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“ TRATAMIENTO DE LAS NEOPLASIAS ESOFÁGICAS MEDIANTE DISECCIÓN ENDOSCÓPICA DE LA SUBMUCOSA: EXPERIENCIA DE MÁS DE 100 PROCEDIMIENTOS CONSECUTIVOS ”

TESIS PARA OPTAR EL GRADO DE MAESTRO EN MEDICINA CON MENCIÓN EN GASTROENTEROLOGÍA

JOSUE JESUS ALIAGA RAMOS

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SECRETARIO

DEDICATORIA.

A mi madre que me enseñó la perseverancia en todos los aspectos de mi vida.

Al Dr. Vitor Arantes al cual considero mi maestro en esta apasionante especialidad

AGRADECIMIENTOS.

Al Dr. Vitor Arantes por su extraordinario e incondicional apoyo.

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TABLA DE CONTENIDOS

I. RESUMEN

La disección endoscópica de la submucosa (ESD) se considera actualmente el tratamiento de primera línea para la erradicación de las neoplasias superficiales de esófago en los países orientales. Sin embargo, en Occidente, particularmente en Latinoamérica, la experiencia con la ESD esofágica es aún limitada debido a la alta complejidad técnica requerida para su realización. Este estudio tuvo como objetivo presentar los resultados de la aplicación clínica de la ESD para el manejo de neoplasias esofágicas superficiales en un centro latinoamericano con más de 100 casos consecutivos. Estudio retrospectivo el cual incluyó pacientes consecutivos sometidos a ESD por neoplasias esofágicas superficiales entre el 2009 y el 2022. Se evaluaron los siguientes resultados clínicos: tasas de resección en bloque, completa y curativa, recurrencia local, eventos adversos y mortalidad relacionada con el procedimiento.

La ESD esofágica se realizó principalmente por carcinoma de células escamosas (66,6%), neoplasia intraepitelial de alto grado (17,1%) y adenocarcinoma (11,4%). Las tasas de resección en bloque y completa fueron del 96,2% y el 81,0%, respectivamente. La tasa de resección curativa fue del 64,8%. Se produjeron eventos adversos en seis casos (5,7%). El seguimiento endoscópico se realizó durante un periodo promedio de 29,7 meses. La ESD realizada por operadores entrenados es factible, segura y clínicamente efectiva para el manejo de lesiones neoplásicas superficiales de esófago en Latinoamérica.

PALABRAS CLAVES Cáncer esofágico temprano; Disección endoscópica de la submucosa; Neoplasias esofágicas superficiales.

II. ABSTRACT

Endoscopic submucosal dissection (ESD) is currently considered the first-line treatment for the eradication of superficial neoplasms of the esophagus in Eastern countries. However, in the West, particularly in Latin America, the experience with esophageal ESD is still limited because of the high technical complexity required for its execution. This study aimed to present the results of the clinical application of ESD to manage superficial esophageal neoplasms in a Latin American center in over 100 consecutive cases.

This retrospective study included consecutive patients who underwent endoscopic ESD for superficial esophageal neoplasms between 2009 and 2022. The following clinical outcomes were assessed: *en bloc*, complete, and curative resection rates, local recurrence, adverse events, and procedure-related mortality. Esophageal ESD was performed mainly for squamous cell carcinoma (66.6%), high-grade intraepithelial neoplasia (17.1%), and adenocarcinoma (11.4%). *En bloc* and complete resection rates were 96.2% and 81.0%, respectively. The curative resection rate was 64.8%. Adverse events occurred in six cases (5.7%). Endoscopic follow-up was performed for an average period of 29.7 months. ESD performed by trained operators is feasible, safe, and clinically effective for managing superficial neoplastic lesions of the esophagus in Latin America.

KEY WORDS Early esophageal cancer; Endoscopic submucosal dissection; Superficial esophageal neoplasms.

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CLINICAL ENDOSCOPY

Management of esophageal neoplasms by endoscopic submucosal dissection: experience over 100 consecutiveprocedures

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Background/Aims: Endoscopic submucosal dissection (ESD) is currently considered the first-line treatment for the eradication of superficial neoplasms of the esophagus in Eastern countries. However, in the West, particularly in Latin America, the experience with esophageal ESD is still limited because of the high technical complexity required for its execution. This study aimed to present the results of the clinical application of ESD to manage superficial esophageal neoplasms in a Latin American center in over 100 consecutive cases.

Methods: This retrospective study included consecutive patients who underwent endoscopic ESD for superficial esophageal neoplasms between 2009 and 2022. The following clinical outcomes were assessed: *en bloc*, complete, and curative resection rates, local recurrence, adverse events, and procedure-related mortality.

Results: Esophageal ESD was performed mainly for squamous cell carcinoma (66.6%), high-grade intraepithelial neoplasia (17.1%), and adenocarcinoma (11.4%). *En bloc* and complete resection rates were 96.2% and 81.0%, respectively. The curative resection rate was 64.8%. Adverse events occurred in six cases (5.7%). Endoscopic follow-up was performed for an average period of 29.7 months.

Conclusions: ESD performed by trained operators is feasible, safe, and clinically effective for managing superficial neoplastic lesions of the esophagus in Latin America.

Keywords: Early esophageal cancer; Endoscopic submucosal dissection; Superficial esophageal neoplasms

INTRODUCTION

Esophageal cancer is currently considered the sixth leading Esophageal ESD is a complex therapeutic procedure that hasa long learning curve. Currently, ESD is routinely practiced in Japan and some Asian countries, and its role is rapidly expanding in the West. Nevertheless, in Latin America, esophageal ESD is still limited to a few tertiary centers, and there is a paucity of scientific evidence from this region that supports the useof ESD for the treatment of early esophageal cancer. The expan-sion of ESD in the Latin America is crucial to increase the *en bloc* resection rate of esophageal tumors regardless of their size,allowing precise histological assessment and reliable staging.[17-29]The aim of our research was to present the results of a large series of patients with early esophageal neoplasms managed byESD by a single trained operator and to compare the clinical outcomes of the patients with those obtained at Japanese endo-scopic centers.

