Clinical effectiveness of short course oral prednisone for stricture prevention after semi-circumferential esophageal endoscopic submucosal dissection

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ABSTRACT

Background and study aims Esophageal strictures (ES) occur frequently after semi-circumferential endoscopic submucosal dissection (ESD) for the eradication of superficial esophageal neoplasms and negatively impact a patient's quality of life. Oral corticosteroids have been shown to be clinically effective, but the most appropriate drug, dose and duration is yet to be determined. The aim of the study was to investigate the clinical effectiveness and safety of 30 mg prednisone with a shortened tapering schedule on ES after semi-circumferential ESD.

Patients and methods This was a retrospective observational study that analyzed consecutive patients with esophageal neoplasms who underwent semi-circumferential ESD with a resection defect greater than 75 % of the circumference that received a protocol of oral steroids for stricture prevention. On postoperative day 3, 30 mg prednisone was prescribed, tapering weekly to 20 mg/10 mg/5 mg over 4 weeks. Follow-up included clinic consultation and endoscopic review at weeks 2 and 4. Effectiveness outcomes included ES rates, safety, tolerability, resection, dilatation and recurrence rates.

Results Ninety ESD procedures were carried out during the specified time period and 18 patients met the inclusion criteria for the final analysis. The mean age was 61.5 years, lesion size was 52.5 mm, and final histology was squamous cell carcinoma in all patients. Incidence of intra-procedure complications was: bleeding 5.5 % (1/18) and ES 5.5 % (1/18), requiring a median two endoscopic dilatations. En bloc, R0 and curative resection rates were 88.8 %, 72.2 %, and 55.5 %, respectively.

Conclusions The short tapering schedule of 30 mg oral prednisone is clinically efficacious and safe for prevention of ES after semi-circumferential ESD in Latin American patients.

Introduction

Esophageal cancer is the sixth most common cause of cancer-related mortality worldwide [1]. The two main subtypes are squamous cell carcinoma (SCC) and adenocarcinoma, with the former accounting for approximately 90 % of cases and is more prevalent in Africa, Asia, and South America [2–4]. Early detection and treatment are key to improving the five-year survival

rate which is currently under 20 %. Endoscopic management of early neoplasia is a rapidly evolving field. Endoscopic mucosal resection (EMR) enabled the removal of early neoplasia but lesions greater than 2 cm were often removed in piecemeal fashion. This had the disadvantage of increasing recurrence rates and scarring post EMR, thus reducing the success rate of further endoscopic resections. Endoscopic submucosal dissection (ESD) was developed to resect lesion en bloc and is not dependent on the nature or size of the lesion [5–7]. ESD is currently considered the treatment of choice for neoplasms confined to the superficial esophageal mucosal layer with results comparable to conventional surgery but with lower morbidity and mortality rates. ESD enables a precise histopathological assessment of the tumor which is often curative but can also aid additional therapy such as chemoradiation or esophagectomy [8–11]. ESD use has expanded globally meaning that techniques have been refined and indications expanded as experience has improved. One consequence of this progression is an increase in resection of complicated lesions. Lesions that occupy more than 50 % of the circumference is one of these new challenges. When safety margins are incorporated into the resection specimen, this often extends the circumference to over 75 %, increasing the risk of esophageal stricture (ES) substantially. ES rates are approximately 90 % if the post-ESD ulcer is more than 5 cm in length. Developing new safe and effective measures to reduce ES is an important research area [12–23].

The development of stricture and healing of the mucosa is characterized by three stages. The initial stage is mucosal injury resulting in the loss of protective barrier to food, acid, and microorganisms. The subsequent stage is the activation of inflammatory cells and generation of granulation tissue. The final stage is scar tissue formation through the activation of cytokines [24–26]. One promising measure is the use of antiproliferative agents such as corticosteroids. Local corticosteroid with triamcinolone has been extensively shown to reduce ES to 10 % [27–33]. However, despite the use of oral corticosteroids showing promise in clinical trials, use in practice varies due to the lack of available data on specific drug type, dose, and duration [34–43]. The primary aim of this study was to determine the clinical effectiveness of a four-week course of prednisone on ES rates after semi-circumferential ESD. Secondary aims were to investigate safety, tolerability of prednisone, endoscopic dilation rates, en bloc resection rates, complete resection with clean lateral and vertical margins (R0 resection) rates, curative resection rates according to the latest Japanese guidelines [6] and recurrence rates.

