Endoscopic Band Ligation versus Argon Plasma Coagulation in Treatment of Gastric Antral Vascular Ectasia

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Abstract: Objective: To evaluate the therapeutic effects of endoscopic band ligation (EBL) as a modality for the treatment of bleeding from gastric antral vascular ectasia (GAVE) in comparison to argon plasma coagulation (APC) in Egyptian patients. **Background:** Argon Plasma Coagulation (APC) is considered the standard commonly used treatment for Gastric antral vascular ectasia (GAVE). Recently, the use of banding in the gastric antrum has been evaluated for the treatment of GAVE. **Methods:** The study was conducted on thirty patients presenting with bleeding from GAVE. The patients were divided into two groups: Group I (EBL) group: 15 patients were subjected to EBL. Group II (APC) group: 15 patients were subjected to APC. Sessions were done every 3 weeks till satisfactory endoscopic ablation was achieved. Regular endoscopic assessment at 3 months was done with documentation of the recurrence of GAVE if found. **Results** revealed that thirteen patients were males and seventeen were females with age ranging from 51-70 years old. Most of the patients presented with overt bleeding (hematemesis and/or melena) (67%) in the APC group and (67%) in the EBL group. In endoscopic band ligation group, all patients (100%) showed complete improvement with no upper gastrointestinal endoscopic recurrence. In APC 10 patients, (67%) showed complete improvement with no upper gastrointestinal endoscopic recurrence, 5 patients (33 %) showed no upper gastrointestinal endoscopic improvement. **In conclusion**, EBL is a better treatment modality for GAVE than APC.

Key words: Argon Plasma Coagulation. Endoscopic Band Ligation. Gastric Antral Vascular Ectasia

1. Introduction:

Gastric antral vascular ectasia (GAVE) is considered rare cause of upper gastrointestinal bleeding**(1).** The etiology of gastric antral vascular ectasia remains unknown but theories include hypergastrenemia. A connective tissue disease has been suspected in some cases. Autoimmunity may have something to do with it, as 25% of all sclerosis patients who had a certain anti-RNA marker have GAVE. **(2).**

The diagnosis is mainly based on endoscopic pattern and, for uncertain cases, on histology. GAVE is characterized by a pathognomonic endoscopic pattern, mainly represented by red spots either organized in stripes radially departing from pylorus, defined as watermelon stomach, or arranged in a diffused-way, the so called honeycomb stomach.**(3**).

The endoscopic treatment of GAVE with argon plasma coagulation (APC) has been successful and provided an alternative treatment option to surgical antrectomy, but significant limitations as multiple treatment sessions and persistent bleeding are found**(4,5)** Recently, the use of banding in the gastric antrum has been evaluated for the treatment of GAVE.**(6).**

Our study was done to evaluate the therapeutic effects of endoscopic band ligation (EBL) as a modality for the treatment of bleeding from GAVE in comparison to argon plasma coagulation (APC) in Egyptian patients.

2. Patients and Methods

This study was conducted on thirty patients with overt or occult bleeding that proved endoscopically to be originating from gastric antral vascular ectasia (GAVE). The recruited patients attended the internal medicine department, Menoufia University from June 2016 to January 2017.

The patients were classified into two groups. Group I (Endoscopic band ligation (EBL) group) included 15 patients and were subjected to EBL sessions. Group II (Argon plasma coagulation (APC) group) included 15 patients and were subjected to APC sessions. An informed consent was obtained from all patients.

Patient demographics and pretreatment data were obtained from both the EBL and APC groups.

Pre treatment data including age, sex, bleeding type, and history of liver disease were obtained. Pre treatment Complete blood count (CBC), hepatitis C virus (HCV) antibody, hepatits B surface Ag (HBsAg) and fecal occult blood in stool were done.

In our study, EBL boston scientific band ligation sets were used which were applied to abnormal GAVE mucosa starting in the antrum followed by ligation proximally until as much as possible abnormal appearing mucosa be treated.

Standard APC equipment was used (ERBE Germany) an automatically regulated argon source (APC 300), the APC probe 2-3 mm Teflon coated catheter passing through the scope work channel with argon fluid 2 L / min. APC was applied to the lesion beginning at the pylorus and proceeding proximally.

Patients in both groups were reevaluated every 3 weeks. All patients underwent follow-up endoscopy at 3 months to assess the recurrence of GAVE.

Data on control of bleeding, hemoglobin levels before and after treatment, fecal occult blood test before and after treatment and upper gastrointestinal endoscopic improvement and recurrence of GAVE were obtained and compared between both groups.

Clinical, Laboratory data of the cases were tabulated.