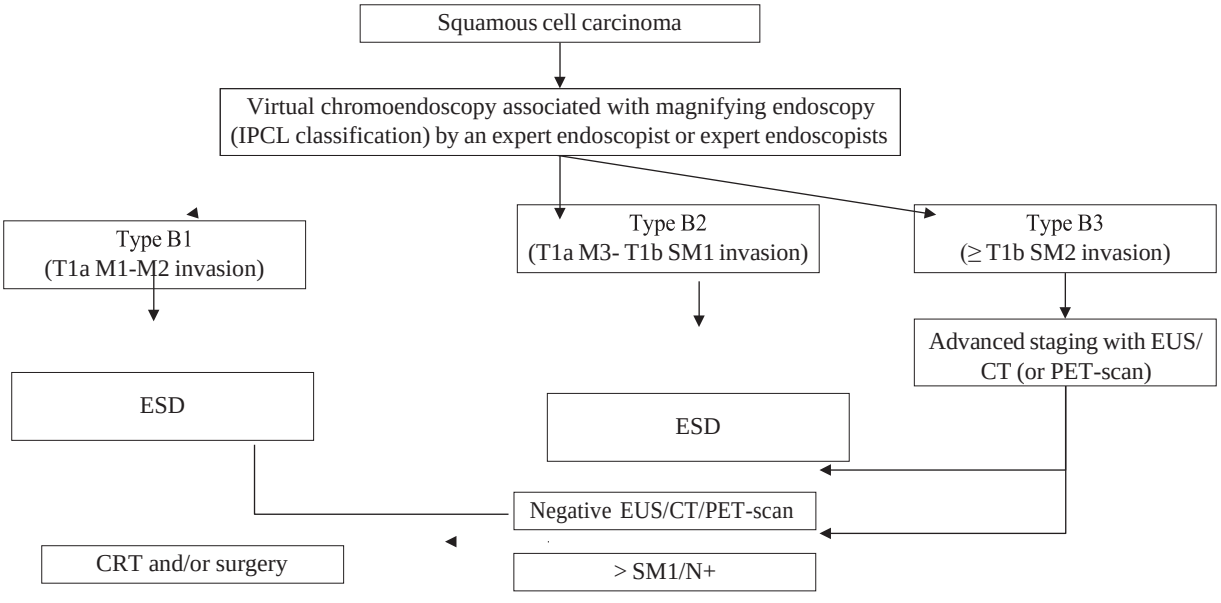
METHODS

Patients

This was a retrospective, observational study. Data were extracted from a prospectively generated database, including consecutive patients from 2009 to 2022 who underwent ESD for superficial esophageal neoplasms.

The inclusion criteria were patients referred for endoscopic resection (ER) with early neoplasms assessed by IEE, including high-resolution white light endoscopy (WLE), Fuji intelligent chromoendoscopy, late narrow band imaging (NBI), blue laser imaging, and linked color imaging. In addition, chromoendoscopy with stains such as Lugol for squamous cell cancer and acetic acid for Barrett's related lesions and adenocarcinoma were utilized in the preoperative assessment. In selected cases, endoscopic ultrasonography (EUS) and computed tomography were performed for preoperative staging. Patients with advanced tumors or clinical conditions considered unsuitable for general anesthesia and endoscopic surgery were excluded. Figure 1 shows an outline of the selection process for our patients before ESD.

The following data were collected: age, sex, histological type of the esophageal neoplastic lesion, preoperative biopsy, location, size, Paris endoscopic classification, duration of the procedure, specimen histological report, adverse events, and hospital permanence. The *en bloc* resection rate, complete resection rate with free margins (R0), and curative resection rate were calculated according to current European guidelines.[2] The curative criteria for squamous cell carcinomas are as follows: very low risk of lymph node metastasis: (1) *en bloc* and complete resection; (2) tumors limited to the epithelium (pT1a-EP) or lamina



propria (pT1a-LMP); (3) absence of lymphovascular invasion; and (4) well-to-moderate grade of differentiation. Low risk of lymph node metastasis: (1) *en bloc* and complete resection; (2) tumors with muscularis mucosa (pT1a-MM) or superficial submucosal (pT1b-Sm1, ≤200 µm) invasion; (3) well-to-moderate grade of differentiation; and (4) absence of lymphovascular invasion. Likewise, the curability criteria for adenocarcinomas were considered as follows: very low risk of lymph node metastasis: (1) *en bloc* and complete resection; (2) tumors limited to the epithelium (pT1a-EP), lamina propria (pT1a-LMP), or muscularis mucosa (pT1a-MM); (3) absence of lymphovascular invasion; and (4) well-to-moderate grade of differentiation. The low risk of lymph node metastasis was as follows: (1) *en bloc* and complete resection; (2) tumors with superficial submucosal invasion (pT1b-Sm1, ≤500 µm); (3) absence of lymphovascular invasion; and (4) well-to-moderate grade of differentiation.

In addition, the local recurrence rate and metachronous lesions were analyzed in the patients who returned for endoscopic follow-up. Endoscopic follow-up was scheduled three months after ESD and once a year thereafter. Local recurrence was defined as the appearance of a new esophageal neoplastic lesion at the same site as the previous resection during endoscopic follow-up. A metachronous lesion was defined as the appearance of a new esophageal lesion at a site different from the previous resection after a minimum of 6 months of follow-up. If a second esophageal tumor was detected within 6 months of ER, it was considered a missed lesion rather than a metachronous tumor.

ESD procedures

All the patients who underwent esophageal ESD were admitted to the hospital. The procedures were performed by a single endoscopist (VA) under general anesthesia. The operator was trained by experienced endoscopists (YM and TT) in a high-volume referral center in Japan and has currently performed close to 300 ESD procedures in the gastrointestinal tract. After a detailed endoscopic assessment with high-definition WLE, virtual chromoendoscopy, and 0.8% Lugol staining (or 1% acetic acid chromoscopy for Barrett's related neoplasia), lesions were classified according to the PARIS classification.[3] ESD procedures were carried out with a therapeutic endoscope and a working channel of 3.2 mm (EG-450 RD; Fujifilm, Saitama, Japan), Flush knife (DK-2618JN; FTS, Tokyo, Japan) BT 1.5 (Fujifilm) connected to the electrosurgical unit (ERBE VIO 200S, 200D, or 300D; Tubingen, Germany), and a 4 mm long cap (Elastic Touch; Top, Tokyo, Japan) attached to the tip of the endoscope to ensure optimal vision of the dissection field. Each procedure consisted of the following six steps: (1) lesion marking with diathermy using soft coagulation mode, effect 6, 100 watts, (2) submucosal injection to lift the lesion with 0.4% sodium hyaluronate in a teardrop form (Adaptis Fresh; Legrand Laboratory, Campinas, Brazil),[4] (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 the soft coagulation mode, effect 6, 100 watts. Blood vessels were sealed with a knife or coagulation forceps (Coagrasper; Olympus, Tokyo, Japan) depending on the vessel size, and (6) antibiotic prophylaxis with intravenous cephalosporin (or clindamycin if history of allergy) was administered to all patients, despite the absence of standardized consensus supporting the routine use of antibiotic prophylaxis in patients undergoing esophageal ESD, in contrast to colorectal ESD.[5]

