee SH, 2004 scale, was applied the endoscopic manoeuvres algorithm (see, figure no. 3).

Figure no. 3. Endoscopic manoeuvres algorithm used in the study group



The endoscopic manoeuvres algorithm, based on the hemorrhagic degree and activity and on the visibility of operating placement has improved the endoscopic hemostasis results in the study lot, from 80,2 % (81 pts., January 2010-June 2012) to 93,6 % (47 pts., July 2012-April 2013).

CONCLUSIONS

1. Endoscopic hemostasis represents the method of choice to stop gastrointestinal hemorrhage (esophagus, stomach, duodenum, including Vater area, bowel).
2. The endoscopy is decisive in hemorrhagic source localization, degree and activity of hemorrhage, contributing to the selection of the hemostatic method.

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3. The most common method was the injection one, although the best definitive efficiency has been found by the mechanical method (p 0,000**), by band ligation respectively.
4. The endoscopic manoeuvres algorithm has improved the endoscopic hemostasis results in the study group, from 80,2 % to 93,6 %.

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