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ORIGINAL ARTICLE

Endoscopic treatment with argon plasma coagulation in postradiation proctopathy

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Abstract
Introduction Postradiation proctopathy (PP) is a major complication in patients who receive radiotherapy for cancer. Medical treatments of this entity are unsatisfactory. Argon plasma coagulation (APC) had been shown to be successful with low complications. The aim was to describe our experience with APC in the management of PP.
Methods We conducted a retrospective analysis of electronic- and paper-based records of patients with PP managed with APC.
Results Nineteen patients with PP were included, nine were women. Median age was 64 years, and follow-up was 29 months. The most frequent cause of radiotherapy for cancer was cervicouterine and prostate
Endoscopic findings Moderate disease was observed in nine patients; mild and severe diseases were observed in five patients each. At endoscopy, telangiectasias were present in 15, ulcers in five, and active bleeding in two patients. Median of APC sessions was two (one to seven). Mean dose of APC was 30 W (30–40 W) and 1.7 l (1.5–2.0 l). Median time for relief of symptoms was 3 months. All patients were asymptomatic at the end of treatment, and bleeding was controlled at the end of treatment in all patients. Recurrence of bleeding presented in one patient at 4 months. No complications were related to the APC treatment.
Conclusions According to our data, APC is successful in treatment of PP, with few sessions and low morbidity and null mortality.

Keywords Argon plasma · Chronic radiation enteropathy · Lower gastrointestinal bleeding

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Introduction

Postradiation proctopathy (PP) results from submucosal damage secondary to radiation therapy. It is a severe complication in patients with cancer who undergo radiation therapy, and it is classified as acute or chronic according to the time of presentation [1]. Acute PP is defined as a clinical manifestation that occurs during the third week of radiation therapy, and the incidence of this subset varies between 20% and 70%. Chronic PP occurs most frequently 2 years after radiotherapy and is observed in about 5–15% of all patients managed with radiotherapy [2]. The spectrum of clinical manifestations is broad; diarrhea, urgency, tenesmus, rectal pain, and bleeding have all been described. Rarely, PP may run asymptomatic [3]. Some factors have been related to an increased risk of damage, such as old age, radiation dose, fraction size, postoperative irradiation, and concurrent chemotherapy.

Although some treatment modalities have been explored, there have been no large clinical trials [3]. Topical steroids, sucralfate enemas, and 5-aminosalicylic acid formulations have been used, but the results have been unsatisfactory.

Endoscopic management with formalin or laser and argon plasma coagulation (APC) has been evaluated [4, 5]. Apparently, APC has better results than other endoscopic therapies [3]. However, there have been no randomized clinical trials, and there are no guidelines for the management of the injury [6].

The objective of this study was to present the experience at our center of endoscopic treatment with APC in the management of PP.

Material and methods

We performed a retrospective analysis of data obtained prospectively as electronic- and paper-based records for all patients evaluated by endoscopy for PP between March 2002 and February 2009. Demographic, clinical, endoscopic, and laboratory variables were evaluated. Endoscopic localization, severity, management, number of treatment sessions, and clinical improvement at follow-up were recorded. When available, endoscopic photographs were reviewed by the authors to categorize the severity of the injury.