In the postoperative period, all patients received protonpump inhibitors for four weeks and sucralfate for two weeks. A4-week prednisone-based protocol was administered to patients with semi-circumferential resection over 75% of their circumference. The protocol consisted of 30 mg of oral prednisone starting on the third postoperative day, and the dose was tapered over 4 weeks period: 30 mg/day week 1, 20 mg/day week 2, 10 mg/day week 3, and 5 mg/day week 4.[6]

Statistical analysis

Data were tabulated using Microsoft Excel for Windows 2010 (Microsoft Corp., Redmond, WA, USA), and statistical analyses were performed using IBM SPSS ver. 24.0 (IBM Corp., Armonk, NY, USA). A descriptive analysis of the data was performed with frequency and proportion for categorical and average variables, and standard deviation (SD), median, and mean±SD for continuous variables.

Ethical statements

The authors declare that the study consisted of a retrospective assessment of Western experience with more than 100 consecutive procedures in esophageal ESD and was conducted in accordance with the Declaration of Helsinki. This study was limited to the analysis and description of the statistical calculations of one of the largest cases of esophageal ESD in the West. This study was conducted in an endoscopic referral center in Brazil with informed consent obtained from the patients, and the re-

in 2019 and updated IRB approval in 2021 both attached by the Hospital das Clinicas, Federal University of Minas Gerais (IRB No: 77/2019).

RESULTS

During the study period, 108 esophageal ESDs were performed on 87 patients. Three procedures were discontinued due to the presence of a non-lifting sign and the impossibility of safely carrying out submucosal dissection. Of the 84 patients included in the analysis, 24 were women (28.6%) and 60 were men (71.4%). The average age was 64.3 years (SD, ±10.9 years). The mean size of the lesions was 33.8 mm (SD, ±16.2> mm). The mean duration of the procedure was 109.3 minutes (SD, ±49.0 minutes). The distribution of the lesions was as follows: upper third, 17 tumors (16.2%); medium third, 48 (45.7%); lower third, 34 (32.4%); and esophagogastric junction, 6 (5.7%). Table 1 shows the clinicopathological characteristics of the patients.

Of the 84 patients, nine underwent more than one ESD because of synchronous esophageal neoplasms. In three patients, the second ESD was performed in the same endoscopy session, while in five cases, the second ESD operation was performed in a different endoscopy session due to clinical conditions of the patient and comorbidities or because of the larger size of the lesion with a prolonged procedure. Of the 105 resected lesions, 70 (66.6%) were squamous cell carcinomas, 18 (17.1%) were high-grade intraepithelial neoplasia, 12 (11.4%) were esophageal adenocarcinomas, three (2.9%) were granular cell tumors, and two (1.9%) were low-grade intraepithelial neoplasia. It should be noted that the 20 intraepithelial neoplasias (dysplastic lesions) found in our casuistry were equally distributed with respect to the epithelium of origin, with ten cases (50.0%) developing on squamous epithelium and the remaining 10 on Barrett's epithelium. Regarding macroscopic morphology, 61 (58.1%) lesions were classified as 0-IIb, 20 (19.0%) lesions were 0-IIa, 11 (10.5%) lesions were 0-IIc, 4 (3.8%) lesions were 0-IIa+IIc, 4 (3.8%) lesions were 0-Is, 3 (2.9%) lesions were elevated with a subepithelial appearance, 1 (0.9%) lesion was 0-IIa+IIb, and 1 (0.9%) lesion was 0-Is+IIb.

An overall *en bloc* resection rate of 96.2% (101/105) was achieved. In seven cases, ESD was completed with *en bloc* snaring of the dissected lesion due to technical difficulties. Complete tumor resection with histologically free margins was obtained in 85 of the 105 lesions (81.0%). In 68 lesions (64.8%), the procedure was considered to be curative. In the carcinoma group, the tumor invasion depth was distributed as follows: 55 lesions with intramucosal tumor (adenocarcinoma, 4; squamous cell carcinoma, 51), 8 lesions with superficial submucosa (SM1) invasion (adenocarcinoma, 3; squamous cell carcinoma, 5), and 19 tumors with deep submucosal (SM2) invasion (adenocarcinoma, 5; squamous cell carcinoma, 14). The histopathological characteristics of the included patients are shown in Table 2.

There were no mortality cases during the 30-day postoperative period or mortality related to the procedure. Among the 37 lesions (35 patients) considered to be non-curative (35.3%), 21 (22/37 lesions; 59.4%) were managed with endoscopic follow-up only, as they were patients with positive lateral margins or with multiple comorbidities and high surgical risk, unsuitable for additional interventions. The remaining 14 patients

Table 1. Patients and lesions characteristics

Characteristic	Value
Patients/lesions	84/105
Male, female	60 (71.4), 24 (28.6)
Average age (range, yr)	64.3 (32–86)
Location	
Upper third	17 (16.2)
Medium third	48 (45.7)
Lower third	34 (32.4)
Esophagogastric junction	6 (5.7)
Macroscopic type (PARIS classification)	
0–IIa	20 (19.0)
0–IIb	61 (58.1)
0–IIc	11 (10.5)
0–IIa+IIc	4 (3.8)
0–Is	4 (3.8)
Others	2 (1.9)
Subepithelial lesions	3 (2.9)
Average size of lesion (range, mm)	33.8 (10–100)
<20	8 (7.6)
20–30	57 (54.3)
>30	40 (38.1)
Complications	
Perforation	2 (1.9)
Gastrointestinal bleeding	1 (1.0)
Esophageal stricture	3 (2.9)
Mortality	0 (0)
Circumferential defect post-ESD (range, %)	68.4 (20–95)
Procedure duration (min)	109.3±46.5
Hospital stay (day)	2.9±1.45

Values are presented as number (%) or mean±standard deviation, unless otherwise indicated.
ESD, endoscopic submucosal dissection.