Patients and methods

Patients

Adult patients referred for ESDs for superficial esophageal neoplasms at Clinics Hospital – Federal University of Minas Gerais, between April 2015 and June 2020 were prospectively collected and included in this retrospective observational study. Patients were eligible if they underwent ESD with endoscopic resection defect greater than 75 % of the circumference (semi-circumferential ESD) for superficial esophageal neoplasm and received oral prednisone postoperatively. The exclusion criteria included: the use of other corticosteroids or other immunosuppressive drugs prior to the procedure, incomplete follow-up data, previous esophageal surgery or advanced disease requiring esophagectomy. Institutional review board from Clinics Hospital approving the study was obtained on March 8, 2021. In addition, written informed consent to ESD procedure was obtained from each patient. The authors followed the Declaration of Helsinki recommendations concerning scientific research, including data confidentiality of each of the enrolled patients.

ES was defined as a luminal reduction that prevents the passage of a standard gastroscope with 9 mm in diameter and/or that caused symptoms of dysphagia. The clinical symptoms of dysphagia were evaluated with the validated Atkinson dysphagia scale (0: no dysphagia; 1: able to swallow some solid foods; 2: able to swallow only semi-solid foods; 3: able to swallow liquids only; and 4: unable to swallow anything).

Curative resection was determined if neoplastic cells were limited to the epithelium or lamina propria, and the margins were free of neoplasia. Patients with muscularis mucosa, submucosal or lymphovascular invasion were discussed at specialist meetings to decide on further therapy.

Endoscopic procedures

Procedures were performed by expert endoscopist (VA) under general anesthetia. After a detailed endoscopic assessment with high-definition white light endoscopy, virtual chromoendoscopy like narrow band imaging or blue light imaging, and 0.8 % Lugol staining, lesions were classified according to the Paris classification [6]. ESD procedures were carried out with a therapeutic endoscope with a working channel of 3.2-mm (EG-450 RD, Fujifilm Co., Japan), Flush Knife BT 1.5 (Fujifilm Co., Japan) connected to the electrosurgical unit (ERBE VIO 200S, 200 D or 300 D, Tubingen, Germany), and a 4-mm long cap (Elastic Touch, Top Co., Japan) attached to the tip of the endoscope, in order to ensure optimal vision of the dissection field. Each procedure followed six steps: 1) lesion marking with diathermy, using soft coagulation mode, effect 6, 100 watts; 2) submucosal injection to lift lesion with 0.4 % sodium hyaluronate in teardrop form (Adaptis Fresh, Legrand Laboratory, Brazil); 3) mucosal incision with Endocut I, effect 2, cut length 3 and cut interval 2; 4) submucosal layer dissection, using forced coagulation mode, effect 3, 50 watts; 5) Pre-hemostasis of the blood vessels using soft coagulation mode, effect 6, 100 watts; and 6) sealing of blood vessels with the knife or with coagulation forceps (Coagrasper, Olympus Co., Japan) depending on vessel size. Antibiotic prophylaxis with intravenous cephalosporin (or clindamycin if history of allergy) was used in all patients.

Histological examination

Specimens were stretched and pinned onto a cork, fixed into formalin, and sectioned longitudinally. Samples were later embedded in paraffin and cut into histological sections. Examination was performed by an expert gastrointestinal pathologist. Neoplasms were assessed for level of infiltration, depth, differentiation, lymphatic and vascular invasion and completeness [4].

Postoperative care and follow-up

All patients were admitted electively for 3 days and the proton pump inhibitor omeprazole (40 mg/day) was given electively for 4 weeks and sucralfate (10 mg three times a day) for 2 weeks. A reduced dose of 30 mg oral prednisone was prescribed on postoperative day 3 for all patients with circumferential resections greater than 75 %. The extension or circumferential resection was determined by visual inspection of several endoscopic images taken from the resection site at the end of the procedure and evaluated by at least two different endoscopists (operator plus assistant). The dose was tapered over a 4-week period (30 mg/day week 1, 20 mg/day week 2, 10 mg/day week 3, 5 mg/day week 4). Follow-up involved a clinic consultation on week 2 and gastroscopy on week 4, to detect any development of esophageal stricture, with the aim of start immediate endoscopic dilation. Telephone consultations were also available if patients developed symptoms such as dysphagia and endoscopy follow-up could be brought forward if required.

If ES was encountered preventing the passage of the standard gastroscope, sessions of bougie or balloon dilation were carried out, at the discretion of the endoscopist. For asymptomatic patients, a second clinical visit and endoscopic control was scheduled at 3 months. Patients with an indication for adjuvant chemoradiation due to non-curative resection waited until 3 months prior to starting treatment to allow complete esophageal healing to try to reduce the additional effect of radiation induced stenosis. Thereafter, all patients were advised to undergo annual endoscopic surveillance.

