

Efficacy of Argon Plasma Coagulation in Gastric Vascular Ectasia in Patients with Liver Cirrhosis

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ABSTRACT

Objective: To determine the efficacy of Argon Plasma Coagulation (APC) in terms of improvement in hemoglobin level and disappearance of telangiectasia as endoscopic treatment for Gastric Antral Vascular Ectasia (GAVE) and Diffuse Antral Vascular Ectasia (DAVE) syndrome in liver cirrhosis.

Study Design: Quasi experimental study.

Place and Duration of Study: Department of Gastroenterology and Hepatology of Shaikh Zayed Hospital/ Federal Postgraduate Medical Institute, Lahore, from January, 2006 to July, 2007.

Methodology: Cirrhotic patient with gastric vascular ectasia were enrolled and followed-up for 18 months with repeated sessions of APC. Efficacy of APC was evaluated on the basis of patient's symptoms, transfusion requirements and hemoglobin levels. APC was performed by using ERBE generator set at 60 W and flow rate 2.0 L/min using primarily end-firing probes.

Results: Fifty patients were enrolled in the study. Mean age was 55.78 ± 1.24 years with 32 males and 18 females giving a male to female ratio 1.7:1. Forty two patients were in Child's Class C and 8 in Child's Class B. Presenting complaints were malena and anemia. Two hundred and fifty three APC sessions were carried out; mean 5.06 ± 1.5 sessions per patient. Mean follow-up period after the last session was 8.5 ± 3.7 months. Mean increase in the hemoglobin level was 1.35 ± 0.24 g/dl. There was no death of any patient during the study period.

Conclusion: Treatment with APC is an effective and safe method to decrease blood loss in patients with GAVE and DAVE.

Key words: Argon plasma coagulation. Cirrhosis. Gastric antral vascular ectasia (GAVE). Diffuse antral vascular ectasia (DAVE).

INTRODUCTION

Cirrhosis is defined as necrosis of liver followed by fibrosis and regeneration.¹ Hematemesis, malena, iron deficiency anemia are common features of cirrhosis.² Varices, portal gastropathy and gastric vascular ectasia are causes of bleeding in liver cirrhosis.³ Gastric vascular ectasia is an increasingly recognized cause of persistent acute or occult Gastrointestinal (GI) bleeding. Gastric Antral Vascular Ectasia (GAVE) and Diffuse Antral Vascular Ectasia (DAVE) are two major subdivisions of this syndrome and considered to be the same disease entity.⁴ In GAVE syndrome, telangiectasia are present in antrum whereas DAVE syndrome can involve any part of stomach or whole of stomach but histologically they are similar.⁵

This disorder often presents with severe iron deficiency anemia, and a variety of associated conditions including autoimmune disease, cirrhosis, achlorhydria, and hypochlorhydria.⁶ Endoscopically, patients present with

characteristic antral appearance so distinctive as to be diagnostic: longitudinal rugal folds traversing the antrum and converging on pylorus, each containing a visible convoluted column of vessels, the aggregate resembling the stripes on a watermelon; and, less prominently, evidence of mucosal prolapse.⁷

Biopsy findings are usually not required for diagnosis.⁸ The optimum treatment is not known. Several treatment options, including surgical antrectomy, and endoscopic photocoagulation with Nd: YAG laser, heater probe therapy, and bipolar electrocautery, have yielded excellent results. Pharmacological agents like corticosteroids, estrogen and progesterone have also been used to treat selected number of patients.⁶

Argon Plasma Coagulation (APC) is a non-contact thermal method of hemostasis. This technology uses argon gas of evenly distributed thermal energy to a field of tissue adjacent to the probe. A high voltage spark is delivered at the tip of probe, which ionizes argon gas as it is sprayed from probe tip in the direction of the target tissue. This ionized gas or plasma then seeks a ground in the nearest tissue, delivering thermal energy with a depth of penetration of roughly 2–3 mm. The plasma coagulates both linearly and tangentially. By delivering energy to all tissue near the probe tip, which will conduct electricity, APC can be used to treat a lesion around a fold and not clearly in view.⁹

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Recently, there have been reports, which have shown the efficacy of APC against gastric vascular ectasia, both GAVE and DAVE.¹⁰⁻¹³ The objective of this study was to determine the efficacy of APC in managing gastric vascular ectasia in liver cirrhosis.