Table 2. Histopathological characteristics of patients

Characteristic	Value
Premalignant lesions	
Total	20 (19.0)
Histological subtype	
Low-grade intraepithelial neoplasia	2 (10.0)
High-grade intraepithelial neoplasia	18 (90.0)
Malignant lesions	
Total	82 (78.1)
Histological subtype	
Squamous cell carcinoma	70 (85.4)
Adenocarcinoma	12 (14.6)
Subepithelial lesions	
Total	3 (2.9)
Granular cell tumor	3 (100)
En bloc resection (*n*=105)	101 (96.2)
Complete resection (R0) (*n*=105)	85 (81.0)
Curative resection (*n*=105)	68 (64.8)
Depth of tumor invasion	
Intramucosal (T1a) (*n*=82)	55 (67.1)
Adenocarcinoma (*n*=55)	4 (7.3)
Squamous cell carcinoma (*n*=55)	51 (92.7)
Intramucosal M1 (*n*=55)	26 (47.3)
Intramucosal M2 (*n*=55)	8 (14.5)
Intramucosal M3 (*n*=55)	21 (38.2)
Submucosal invasion (T1b) (*n*=82)	27 (32.9)
Superficial submucosa (SM1) (*n*=27)	8 (29.6)
Adenocarcinoma (*n*=8)	3 (37.5)
Squamous cell carcinoma (*n*=8)	5 (62.5)
Deep submucosa (SM2) (*n*=27)	19 (70.4)
Adenocarcinoma (*n*=19)	5 (26.3)
Squamous cell carcinoma (*n*=19)	14 (73.7)
Median endoscopic follow-up time (mo)	18±33.2
Rate of local recurrence	4 (3.8)
Rate of metachronic lesion	9 (8.6)
Post-ESD specimen size (cm)	5.3±1.8

Values are presented as number (%) or mean±standard deviation.
M1, intramucosal M1; M2, intramucosal M2; M3, intramucosal M3; SM1, superficial submucosa; SM2, deep submucosa; ESD, endoscopic submucosal dissection.

with non-curative ESD were discussed on a multidisciplinary tumor board, and in ten patients (11/37 lesions; 29.7%), a decision was made for adjuvant chemoradiotherapy, and four patients (4/37 lesions; 10.8%) underwent esophagectomy. The main indications for adjuvant chemoradiotherapy were lymphovascular invasion, SM2 invasion, and compromised deep margins. Table 3 shows the list of patients with the criteria for non-curative ER and subsequent management plans.

The mean duration of hospital stay after the procedure was 2.9 days (SD, ±1.45 days). Six patients (6 lesions) experienced adverse events (5.7%); one case of post-ESD gastrointestinal bleeding, two cases of intraoperative esophageal perforation, and three cases of postoperative esophageal stricture (ES). The overall ES rate was 2.9% (3/105 lesions). All adverse events were successfully controlled endoscopically, including two perforations by clip closure, a case of gastrointestinal bleeding by clip hemostasis associated with thermal coagulation and three 3 cases of ES by sessions of endoscopic balloon dilation with a mean of two sessions of endoscopic dilation up to 15 mm in diameter. Figure 2 shows an illustrative case of esophageal ESD.

Endoscopic follow-up for a median period of 18 months (range, 3–156 months; mean: 29.7 months) was performed, disclosing four cases of local recurrence (3.9%) and nine cases of metachronous lesions (8.9%). Among the group of recurrent lesions, one occurred in the first 3 months and the other three originated after 20 months of endoscopic follow-up and thereafter. Of the four patients with local recurrence, three were referred for chemoradiotherapy, and one patient who was unfit for surgery was kept on for close endoscopic surveillance. With regard to metachronous lesions, three cases were detected within the first 6 to 12 months of follow-up, and the other cases were detected after at least 19 months of follow-up. In four patients, the metachronous lesion was managed by EMR, two patients with advanced metachronous lesions underwent esophagectomy, one patient underwent an additional ESD, one patient was referred for chemoradiotherapy, and in one patient, a new ESD was contraindicated due to severe pulmonary disease; thus, only endoscopic surveillance was recommended.

DISCUSSION

This case series adds further evidence to the efficacy and safety of esophageal ESD in the treatment of superficial esophageal neoplasms, but only in a Latin American population and by a single trained operator. The main strength of our study is that it reports 105 consecutive esophageal ESD procedures in the West, to our knowledge, the largest published experience from Latin America, presenting clinical outcomes similar to those obtained in world reference Japanese endoscopic centers. Moreover, this study highlights the importance and relevant impact of Japanese centers of excellence offering ESD training to international trainees to disseminate ESD all over the world.

One of the main issues prior to the therapeutic approach for

Table 3. List of patients with criteria for non-curative resection and management plan

List of cases	Criteria for non-curative resection	Management plan
8, 23, 24, 40, 59	SCC with compromise of lateral margins	Follow-up endoscopy
52, 58, 86	HGD with compromise of lateral margins	Follow-up endoscopy
93	HGD with compromise of lateral margins	Chemoradiotherapy
39, 43, 71	SCC with R0 resection with SM2 invasion	Follow-up endoscopy
30, 54, 73, 92	SCC with R0 resection with SM2 invasion	Chemoradiotherapy
28, 85, 87	SCC with R0 resection with SM2 invasion+lymphatic/vascular invasion	Follow-up endoscopy
3, 6, 49	SCC with compromise of lateral margins (converted to piecemeal)	Follow-up endoscopy
72	SCC with compromise of lateral margins (converted to piecemeal)	Chemoradiotherapy
5	Adenocarcinoma with compromise of lateral margins+compromised deep margin	Follow-up endoscopy
12	Adenocarcinoma with SM2 invasion (1,500 μ)+compromise of deep margin+compromise of lateral margins	Esophagectomy
25	Adenocarcinoma with R0 resection with SM2 invasion (2,000 μ)+lymphatic/vascular invasion	Follow-up endoscopy
35	SCC with R0 resection with SM2 invasion (760 μ)+lymphatic/vascular invasion	Follow-up endoscopy
42	Adenocarcinoma with SM2 invasion+lymphatic/vascular invasion+compromised deep margin + compromise of lateral margins	Chemoradiotherapy
70	SCC undifferentiated with SM2 invasion+compromise of lateral margins	Esophagectomy
88	SCC with SM2 invasion+compromise of deep margin	Esophagectomy
17	HGD with R0 resection+signet ring cells	Follow-up endoscopy
74	SCC with R0 resection with lymphatic/vascular invasion	Follow-up endoscopy
78, 95	SCC undifferentiated with R0 resection+lymphatic/vascular invasion	Chemoradiotherapy
100	SCC undifferentiated with SM2 invasion (350 μ)	Chemoradiotherapy
102	SCC with compromise of deep margin+compromise of lateral margins	Chemoradiotherapy
105	Adenocarcinoma associated with undifferentiated neuroendocrine carcinoma with SM2 invasion (2,800 μ)+compromise of deep margin	Esophagectomy