Statistical analysis:

Data entry, coding, and analysis were conducted using SPSS (20), IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp. USA.

Statistical tests used:

- •Description of quantitative variables in the form of Mean and Stander Deviation (mean±SD).
- •Description of qualitative variables by frequency and percentage.
- Kruskal Wallis, to estimate the difference of 'Means" of more than two groups.
- Fisher exact test: to assess the relationship between two or more qualitative groups.
- The level of significance of our data were 95%, so, p value >0.05 was considered a non-statistically significant difference, while p value < 0.05 was considered a statistically significant difference. On the other hand, a p value <0.01 was considered a highly statistically significant difference.

3. Results

The study was done on 30 patients 13 patients (43.35%) were males and 17 patients (56.65%) were females with age ranging from 51-70 years old.

There was no statistical significance between endoscopic band ligation ligation (EBL) group and argon plasma coagulation (APC) group regarding laboratory investigations of studied groups 3 weeks

after the procedure. Mean hemoglobin (Hb) 3 weeks after endoscopic band ligation was 9.06 while after argon plasma coagulation was 9.51 with no significant difference between both (P value 0.711). Mean white blood cells (WBCs) 3 weeks after endoscopic band ligation was 6.62 while after argon plasma coagulation was 6.61 with no significant difference between both (P value 0.328). Mean platelet count 3 weeks after endoscopic band ligation was 90.1 while after argon plasma coagulation was 85.9 with no significant difference between both (P value 0.950). **(Table 1).**

Hemoglobin levels were significantly higher after 3 weeks in patients who underwent endoscopic band ligation and blood transfusion on admission. Mean Hb before endoscopic band ligation was 7.71 while mean Hb 3 weeks after the procedure was 9.06 which showed significant improvement (P value 0.001). Mean WBCs before endoscopic band ligation was 5.25 while mean WBCs 3 weeks after the procedure was 6.62 which showed no significant difference (P value 0.255). Mean platelet count before endoscopic band ligation was 92.7 while mean platelets 3 weeks after the procedure was 90.1 which showed significant improvement (P value 0.037).**(Table 2).**

Hemoglobin levels were significantly higher after 3 weeks in patients who underwent APC and blood transfusion on admission. Mean Hb before APC was 7.25 while mean HB 3 weeks after the procedure was 9.51 which showed significant improvement (P value 0.001). Mean WBCs before APC was 6.79 while mean WBCs 3 weeks after the procedure was 6.61 which showed no significant difference (P value 0.732). Mean platelet count before APC was 85.7 while mean platelets 3 weeks after the procedure was 85.9 which showed no significant difference (P value 0.431).**(Table 3).**

There was no statistical significance regarding fecal occult blood test (FOBT) in stool between endoscopic band ligation group and argon plasma coagulation group.

3 weeks after endoscopic band ligation 15 patients(100 %) showed negative fecal occult blood test while after argon plasma coagulation 14 patients(93.3%) showed negative FOBT with 1 patient(6.7%) showing positive FOBT with no significant difference between both EBL and APC regarding FOBT results 3 weeks after the procedure(P value 0.309).**(table 4).**

In endoscopic band ligation group, all patients (100%) showed complete improvement with no upper gastrointestinal endoscopic recurrence. In APC 10patients (67%) showed complete improvement with no upper gastrointestinal endoscopic recurrence, 5 patients (33 %) showed no upper gastrointestinal

endoscopic improvement. EBL showed better follow   up results than APC (p value 0.014). **(Table 5).**

Table (1): Laboratory investigations of studied groups 3 weeks after the procedure and blood transfusion on admission

Studied variables	Endoscopic Band Ligation group (N=15)	Argon Plasma Coagulation group (N=15)	Mann Whitney test	*P* value
	$\overline{X}$ ±SD	$\overline{X}$ ±SD		
HB (gm %)	9.06±0.87	9.51±0.41`	0.374*	0.711(NS)
WBCs (cell/cmm)×10^3	6.62±6.61	6.61±2.99	0.977	0.328(NS)
Platelet (cell/cmm)×10^3	90.1±39.3	85.9±30.6	0.062	0.950(NS)

χ^2= Chi square test   No=Number SD=Standard deviation   %=percentage *t-test **P value**: NS= non-significant (P-value > 0.05), S = significant (P-value ≤ 0.5) HS= highly significant (P-value ≤ 0.001**).** HB=hemoglobin, WBCs=white blood cells.