Statistical analysis

The tabulation of data was carried out using Microsoft Excel for Windows 2010, and the statistical analysis was carried out using SPSS version 24, with a 5 % significance level. A descriptive analysis of data was performed with frequency and proportion for categorical and average variables, standard deviation, median and mean ±standard deviation (SD) for continuous variables.

Results

During the study period, 90 esophageal ESD procedures were carried out in 77 patients. Sixty-nine procedures were excluded due to resection circumferences of less than 75 % (n = 66) and non-lifting signs suggesting locally advance disease therefore precluding ESD (n = 3). A total of 21 procedures (23.3 %) were classified as semi-circumferential ESD and eligible to receive the protocol of oral prednisone. Three patients were excluded: one received triamcinolone injection, one declined to enter the study protocol and one failed to complete the 4-week course. Therefore, a total of 18 patients completed the prednisone course (20 % of screened study population) and were included in the final analysis. The mean age was 61.5 years (range 32 to 79 years; SD ± 10.07). The mean length of the specimen size post-ESD was 53.6 mm (range 20–90 mm; SD ± 16.5). The mean duration of the procedure was 135.5 minutes (range 100–240 minutes; SD ± 30.9). The topographical distribution of the esophageal lesions was upper third – 3 cases (16.6 %); middle third – 10 cases (55.5 %) and lower third – 5 cases (27.7 %). The final histological diagnosis of the resected lesions in all 18 cases (100 %) was superficial SCC. ▶ **Table 1** details patient and lesion characteristics.

The rate of ES in the patients who received the prednisone-based protocol was 5.5 % (1/18). The single patient who developed stricture had grade 3 dysphagia (Atkinson scale), however was successfully treated with two sessions of endoscopic dilation up to 15 mm in diameter. None of the patients in this study presented with postoperative complications or severe adverse events (AEs) associated with oral prednisone use, such as systemic infection (bacteremia). There were three cases (16.6 %) of mild AEs (asymptomatic *Candida* esophagitis) all resolved with fluconazole treatment. ▶ **Table 2** describes the clinical outcome of the patients who received the protocol treatment.

En bloc resection rate was 88.8 % (16/18), with R0 resection rate of 72.2 % (13/18), and a curative resection was obtained in 55.5 % (10/18). There was one case of intraoperative bleeding managed endoscopically with clips. There was no blood transfusion required and the patient was later discharged. The clinical outcomes of the 90 patients who underwent esophageal ESD demonstrated rates of en bloc resection, complete resection and curative resection of 92.2 % (83/90), 73.3 % (66/90) and 58.8 % (53/90), respectively. All patients included in the study underwent endoscopic follow-up with a mean time of 11 months (range: 3 to 36 months), the 18 enrolled patients showed a single case of local recurrence (5.5 %) at 30 months of endoscopic follow-up which was managed with chemoradiation. In addition, a single case of metachronous lesion was detected (5.5 %) which was managed with another ESD. ▶ **Fig. 1**, ▶ **Fig. 2**, ▶ **Fig. 3**, ▶ **Fig. 4**, ▶ **Fig. 5**, ▶ **Fig. 6**, ▶ **Fig. 7**, ▶ **Fig. 8**, ▶ **Fig. 9**, and ▶ **Fig. 10** demonstrate two illustrative cases of semi-circumferential ESD that received the protocol therapy with oral prednisone.

Discussion

This case series demonstrates the efficacy and safety of the use of a short course of oral prednisone in the prevention of ES post-semi-circumferential ESD. This is the first study to demonstrate effectiveness of prednisone in ES prevention in a Latin American population. The main strengths of this study are that the drug is relatively cheap, easily available in all geographical areas with well documented safety profile. All endoscopies were performed by a single expert clinician and all procedures followed the same protocol allowing for uniform practice. Results from this case series provide valuable real world practice data and can be generalizable to the rest of Latin America tertiary centers. The prospective nature of data collection enables more accurate data to be recorded.

Circumferential endoscopic resection (either semi-circumferential or completely circumferential) in the treatment of the superficial esophageal neoplasms is the main risk factor for the formation of ES after ESD, highlighting the much higher probability of developing refractory esophageal stricture in patients who undergo complete circumferential resections. This is due

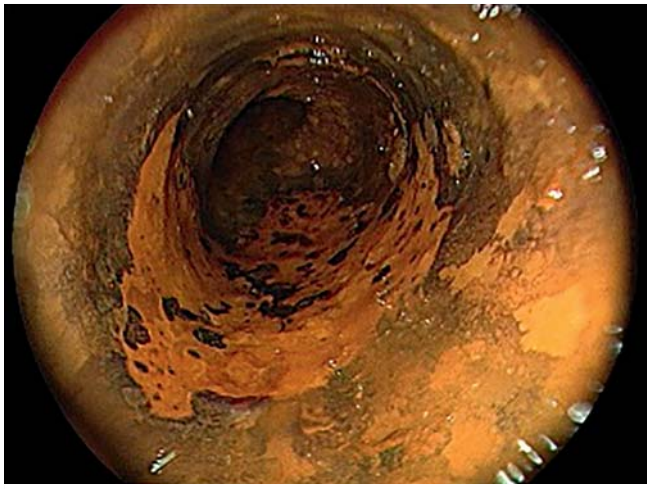
▶ **Table 1** Patient and lesion characteristics.