SCC, squamous cell carcinoma; HGD, high-grade dysplasia; M1, intramucosal M1; M2, intramucosal M2; M3, intramucosal M3; SM1, superficial submucosa; SM2, deep submucosa.

mor invasion depth, which influences the management plan.[7-11] In addition to EUS, recent studies from Asia have shown that endoscopic assessment using improved imaging technologies by an expert operator can obtain reliable results. Mizumoto et al.[12] performed a retrospective study in 174 patients with early esophageal squamous cell carcinomas and compared the effectiveness of EUS and magnifying endoscopy with NBI (ME-NBI) to estimate tumor invasion depth. The authors demonstrated significantly higher sensitivity and accuracy for ME-NBI compared to EUS in distinguishing squamous cell carcinoma limited to the epithelium or lamina propria from those that invade the muscularis mucosae (MM) or superficial submucosa and more deeply invasive lesions before ESD (sensitivity, p=0.048; accuracy, p=0.017). These findings show that endoscopic analysis of lesions with IEE tools could be used as an effective alternative in endoscopic centers where EUS expertise is unavailable. In our study, in the first period, we frequently used EUS (either miniprobe or radial echoendoscopes) to assess tumor depth invasion. Recently, we prioritized the use of IEE, particularly with virtual chromoendoscopy and magnification, to estimate the depth of invasion and to select patients for ER. Our current protocol for the selection of patients for ESD relies mainly on endoscopic assessment with virtual chromoendoscopy (blue laser imaging or NBI) and magnifying endoscopy, considering the microvessel morphology (intrapapillary capillary loops) according to the current classification proposed by the Japan Esophageal Society.[13] If a lesion has Japan Esophageal Society type B3 or features suspicious for deep SM invasion, such as nodules, ulceration, or depression, we consider additional staging procedures such as EUS and computed tomography.

In the early periods of endoscopic therapy, superficial esophageal carcinomas were treated with esophagectomy with considerable post-surgical morbidity. The development and improvement of ER techniques, such as EMR and, more recently, ESD, has revolutionized this management strategy. At present, different studies have shown great benefits of ESD over surgery in the eradication of early esophageal carcinomas.[14,15] Min et al.[16] found in a comparative study of 240 patients (ESD, 120; esophagectomy, 120) during a follow-up period of 5 years; overall survival, disease-specific survival, recurrence-free survival,