METHODOLOGY

This quasi experimental study was carried out in the Department of Gastroenterology and Hepatology of Shaikh Zayed Hospital, Lahore, from January, 2006 to July, 2007. Cirrhotic patients of all ages and either gender presenting with anemia were included in this study. Patients with upper GI bleeding due to ulcer, bone marrow transplants, chronic renal failure, esophageal, gastric, duodenal erosions, bleeding tumour and Dieulafoy's lesion were excluded. Fifty cases were included by non-probability convenience sampling technique. Informed consent was taken.

Demographic characteristics were noted. General physical and systemic examination was done. Routine investigations including complete blood count, serum electrolytes, liver function tests, and renal function tests were performed. Baseline hemoglobin was recorded and upper GI endoscopy was performed by video endoscope, Olympus GIF 160. APC was performed by ICC 200 ERBE, using frequency of 60 Watt, and an argon gas flow of 2 L/min. Patients were followed up after 2 weeks as 2 weeks are needed for ulcerations of APC to get healed, during this period, patients were put on sucralfate and proton pump inhibitor. After 2 weeks, a repeat upper GI endoscopy was performed and findings recorded. Any improvement i.e. endoscopically demonstrated decrease in lesion extent size and intensity was noted and, if needed, another session of APC performed. Patients were followed-up every 2 weeks until complete disappearance of telangiectasia. Number of APC sessions to obliterate the vascular ectasia were noted in each case. Serial hemoglobin levels were performed at every session. Improvement in hemoglobin was noted at the end of all sessions. Every EGD session was video recorded for serial comparison subsequently. All findings were recorded in a specially-designed proforma.

Statistical analysis was performed by SPSS (version 15.0). Age, gender, liver cirrhosis staging, appearance of the lesion, disappearance of the lesion, number of sessions required and hemoglobin of the patients were the variables for study. Nominal variables (gender, child class A, B, C, appearance, disappearance of the lesion) were recorded as frequency/percentages and Chi-square test was applied. Numerical data was reported as mean \pm SD (age, number of session, hemoglobin level) and student's t-test was applied. The efficacy of APC was determined in terms of improvement in the hemoglobin level of the patient without blood transfusion and disappearance of the telangiectasia after APC sessions.

RESULTS

Of the 50 cirrhotic patients included in the study, 32 (64%) were males and 18 (36%) were females, male to female ratio was 1.7:1. Mean age was 55.78 \pm 8.79 years. Twenty five patients were in age group from 45-55 years, 19 patients in 55-65 years group, 4 were in 65-75 years group and 2 patients were in age group of 75-86 years.

All patients complained of lethargy, fatigue, exertional dyspnea and 14 patients gave history of melena. None (0%) of the 50 patients was in Child's Class A; 8 (16%) were in Child's Class B and 42 (84 %) were in Child Class C. A total of 253 APC sessions were performed (mean 5.06 \pm 1.5 sessions per patient, ranging from 3-9). Mean follow-up period, after the last session, was 8.5 months + 3.7 (45 days to 16 months). Thirty (60%), out of 50 patients, required repeated blood transfusions before APC, compared with only 6 (12 %) patients after treatment. Total blood transfusions were 45 units before APC i.e. average of 1.5 units per patient compared with only 7 units after APC i.e. an average of 0.23 units per patient. Forty two (84.0%) patients had an endoscopically observed response to therapy i.e. decrease in severity and intensity of lesion, 38 (76%) patients had a sustained rise in hemoglobin level after treatment ($p < 0.05$). Mean initial hemoglobin level was 7.46 g/dl compared with 8.81 after treatment ($p < 0.05$). The mean increase in the hemoglobin level was 1.35 \pm 0.24 g/dl ($p < 0.05$), which is statistically significant. There was no death of any patient during the study period.