Patients/lesions	16/18
Male (%), female (%)	11 (68.7 %), 5 (31.2 %)
Average age (range)	61.5 years (32–79)
Location	
Upper third	3 (16.6 %)
Medium third 10	(55.5 %)
Lower third	5 (27.7 %)
Macroscopic type (PARIS Classification)	
0-IIa 3	(16.6 %)
0-IIb 13	(72.2 %)
0-IIc 2	(11.1 %)
Average size of lesion (standard deviation)	52.5 mm (SD ± 20.5)
Semi-circumferential ESD/complete circular ESD	18/0
Average time of duration of procedure in minutes (standard deviation)	135.5 min (SD ± 30.9)
Average hospital stay (standard deviation)	65.3 hrs (SD ± 10.7)
Tumor differentiation	
Differentiated tumors	18/18 (100 %)
Undifferentiated tumors	0/18 (0 %)
Deep tumoral invasión	
Intramucosal (T1a)	15/18 (83.3 %)
Intramucosal M1	6/15 (40 %)
Intramucosal M2	1/15 (6.6 %)
Intramucosal M3	8/15 (53.3 %)
Submucosal invasion (T1b)	3/18 (16.6 %)
Superficial submucosa (SM1)	0/3 (0 %)
Deep submucosa (SM2)	3/3 (100 %)
Percentage of endoscopic resection in circumferential ESD	
95 % of esophageal circumference	2/18 (11.1 %)
90 % of esophageal circumference	5/18 (27.7 %)
85 % of esophageal circumference	4/18 (22.2 %)
80 % of esophageal circumference	3/18 (16.6 %)
75 % of esophageal circumference	4/18 (22.2 %)
Overall rate en bloc resection	83/90 (92.2 %)
Overall rate complete resection	66/90 (73.3 %)
Overall rate curative resection	53/90 (58.8 %)

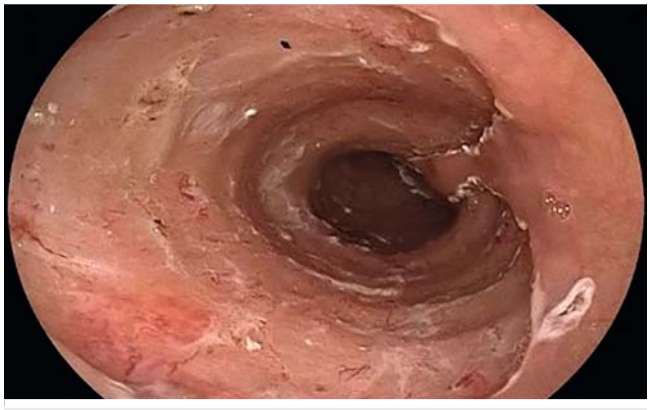
▶ **Table 2** Outcomes of patients treated with oral prednisone.

	n (%)
Rate of esophageal stricture	1/18 (5.5 %)
Adverse events	
Mild *Candida* esophagitis	3 (16.6 %)
Systemic infection (bacteremia)	0 (0 %)
Other severe adverse events	0 (0 %)
En bloc resection	16/18 (88.8 %)
Complete resection (R0)	13/18 (72.2 %)
Curative resection	10/18 (55.5 %)
Complications	
Perforation	0 (0 %)
Gastrointestinal bleeding	1 (5.5 %)
Mortality	0 (0 %)
Average endoscopic follow-up time (standard deviation) n = 18	11.5 months (SD ± 13.4)
Rate of local recurrence	1 (5.5 %)
Rate of metachronic lesion	1 (5.5 %)