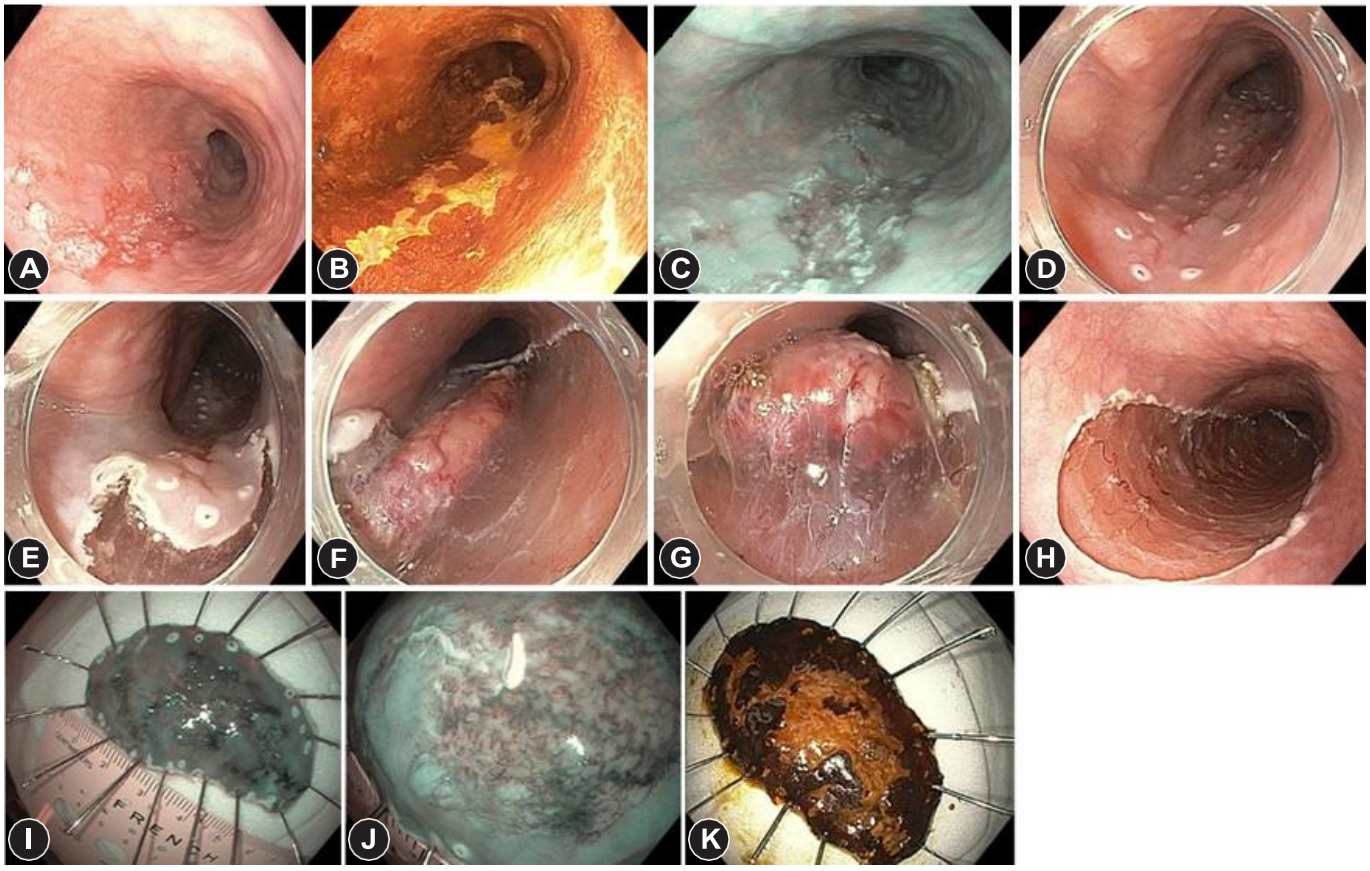


Fig. 2. Illustrative case of esophageal endoscopic submucosal dissection (ESD). (A) Illustrative clinical case of a 68 year-old man with a flat erythematous lesion (Type 0II-b) in the distal esophagus in white-light view. (B) Lugol chromoendoscopy demonstrating lesion extension. The biopsy findings were consistent with those of squamous cell cancer. (C) Narrow band imaging (NBI) view revealing a typical Lugol-negative flat neoplasm with clear margins and a good indication for endoscopic resection. (D) Markings were placed. (E) After submucosal injection of sodium hyaluronate, oral incision was started. (F) After circumferential incision and submucosal dissection, a flap was created toward the gravity side. (G) ESD was performed in the oral to anal direction. A clear view of the submucosal space was noted for trimming. (H) ESD was successfully accomplished with a final defect occupying 50% of the circumference and 8 cm in longitudinal extension. (I) A 60-mm specimen was fixed for histological assessment. The NBI view shows all the markings inside the specimen. (J) Closed-view NBI demonstrating a mixed B1 microvascular pattern with minimal avascular areas. (K) Lugol chromoendoscopy of the specimen revealing a tumor with free margins. Histology revealed squamous cell cancer with lamina propria invasion (M2), free margins, and no lymph/vascular invasion. ESD is considered curative, and endoscopic follow-up is recommended.

and metachronous recurrence-free survival of 93.9% vs. 91.2%, 100% vs. 97.4%, 92.8% vs. 95.3%, and 90.3% vs. 100% for ESD and esophagectomy groups, respectively (p=0.004). The authors also noted adverse event rates of 55.5% and 18.5% %for the esophagectomy and ESD group, respectively (p<0.0001). The same type of observation can be demonstrated in this study, indicating that with proper training and after experiencing the learning curve period, ESD can be consolidated as a safe and efficient therapy for early esophageal tumor management, not only in Asia but also in different Western countries.

The limited experience with esophageal ESD in the treatment of superficial esophageal neoplasms outside Asia is mainly due to its high technical complexity and long learning curve.[17] Few studies representing Western experience with ESD for superficial esophageal carcinomas have been published thus far.[18-20] Our group reported our initial experience with esophageal ESD in 2013. The *en bloc*, complete, and curative resection rates obtained in this first period were 92.0% (23/25 lesions), 84.0% (21/25 lesions), and 80.0% (20/25 lesions), respectively, with a complication rate of 12.0% (3/25 lesions), two subcutane-

Table 4. Comparative table of world-wide outcomes in esophageal ESD

Study	Bloc resection rate	Complete resection rate (R0)	Curative resection rate	Rate complications	Rate of esophageal stricture post-ESD
Arantes et al.[6] 2022	96.2 (101/105)	81.0 (85/105)	64.8 (68/105)	5.7 (6/105)	2.9 (3/105)
Furue et al.[26] 2019	91.6 (251/274)	91.6 (251/274)	86.9 (238/274)	6.2 (17/274)	7.3 (20/274)
Tsujii et al.[27] 2015	96.7 (356/368)	84.5 (311/368)	76.2 (272/357)	6.8 (25/368)	7.1 (26/368)
Park et al.[29] 2016	97.2 (35/36)	91.7 (33/36)	80.6 (29/36)	11.1 (4/36)	13.9 (5/36)
Yamashina et al.[28] 2012	100 (39/39)	92.3 (36/39)	69.7 (23/33)	2.6 (1/39)	28.2 (11/39)

Values are presented as % (number/total number of lesions).
ESD, endoscopic submucosal dissection.

ous emphysemas, and one perforation.[21] If we compare these numbers to the data accumulated over the entire cohort, we observed that the *en bloc* resection rate increased to 96.2%, and the adverse event rate dropped to 6%. Nevertheless, the rates of complete and curative resections decreased to 81.0% and 64.8%, respectively. We hypothesized that after accomplishing the learning curve period and with accumulated experience, we have admitted for ESD more challenging cases and larger tumor lesions with higher rates of submucosal invasion or lymphovascular compromise, which ultimately resulted in a non-curative intervention despite complete tumor removal. The compilation of our cumulative data shows that in the West, rates of clinical efficacy and complications associated with esophageal ESD can be achieved in a similar proportion to those reported in Asian studies,[22-25] with a significant improvement over time after further accumulating experience with the method.[26-29] Table 4 presents a comparative analysis of our results in terms of esophageal ESD clinical effectiveness in different published case series.[6,26-29]

The current study had some limitations. The study population was heterogeneous and included premalignant dysplas- tic lesions originating from both squamous epithelium and Barrett's-related squamous cell cancer, adenocarcinoma, and subepithelial tumors (granular cell tumors). Nevertheless, in all cases, the same ESD approach was used, enabling the appreciation of the clinical utility of ESD in a wide range of superficial neoplasms. The number of cases included in our casuistry can be considered relatively small when compared to previous studies conducted in Asia; however, to our knowledge, this is one of the largest case series from Western centers, particularly from Latin America. In addition, since this is a single-operator experience report of patients who received focused training in Japanese centers, the data presented in this manuscript may not be representative of endoscopy units without operators with extensive training in ESD and cannot be generalized.

In conclusion, esophageal ESD for the optimal eradication of superficial neoplasms is a reality in the West and Latin America, with high clinical efficiency and low complication rates in expert hands similar to those obtained in Japanese referral endoscopic centers, with the potential to become the first-line treatment for this type of neoplastic lesion.

1.1. Conflicts of Interest

The authors have no potential conflicts of interest.

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1.4. Author Contributions

Conceptualization: all authors; Data curation; all authors; Formal análisis: all authors; Investigation: all authors; Methodology: all authors; Project administration: all authors; Resources: all authors; Software: all authors; Supervision: all authors; Validation: all authors; Visualization: all authors; Writing–original draft: all authors; Writing–review & editing: all authors.

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IV. DISCUSION:

Esta serie de casos agrega evidencia científica adicional a la eficacia y seguridad de la ESD esofágica en el tratamiento de las neoplasias esofágicas superficiales, pero en una población latinoamericana y por un único operador entrenado. La principal fortaleza de nuestro estudio es que reporta 105 procedimientos consecutivos de ESD esofágica en Occidente, hasta donde sabemos, la mayor experiencia publicada en Latinoamérica, presentando resultados clínicos similares a los obtenidos en centros endoscópicos japoneses de referencia mundial. Además, este estudio destaca la importancia y el impacto relevante de los centros japoneses de excelencia que ofrecen formación en ESD a endoscopistas internacionales para difundir la ESD en todo el mundo.