Table (2): Laboratory investigations before and after 3 weeks among endoscopic band ligation group

Studied variables	Endoscopic Band Ligation group		Wilcoxon test	*P* value
	Before	After		
	$\overline{X}$ ±SD	$\overline{X}$ ±SD		
HB (gm %)	7.71±1.33	9.06±0.87	6.35*	**0.001(HS)**
WBCs (cell/cmm)×10^3	5.25±3.22	6.62±6.61	1.13	0.255(NS)
Platelet (cell/cmm)×10^3	92.7±38.6	90.1±39.3	2.08	**0.037(S)**

χ^2= Chi square test   No=Number   SD=Standard deviation   %=percentage *t-test.
P value: NS= non-significant (P-value > 0.05), S = significant (P-value ≤ 0.05) HS= highly significant (P-value ≤ 0.001) HB=hemoglobin, WBCs=white blood cells.

Table (3): Laboratory investigations before and 3 weeks after argon plasma coagulation and blood transfusion on admission

Studied variables	Argon Plasma Coagulation group		Wilcoxon test	*P* value
	Before	After		
	$\overline{X}$ ±SD	$\overline{X}$ ±SD		
HB (gm %)	7.25±1.28	9.51±0.41`	7.16*	**0.001(HS)**
WBCs (cell/cmm)×10^3	6.79±3.44	6.61±2.99	0.342	0.732(NS)
Platelet (cell/cmm)×10^3	85.7±28.7	85.9±30.6	0.787	0.431(NS)

χ^2= Chi square test   No=Number   SD=Standard deviation   %=percentage *t-test.
P value: NS= non-significant (P-value > 0.05), S = significant (P-value ≤ 0.05).
HS= highly significant (P-value ≤ 0.001)HB=hemoglobin, WBCs=white blood cells.

Table (4): FOBT among studied groups (N=30):

FOBT	Endoscopic Band Ligation group (N=15)		Argon Plasma Coagulation group (N=15)		χ^2	*P* value
	No.	%	No.	%		
Before					-	-
Positive	12	80.0	12	80.0		
Negative	3	20.0	3	20.0		
After					1.03	0.309(NS)
Positive	0	0.00	1	6.7		
Negative	15	100	14	93.3		

χ^2= Chi square test   No=Number   SD=Standard deviation   %=percentage *t-test.
P value: NS= non-significant (P-value > 0.05), S = significant (P-value ≤ 0.05).
HS= highly significant (P-value ≤ 0.001) FOBT= fecal occult blood test.

Table (5): upper gastrointestinal endoscopic Follow up results for recurrence and need for further treatment sessions among studied groups (N=30):

F0llow up	Endoscopic Band Ligation group (N=15)		Argon Plasma Coagulation group (N=15)		χ^2	P value
	No.	%	No.	%		
Improvement (no recurrence)	15	100.0	10	66.7		
No improvement	0	0.00	5	33.3	6.00	**0.014(S)**

χ^2= **Chi square test   N0=Number   SD=Standard deviation   %=percentage   *t-test.**
P value: NS= non-significant (P-value > 0.05), S = significant (P-value ≤ 0.05).
HS= highly significant (P-value ≤ 0.001).

4. Discussion:

In our study the mean age of patients presented with gastric antral vascular ectasia (GAVE) was 61 years and it was more common in females (56.65%) than males (43.35%).

Selinger and Ang showed that the mean age of patients presenting with bleeding GAVE is 65 years and it was more common in males (75% of the patients were males) which does not consist with our results **(1).**

In our study, acute blood loss (hematemsis and/or melena) was in 20 patients(67%) in the APC group and EBL group while Abdelhalim and colleagues found that that hemorrhage acutely was in 11 patients(55%) in the APC group compared to16 patients(80%) in the EBL group which was consistent with our study.**(7).**

Fecal occult blood test (FOBT) results 3 weeks after both EBL and APC showed significant improvement (p value 0.001).

Hemoglobin levels were significantly higher in both APC group and EBL group 3 weeks after the procedure (p value 0.001).

In our study, all patients (100%) in EBL group revealed no upper gastrointestinal endoscopic recurrence. In APC 10 patients (67%) showed upper gastrointestinal endoscopic recurrence., 5 patients (33 %) revealed no upper gastrointestinal endoscopic improvement. EBL revealed better follow up results than APC (p value 0.014).

Wells and colleagues found that treatment of GAVE by EBL revealed better endoscopic outcome compared to APC **(6).**

Zeped-gomez et al, had a study on 21 GAVE patients treated by EBL and improvement was in 19 patients (91 %) while 2 patients(9 %) revealed no improvement and required further sessions with both EBL and APC which shows significant improvement with EBL treatment. EBL was easier maneuver when used for GAVE and revealed to be safe, with no major side effects **(8).**

Conclusion

Endoscopic band ligation is effective treatment modality for gastric antral vascular ectasia.

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