to tissue regeneration originates from the muscularis propria and not from the remaining mucosa, generating a greater degree of fibrosis. Thus, in our view, whenever possible and without compromising oncological radicality, it is important to spare a band of intact mucosa, even as low as 5 % to 10 % of the circumference. This study demonstrates that performing semi-circumferential resections (< 100 % of the esophageal circumference) and adding a simplified prednisone-based protocol in the postoperative period it is possible to reduce ES incidence in the medium and long-term. ES significantly impacts the patient's quality of life, often requiring multiple sessions of endoscopic dilation [6–13]. Due to the increasing usage of ESD and the significant symptom burden of ES, research addressing preventive measures have advanced in recent years. The four preventive measures include: 1) wound-protective strategies such as shielding with polyglycolic acid sheets and fibrin glue; amniotic membranes, steroid-loaded gel or matrix and mucosa patch; 2) regenerative strategies using cell sheets of autologous keratinocytes and mesenchymal stem cell culture; 3) mechanical treatment prophylactic strategies using balloon dilation or covered stents; and 4) antiproliferative therapy using corticosteroids (intralesional or oral) [14–26]. An extensive systematic review of 13 studies on an Asian population on preventive measures, concluded that intralesional triamcinolone acetonide significantly reduced stricture rate and that oral prednisolone significantly reduced the rate of endoscopic dilations and strictures [27]. A retrospective study showed the benefits of oral corticosteroids (prednisolone) as opposed to other classically used therapies such as prophylactic endoscopic balloon dilation [28]. This pioneering work has been im-

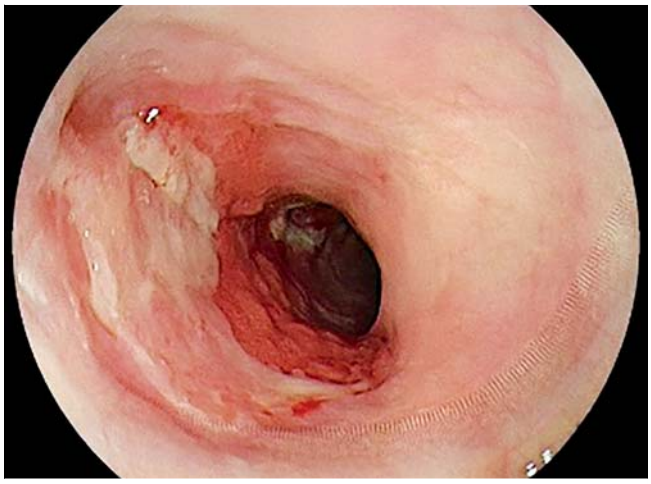


▶ **Fig. 1** Illustrative clinical case of a patient with unstained neoplastic flat lesion (Type 0II-b) occupying approximately 70 % of the esophageal circumference.

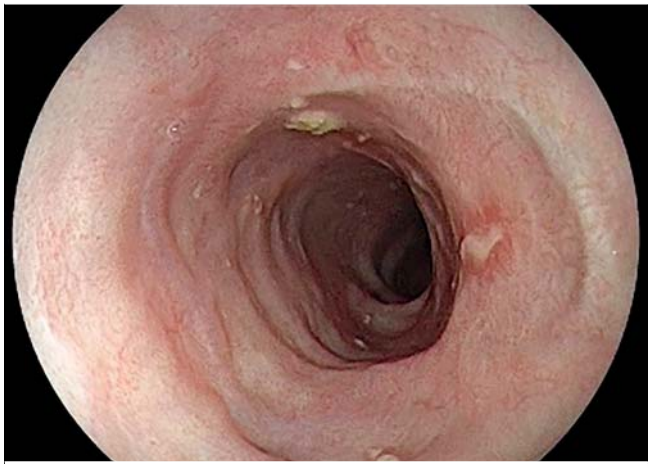


▶ **Fig. 2** Endoscopic submucosal dissection with en bloc removal of the lesion with the defect occupying approximately 95 % of the circumference.

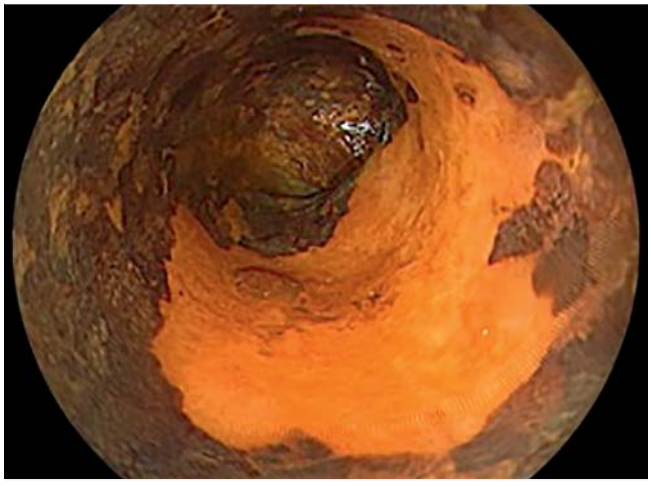
▶ **Fig. 3** A specimen measuring 56 mm × 35 mm fixed for histological assessment that revealed squamous cell cancer with submucosal invasion up to 700 micrometers (SM2).