DISCUSSION

Watermelon stomach or Gastric Antral Vascular Ectasia (GAVE) is a rare but well-recognized cause of gastrointestinal blood loss, which typically affects elderly women. Historically, patients were treated with antrectomy but this has been largely replaced by endoscopic therapy such as Nd: YAG laser. Argon Plasma Coagulation (APC) is a new non-contact electrocoagulation technique, which has several theoretical advantages over laser.¹⁴ In a recent study, APC was done by using high frequency generators, ICC 200 and ICC 300. With a high frequency of 60 Watt and an argon gas flow rate of 2 L/min, cauterization was carried out as an outpatient procedure. The only adverse effect was mild epigastric pain, which can occur during APC cauterization. No other serious complication was noted either during or after the treatment.⁵ In this study, the same APC generator and setting were used.

Grund *et al.* published the first series of clinical application of APC in GI endoscopy in 1994. They described the technique as successful in achieving objectives of treating lesions without complication.⁹ Since that time, several centres have reported experience with this technique demonstrating its safety

and efficacy in the management of GI bleeding.¹¹ Johanns *et al.* reported similar success in 59 out of 60 patients in whom APC was used to coagulate bleeding lesions.¹⁵ As with laser and direct contact bipolar electrocautery, serial treatments with APC have shown to reduce transfusion requirements and raise hemoglobin in patients with GAVE syndrome. No head to head comparison of techniques has been reported.

An average number of 5.06 ± 1.5 sessions of APC were performed per patient, which is comparatively more than reported by studies done in the past, in which the mean sessions for the APC were 3.2 and 2.8 respectively.^{16,17} However, there are studies in which the mean number of sessions is less i.e. 1.8.¹⁸ The number of sessions depends upon the severity of the lesions. A greater number of sessions in this study were probably due to the introduction of new technique in our set-up with less experience at the time of study.

The efficacy of APC has been evaluated in the past on the basis of patient symptoms, transfusion requirements and hemoglobin levels. Cohen reported an increase of hemoglobin from 9.1 to 11.6 gm/dl after APC sessions and a study done by Ter showed an increase in hemoglobin from 7.9 to 10.9 gm/dl.¹⁶ In this study, the increase in the hemoglobin was 1.35 ± 0.24 gm/dl i.e. from 7.46 gm/dl to 8.81 gm/dl after APC sessions. There was significant decrease in the severity and density of the endoscopically visible lesions, which is in concurrence with the past reports suggesting that resolution of the gastric telangiectasia could be achieved in all patients by endoscopic APC after 1 - 4 treatment sessions.^{10,11,19} APC in flexible endoscopy is a very effective and easy to perform technique without complications due to its limited depth of tissue penetration, which allows its application even in critical areas. It is superior to all other treatment options like hormone therapies, using corticosteroid and estrogen-progesterone and interferon therapy and endoscopic treatments, employing neodymium:yttrium-aluminum-garnet (Nd:YAG) laser, heater probe and bipolar electrocoagulation.^{5,20,21} There were no significant side effects due to the APC during the sessions and on 16 months follow-up after the sessions in our study. Further long-term follow-up will continue to note the long-term sequelae of the APC.

CONCLUSION

A majority of cirrhotic patients suffer from iron deficiency anemia due to blood loss from gastric vascular ectasia. Argon Plasma Coagulation (APC) has proved to be a safe and effective endoscopic treatment for blood loss due to gastric antral ectasia as statistically significant group of patients have sustained increase of hemoglobin and disappearance of lesion.

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