In all patients, a complete colonoscopy was mandatory to exclude any occult proximal malignancy or alternate source of bleeding. For this reason and because of the potential risk of combustion and colonic explosion in an unprepared bowel, formal bowel preparation was undertaken in all patients. Endoscopic procedures were performed with a standard colonoscope (CFQ 100-160 L; Olympus, USA). Preliminary bowel preparation was undertaken on the day preceding the study with 4 l of polyethylene glycol solution (Nulytely, Asofarma, USA) and a low-residue diet. Nonsteroidal anti-inflammatory drugs, aspirin, and anticoagulants were discontinued a week before all elective procedures. The procedures were repeated in patients with poor bowel preparation according to endoscopic criteria. The severity of rectal bleeding before and after treatment was graded on a scale of 0–4, according to the criteria of Chutkan et al. [6]: 0, no blood; 1, blood on toilet paper or stool; 2, blood in toilet bowl; 3, heavy bleeding with clots; 4, bleeding necessitating transfusion. In the absence of a consensual endoscopic score, we used the following scale, based upon the distribution of telangiectasias and the surface involved at the initial endoscopy: grade 1, localized single telangiectasias; 2, diffuse telangiectasias; 3, localized confluent telangiectasias; and 4, diffuse confluent telangiectasias [7]. APC was performed with the Söring Arco System 3000 (Söring, Germany) and an APC probe (Söring, Germany). The argon flow rate was set between 1.0 and 1.5 l/min. A current of 40±50 W was used, although it could be increased to 60 W for areas of significant hemorrhage. APC was applied close to the mucosal surface, but not in direct contact with it. Proximal areas were treated before distal areas, and single or repeated pulses of less than 1 s were used until the mucosa appeared whitish. Sessions were performed every 3 weeks, and the number of sessions was determined based on the severity and clinical progression of the injury. All endoscopic procedures were performed with the patient sedated by an anesthesiologist. All patients were treated on an outpatient basis, with no antibiotic prophylaxis. After the procedures, all patients were observed for 4 h to detect complications related to the procedure.

The results are expressed as descriptive statistics (relative frequencies, absolute frequencies), medians and ranges, and mean ± SD. The P value was calculated with Wilcoxon's test. Correlations were evaluated with Spearman correlation. A P value of < 0.05 was considered statistically significant. All analyses were conducted with SPSS statistical software (v. 12.0; SPSS Inc., Chicago, IL, USA).

Results

A total of 19 patients with PP were included. Nine (47.3%) patients were women. The median age was 64 years (range 25–80 years) and the median follow-up was 29 months (1–93 months). In three patients, the follow-up period was 1 month, and in these patients, full improvement of their symptoms was reported. The most frequent cause of radiotherapy in women was cervicouterine cancer in five of nine (55.5%) patients; other causes were endometrial cancer in two of nine (22.2%) patients and vaginal cancer in two of nine (22.2%) patients. In men, the most frequent cause was prostate cancer in nine of ten (90%), with colorectal cancer in one (10%) patient. The mean number of radiotherapy sessions was 28±8.6.

Clinical and laboratory findings

The median time after the last radiotherapy session and the initial clinical manifestation was 15 months (range 2–17 months). The main clinical finding was rectal bleeding, and in six (31.5%) patients, it was the only clinical manifestation; seven (36.8%) patients referred to more than one symptom (Table 1). Comorbidities were observed in seven (36.8%) patients (Table 1). The median hemoglobin level before endoscopic treatment with APC was 11.8 g/dl (range 7.3–16.5 g/dl), and five (26.3%) patients required a red cell transfusion. In those patients requiring red cells, the maximum number of packages was two (two patients). After the APC sessions, the median hemoglobin level was 12.9 g/dl (range 7.5–16.5 g/dl). The mean clinical score before the procedure was 2.2±1.5 points, and it had decreased to 0 at the end of the APC sessions (P=0.001). There was a tendency for a positive correlation between

Table 1 Clinical characteristics of patients, $n=19$

Variable	*n* (%)
Hemoglobin (g/dl)[a]	11.8 (7.3–16.5)
NSAID	2 (10)
Oral anticoagulation	1 (5)
Symptoms	
Rectal pain	4 (20)
Diarrhea	2 (10)
Rectal tenesmus	1 (5)
Comorbidities	
Hypertension	2 (10)
Hepatitis C virus infection	1 (5)
Systemic lupus erythematosus	1 (5)
Hypothyroidism	1 (5)
Chronic renal failure	1 (5)
Rheumatic cardiopathy	1 (5)

NSAID nonsteroid anti-inflammatory drugs

[a] Expressed in median (range)