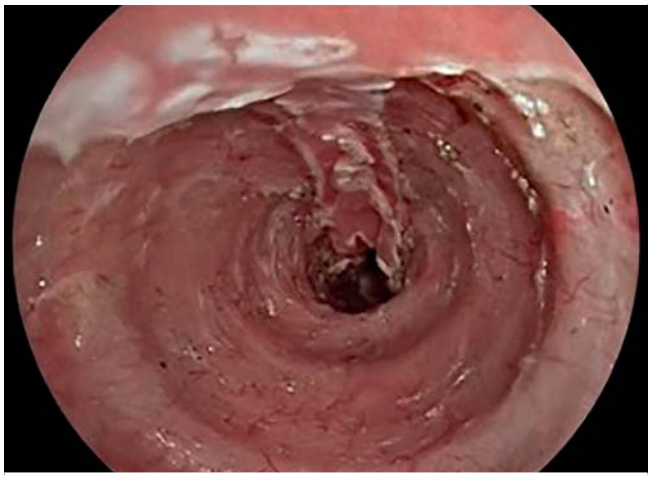
▶ **Fig. 4** A patient received therapy with oral prednisone. First follow-up control at 30 days revealed healing of the defect in process without stricture.



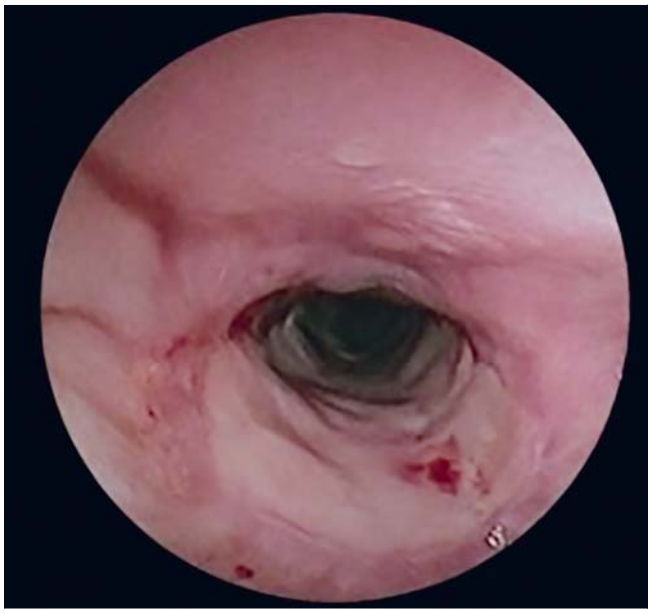
▶ **Fig. 5** Second control at 3 months revealed complete epithelialization without stricture. Adjuvant chemotherapy and radiotherapy was later started.



▶ **Fig. 6** Illustrative clinical case of another patient with unstained neoplastic flat lesion (Type 0II-b) occupying approximately 75 % of the esophageal circumference.

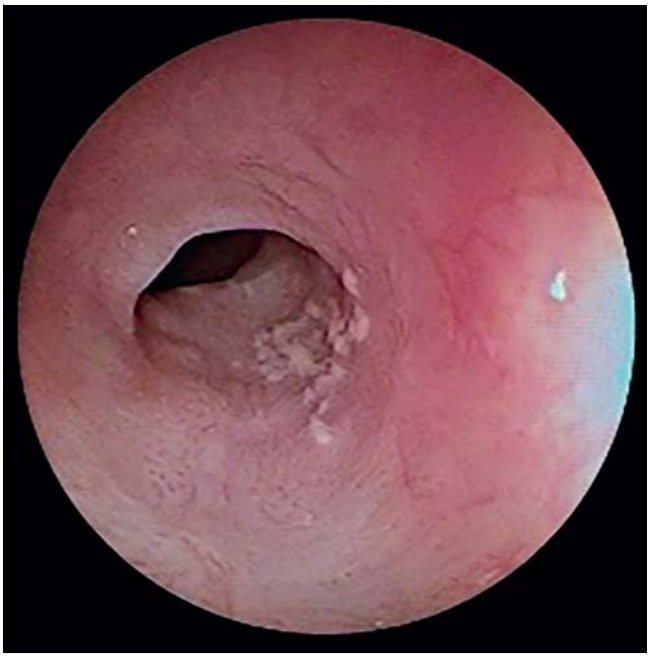


▶ **Fig. 7** Endoscopic submucosal dissection with en bloc removal of the lesion with the defect occupying 90 % of the circumference. Specimen size measured 65 mm × 43 mm. Therapy with oral prednisone was started on day 3.