Uno de los principales aspectos previos al abordaje terapéutico de los carcinomas superficiales de esófago es la evaluación de la profundidad de invasión tumoral, que influye en el plan de manejo [7-11]. Además de la EUS, estudios recientes realizados en Asia han demostrado que la evaluación endoscópica mediante tecnologías de imagen mejoradas por un operador experto puede obtener resultados fiables. Mizumoto et al [12]. realizaron un estudio retrospectivo en 174 pacientes con carcinomas esofágicos precoces de células escamosas y compararon la eficacia de la EUS y la endoscopia de aumento con NBI (ME-NBI) para estimar la profundidad de invasión tumoral.

Los autores demostraron una sensibilidad y precisión significativamente mayores de la ME-NBI en comparación con la EUS a la hora de distinguir el carcinoma de

células escamosas limitado al epitelio o a la lámina propia de aquellos que invaden la muscularis mucosae (MM) o la submucosa superficial y las lesiones invasivas más profundas antes de la ESD (sensibilidad, p=0,048; precisión, p=0,017). Estos resultados demuestran que el análisis endoscópico de las lesiones con herramientas de IEE podría utilizarse como una alternativa eficaz en los centros endoscópicos en los que no se dispone de experiencia en EUS. En nuestro estudio, en el primer periodo, utilizamos con frecuencia la EUS (ya fuera minisonda o ecoendoscopia radial) para evaluar la invasión tumoral en profundidad. Recientemente, hemos priorizado el uso de la IEE, en particular con cromoendoscopia virtual y magnificación, para estimar la profundidad de la invasión y seleccionar a los pacientes para la resección endoscópica. Nuestro protocolo actual para la selección de pacientes para la ESD se basa principalmente en la evaluación endoscópica con cromoendoscopia virtual (blue laser imaging o NBI) y magnificación endoscópica, teniendo en cuenta la morfología de los microvasos (asas capilares intrapapilares) de acuerdo con la clasificación actual propuesta por la Sociedad Japonesa de Esófago [(13)]. Si una lesión tiene el tipo B3 de la Sociedad Esofágica Japonesa o características sospechosas de invasión profunda de la submucosa, como nódulos, ulceración o depresión, consideramos procedimientos de estadificación adicionales como la EUS y/o tomografía computarizada.

En los primeros periodos de la terapia endoscópica, los carcinomas esofágicos superficiales se trataban mediante esofagectomía con una considerable morbilidad posquirúrgica. El desarrollo y la mejora de las técnicas de resección endoscópica, como la EMR y, más recientemente, la ESD, han revolucionado esta estrategia de

tratamiento. En la actualidad, diferentes estudios han demostrado grandes beneficios de la ESD frente a la cirugía en la erradicación de los carcinomas esofágicos precoces [14][15]. Min et al [16]. hallaron en un estudio comparativo de 240 pacientes (ESD: 120; esofagectomía: 120) durante un periodo de seguimiento de 5 años; una supervivencia global, una supervivencia específica de la enfermedad, una supervivencia libre de recidiva y una supervivencia libre de recidiva metacrónica del 93,9% frente al 91,2%, del 100% frente al 97,4%, del 92,8% frente al 95,3% y del 90,3% frente al 100% para los grupos de ESD y esofagectomía, respectivamente ($p=0,004$). Los autores también observaron unas tasas de eventos adversos del 55,5% y el 18,5% para los grupos de esofagectomía y ESD, respectivamente ($p<0,0001$). El mismo tipo de observación puede demostrarse en este estudio, lo que indica que con una formación adecuada y tras experimentar el periodo de curva de aprendizaje, la ESD puede consolidarse como una terapia segura y eficaz para el tratamiento precoz de tumores esofágicos, no sólo en Asia sino también en diferentes países occidentales.

Uno de los aspectos mas importantes durante la ejecución de la ESD esofágica es la presencia de complicaciones asociadas al procedimiento, las cuales pueden ser: perforación, estenosis esofagica, hemorragia digestiva. Estos eventos adversos estan fuertemente relacionados a dos factores: la experiencia del endoscopista y el uso adecuado de sustancias y/o técnicas para evitarlas. Una de las mas frecuentes es la perforación esofágica la cual esta directamente asociada a la calidad del colchon submucoso, en Occidente existen multiples sustancias para lograr este fin sin embargo la mayoría de ellas son poco accesibles para la población general.

Nuestro grupo de investigación [4] elaboro un estudio utilizando hialuronato sodico 0.4% en su presentación farmacológica de gotas oftálmicas para inyección submucosa en ESD gástrica, obteniendo una tasa de resección en bloque, completa y curativa del 96.1%, 92.3% y 83.8% respectivamente, con una baja tasa de complicaciones: perforación 2.5% (2/78) y hemorragia digestiva 3.8% (3/78), mostrando además una mortalidad asociada al procedimiento del 0%. Lo cual nos demuestra el optimo perfil de eficacia- seguridad de esta sustancia en la prevencion de la perforación esofágica durante la ESD.

La limitada experiencia con la ESD esofágica en el tratamiento de las neoplasias esofágicas superficiales fuera de Asia se debe principalmente a su elevada complejidad técnica y su larga curva de aprendizaje [17]. Hasta ahora se han publicado pocos estudios que representen la experiencia occidental con la ESD para carcinomas esofágicos superficiales [18-20]. Nuestro grupo informó de nuestra experiencia inicial con la ESD esofágica en el 2013. Las tasas de resección en bloque, completa y curativa obtenidas en este primer periodo fueron del 92,0% (23/25 lesiones), 84,0% (21/25 lesiones) y 80,0% (20/25 lesiones), respectivamente, con una tasa de complicaciones del 12,0% (3/25 lesiones), dos enfisemas subcutáneos y una perforación [21]. Si comparamos estas cifras con los datos acumulados en toda nuestra cohorte, observamos que la tasa de resección en bloque aumentó al 96,2%, y la tasa de eventos adversos descendió al 6%. Sin embargo, las tasas de resecciones completas y curativas disminuyeron hasta el 81,0% y el 64,8%, respectivamente. Nuestra hipótesis es que, tras superar el periodo de curva de aprendizaje y con la experiencia acumulada, hemos admitido para la