Table 2 Endoscopic findings of patients, $n=19$

Variable	*n* (%)
Segment involved	
Only rectum	17 (89.5)
Rectum + left colon	2 (10.5)
Telangiectasias	15 (79)
Ulcers	5 (26)
Strictures	3 (16)
Active bleeding during procedure	2 (10.5)
Endoscopic severity of disease	
Grade 1	5 (26)
Grade 2	4 (21)
Grade 3	3 (16)
Grade 4	7 (37)
Clinical score	
Grade 0	5 (26.3)
Grade 1	0
Grade 2	6 (31.6)
Grade 3	3 (15.8)
Grade 4	5 (26.3)

severity of postradiation proctopathy and number of sessions ($r=0.44$; $P=0.08$). There was a negative correlation between endoscopic severity of postradiation proctopathy and hemoglobin levels ($r=-0.65$; $P=0.005$).

Endoscopic findings

The rectum was involved in all patients, and in two (10.5%) patients, the sigmoid colon was also involved. Active bleeding at endoscopy was noted in two (10.5%) patients. Telangiectasia was the most frequent endoscopic finding, occurring in 15 (78.9%) patients. Ulcers were encountered in five (26.3%) patients. In those cases, the median maximum size was 3 cm (range 0.8–6 cm). Endoscopic findings at the end of treatment were grade 1 in six patients and grade 2 in one patient, and chronic mucosal changes related to the application of APC or scarring were noted in the remaining 12 patients (grade 0). Other endoscopic findings are shown in Table 2.

In patients with ulcers on endoscopy, four or more sessions of APC were needed (four to seven sessions). In these patients, the mean of hemoglobin was 9.9 g/dl (range 8.2–11.9 g/dl) at the beginning of endoscopic treatment. In patients with angiodysplasia-like lesions, the median number of sessions was two (range zero to seven), median of hemoglobin was 11.8 g/dl (range 7.3–16.5 g/dl). In four patients, both types of lesions were documented.

Follow-up

The median number of APC sessions was two (range one to seven), and in all patients, chronic rectal bleeding had stopped after the last session. The mean time for symptom relief was 1.5 months. The median dose of APC was 30 W (range 30–40 W) and 1.7 l (range 1.5–2.0 l). All patients were asymptomatic after the APC treatment and were followed up in the clinic. Only one patient suffered a recurrence of rectal bleeding 4 months later, requiring two additional treatment sessions. No complications were related to the APC treatment.

Discussion

We have presented our experience with APC for PP at our center. Patients were treated successfully, and no adverse events were observed. Our findings support the efficacy and safety of APC for this pathology.

According to other studies, the principal cause of PP in women is cervicouterine cancer, whereas in men, prostate cancer is the main cause. Our findings are consistent with these data. However, PP is a poorly studied entity, and there are no guidelines for its management. APC is an accepted treatment because it is useful and has a low morbidity rate. Rare complications such as colon explosion have been reported [8]. We observed no complications or mortality related to APC. In the present work, APC was applied as a mean number of 1.5 (median = 2) sessions per patient, similar to the results observed by Villavicencio et al. (median of 1.7 sessions per patient) [9]. We observed a significant reduction in the clinical and endoscopic scores

in all the patients analyzed. In our study, the dose (watts) applied varied from 30 to 40 W, but other authors have reported doses as high as 60 W with good results [10, 11]. It is well known that complications may be more frequent with higher doses of APC [4, 11–13]. Our results, consistent with those of other studies, suggest that low doses of APC offer a similar success rate without complications [9].

The limitations of this study must be noted: firstly, the small sample size and, secondly, the retrospective design. However, it would be difficult to perform a large prospective study or a randomized controlled trial because of the incidence of PP. The data presented here could be used in future compilation of cases and to increase the available information about PP.

In conclusion, APC is a useful and safe method for the management of PP. Randomized trials and management guidelines are required to standardize the optimal application of this modality.

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Conflicts of interest None

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