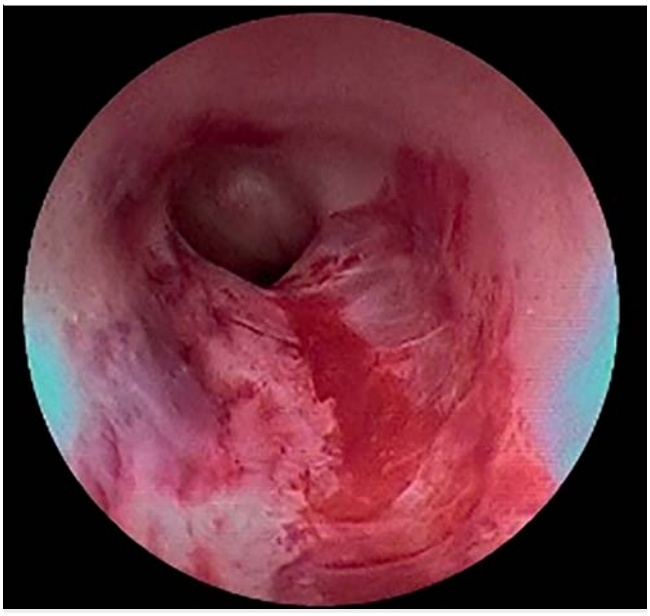


▶ **Fig. 8** First follow-up control performed at 30 days revealed a healing defect evolving to stricture.

portant in demonstrating the benefits of corticosteroids and establishing its use for post-ESD stricture prevention. The authors evaluated 41 patients (41 lesions) who were divided into either endoscopic balloon dilation (22 patients) or oral prednisolone (19 patients). After 3 months follow-up the post-ESD ES rate was 31.8 % (7/22) vs 5.3 % (1/19), (P<0.05) respectively [28]. Our study presents similar findings, prednisone has a lower cost and widely availability in comparison to other corticosteroids traditionally used in the different studies. It also presents the advantage of tapering prednisone dose over shorter duration, potentially reducing the risks of corticosteroid complications.



▶ **Fig. 9** The patient developed dysphagia and endoscopic assessment at 60 days revealed a stricture at the resection site.



▶ **Fig. 10** Endoscopic dilation was performed successfully. Two sessions were required to resolve the stricture and improve the symptoms of dysphagia.

Triamcinolone acetonide location injection to the ulcer base although an effective prophylactic alternative has serious potential complications such as esophageal perforation, gastrointestinal bleeding, and formation of microabsesses, therefore, oral corticosteroid therapy is the more commonly researched therapy [29–37].

There are few head-to-head comparative studies that evaluate the clinical effectiveness of oral corticosteroids to intrale-

▶ **Table 3** Comparative analysis of the efficacy of oral corticosteroid-based protocols in the prevention of esophageal stricture after wide-field endoscopic resection.

	Mean tumor size (range) mm	Corticosteroid	Protocol used (doses)	Duration	Stricture, n (%)
Yamaguchi et al. 2011	33.4 (11–84)	Prednisolone	Started at a dose of 30 mg/day on the third day post-ESD, tapered gradually (30, 30, 25, 25, 20, 15, 10, and 5 mg for 7 days each)	8 weeks	1/19 (5.3 %)
Kataoka et al. 2015	46.1 (35–70)	Prednisolone	Started with 30 mg/day on the second day post-ESD, continued with a gradually tapering prednisolone dose (30, 20, and 10 mg/day in weeks 1, 2, and 3, respectively)	3 weeks	3/17 (17.6 %)
Zhou et al. 2017	54.6 (35–100)	Prednisolone	Started at a dose of 30 mg/day on the third day post-ESD, and then tapered gradually (30, 25, 20, 15, 10, and 5 mg for 14 days)	12 weeks	3/13 (23.1 %)
Pih et al. 2019	30 (23.5–39)	Prednisolone	Started at a dose of 30 mg 3 days after ESD, which was gradually tapered over 8 weeks (daily dose 30, 30, 25, 25, 20, 15, 10, and 5 mg for 7 days each)	8 weeks	5/25 (20 %) (P = 0.037)
Bartel et al. 2020	30 (23.4 [SD])	Budesonide	3 mg twice a day for 8 weeks started within 24 hours after resection	8 weeks	4/25 (16 %)
Arantes et al. 2021	52.5 (25–100)	Prednisone	Started at a dose of 30 mg/day. The dose was tapered over 4 weeks period (30, 20, 10, 5 for 7 days each)	4 weeks	1/18 (5.5 %)

SD, standard deviation.

sional triamcinolone. An experience of 53 patients undergoing wide endoscopic resections (>75 % of the esophageal circumference), showed the following ES rates in three groups: Group 1 no prophylactic measure 50 % (11/22 patients), Group 2 oral corticosteroids 20 % (5/25 patients) and Group 3 local injected corticosteroids 33.3 % (2/6 patients). Although oral corticosteroid use was promising the results difference were not statistically significant [38]. Our findings demonstrate that using semi-circumferential ESD allows for the preservation of narrow band of squamous mucosa and enables regeneration of epithelium from unresected mucosa. This in combination with a short course of low dose prednisone reduces ES rates.

The first reports of the use of corticosteroids in ES prevention involved administration of higher doses for longer periods but were associated with several significant AEs [39–42]. Therefore, a study described a lower-dose and shorter-duration protocol to maintain efficiency but reduced side effect profile [43]. The authors reported that the stricture rate was significantly lower in the group with a tapered oral prednisolone dose (30, 20, and 10 mg per day in weeks 1, 2, and 3, respectively) 17.6 % (3/17) compared to the non-treated group 68.7 % (11/16), (P<0.05) [43]. Our study corroborates those findings, demonstrating that by using a faster corticosteroid weaning (10 mg/week) at an initial dose of 30 mg/d, it is possible to obtain an attractive efficacy-safety profile, with the advantage of reducing the rate of AEs, as a result of the shorter exposure time to steroids. It is important to underscore that currently there is no international consensus that establishes a standard strategy for gradual corticosteroid weaning, however none of the patients subjected to our protocol based on oral prednisone presented a high risk of suppression of the hypothalamic-pituitary-adrenal axis, this is due to the fact that they did not meet the necessary criteria for this condition (dose ≥ 20 mg/d for a time ≥ 3 weeks), established by previous publications [44–46]. Interestingly, some studies have also demonstrated that corticosteroid use also improves response to endoscopic dilatation in terms of reduced sessions and duration of treatment [47–50]. Our study mirrors these findings with only a single patient developing ES requiring two dilatation sessions, suggesting that early use of corticosteroids may influence submucosal fibrogenesis. ▶ **Table 3** present a comparative analysis between the drug regimen and clinical outcome adopted in our study to different protocols based on oral corticosteroids. It is noteworthy that the clinical effectiveness of our prednisone-based protocol is either similar or even superior to other reports of corticosteroid therapy [38–40, 43, 51].

Recently, another promising alternative that has been proposed is the use of topical budesonide to reduce the incidence of ES after wide endoscopic resections. A comparative study of 100 patients with superficial esophageal neoplasms submitted to EMR or ESD over 50 % of the circumference, who were divided into two groups: a prospective cohort with oral budesonide for 8 weeks at an initial dose of 6 mg/day (25 patients); and a retrospective cohort without oral budesonide (75 patients). During a clinical-endoscopic follow-up time of 12 weeks, an ES rate of 16 % (4/25) and 28 % (21/75) was noted in groups 1 and 2 respectively (P = 0.23), associated with a similar adverse event rate of 4 % for the budesonide group and 6.6 % for the control group. The authors concluded that topical budesonide appeared to have a beneficial impact on the rate of ES formation

after EMR and ESD, but they also acknowledged that their results were impaired by the small sample size and the comparison carried out to a historical patient cohort [51]. Nevertheless, it is difficult to compare these results to our cohort because we included only patients with ESD resection over 75 % of the circumference instead of 50 % of the circumference and we excluded patients who underwent EMR piecemeal resection. Moreover, our period of treatment was half the duration of treatment advocated by the aforementioned study.

The current study has several limitations. The lack of a control group prevents comparison between non-preventive measures. The researchers were not blinded, and no randomization or placebo arms were offered. The sample size can be considered relatively small when compared to previous studies completed in Asian tertiary centers, but to our knowledge, this is the largest case series from Latin America, and the number of patients enrolled in the prednisone-based protocol is similar to other reports of stricture prevention post-ESD in the literature as shown in ▶ **Table 3**. Also, patients with complete circumferential ESD were not included, as they are expected to develop very severe ES requiring long treatment courses. This is likely to bias the results, impacting on ES rates. Post-ESD therapy also includes co-prescription of PPI and sucralfate to aid the ulcer healing process, but this, too, may influence stricture development.

Conclusions

In summary, 30 mg of prednisone with a 4-week tapering period is clinically effective in reducing ES occurrence post semi-circumferential ESD, with a favorable safety and tolerability profile in a Latin American cohort of patients. Larger randomized controlled trials are needed to further investigate these findings and to establish the most appropriate treatment for reducing this disabling complication of potentially curative therapy.

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Competing interests

The authors declare that they have no conflict of interest.

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