ESD casos más difíciles y lesiones tumorales de mayor tamaño con tasas más elevadas de invasión submucosa o compromiso linfovascular, lo que en última instancia dio lugar a una intervención no curativa a pesar de la extirpación completa del tumor. La recopilación de nuestros datos acumulados demuestra que en Occidente, las tasas de eficacia clínica y de complicaciones asociadas a la ESD esofágica pueden alcanzarse en una proporción similar a las comunicadas en estudios asiáticos [22-25], con una mejora significativa a lo largo del tiempo tras seguir acumulando experiencia con el método [26-29]. Furue et.al [26] incluyeron retrospectivamente 374 pacientes (423 lesiones) con diagnostico histologico confirmado de carcinoma de células escamosas de esofago, los cuales fueron sometidos a ESD (274 lesiones) y EMR (149 lesiones), obteniendo para el grupo de ESD una tasa de resección en bloque, completa y curativa de 91.6%, 91.6% y 84.9% respectivamente, con una tasa global de eventos adversos del 6.2% (17/274), mientras que para el grupo de EMR obtuvieron una tasa de resección en bloque y completa del 48.3%, con una tasa de perforacion esofágica del 0%. Nuestros resultados son muy similares a los obtenidos en el grupo de ESD del estudio antes mencionado, lo cual nos demuestra que en Latinoamerica luego de superar adecuadamente la curva de aprendizaje de la ESD es factible lograr un perfil de eficacia – seguridad semejante a los presentados en los estudios asiáticos mas representativos. Asimismo el estudio antes mencionado reafirma las grandes ventajas de la ESD respecto a la EMR en términos de resección en bloque y completa, lo cual es fundamental para una optima evaluación histopatológica del especimen resecado. La tabla 4 presenta un análisis comparativo de nuestros

resultados en términos de eficacia clínica de la ESD esofágica con diferentes series de casos publicadas [6, 26-29].

Uno de los principales tratamientos co-adyuvantes en los pacientes con ESD esofagicas no curativas es la quimioradioterapia, sin embargo recientemente algunos autores estan proponiendo el uso de un esquema de quimioradioterapia selectiva para cierto grupo de pacientes con resecciones curativas pero con un alto riesgo de metastasis linfonodal locoregional. Minashi et al [(30)] enrolaron prospectivamente 176 pacientes con diagnostico de carcinoma de células escamosas de esofago los cuales fueron divididos en tres grupos: Grupo A (solo seguimiento) : Tumores intramucosos (p T1a) con márgenes de resección negativos y sin invasion linfovascular. Grupo B (quimioradioterapia profiláctica): Tumores con invasion submucosa (p T1b) con márgenes negativos o tumores intramucosos (p T1a) con invasion linfovascular. Grupo C (quimioradioterapia definitiva): Tumores con márgenes verticales positivos, demostrando una sobrevida global a los 3 años del 90.7% para el Grupo B (90% intervalo de confianza, 84.0%–94.7%) y del 92.6% en todos los pacientes incluidos (90% intervalo de confianza, 88.5%– 95.2%). Esto nos muestra que la quimioradioterapia selectiva (profiláctica) en cierto grupo de pacientes post- ESD esofágica mejora significativamente la sobrevida a mediano y largo plazo, similar a la esofaguectomía pero preservando el órgano afectado y evitando la morbilidad post-quirurgica.

Nuestro estudio presenta algunas limitaciones. La población de estudio era heterogénea e incluía lesiones displásicas premalignas originadas tanto en epitelio

escamoso como en epitelio relacionado con Barrett, adenocarcinomas y tumores subepiteliales (tumores de células granulares). No obstante, en todos los casos se utilizó el mismo enfoque de ESD, lo que permite apreciar la utilidad clínica de la ESD en una amplia gama de neoplasias superficiales. El número de casos incluidos en nuestra casuística puede considerarse relativamente pequeño en comparación con estudios previos realizados en Asia; sin embargo, hasta donde sabemos, ésta es una de las series de casos más amplias procedentes de centros occidentales, en particular de Latinoamérica. Además, dado que se trata del informe de la experiencia de un solo operador que recibió formación específica en centros japoneses, los datos presentados en este manuscrito pueden no ser representativos de unidades de endoscopia sin operadores con amplia formación en ESD y no pueden generalizarse.

V. CONCLUSION:

La ESD esofágica para la erradicación óptima de las neoplasias superficiales es una realidad en Occidente y Latinoamérica, con una alta eficacia clínica y bajas tasas de complicaciones en manos expertas similares a las obtenidas en centros endoscópicos de referencia mundial, con el potencial para convertirse en el tratamiento de primera línea para este tipo de lesiones neoplásicas.

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VII. ANEXOS:

Tabla 1: Características de los pacientes y las lesiones

Pacientes / Lesiones	84/105
Masculino (%), Femenino (%)	60 (71.4%), 24 (28.6%)
Edad promedio (rango)	64.3 años (32 - 86)
Localización	
Tercio Superior	17 (16.2%)
Tercio Medio	48 (45.7%)
Tercio Inferior	34 (32.4%)
Unión esofagogástrica	6 (5.7%)
Tipo Macroscópico (Clasificación PARIS)	
0-IIa	20 (19.0%)
0-IIb	61 (58.1%)
0-IIc	11 (10.5%)
0-IIa+IIc	4 (3.8%)
0-Is	4 (3.8%)
Otros	2 (1.9%)
Lesiones Subepiteliales	3 (2.9%)
Media de tamaño de las lesiones (rango)	33.8 mm (10 - 100)
< 20 mm	8 (7.6%)
20-30mm	57 (54.3%)
>30mm	40 (38.1%)
Complicaciones	
Perforación	2 (1.9%)
Hemorragia Gastrointestinal	1 (1.0%)
Estenosis esofágica	3 (2.9%)
Mortalidad	0 (0%)
Porcentaje de defecto circunferencial post -ESD (Rango)	68.4% (20% - 95%)
Duración del procedimiento en minutos (desviación estándar)	109.3 min (*SD* +/- 46.5)
Estancia hospitalaria en días (Desviación estándar)	2.9 días (*SD* +/- 1.45)

Tabla 2: Características histopatológicas de los pacientes

	n (%)
Lesiones Premalignas	
Total	20 (19.0%)
Subtipos Histológicos	
Neoplasia intraepitelial de bajo grado	2 (10.0%)
Neoplasia intraepitelial de alto grado	18 (90.0%)
Lesiones Malignas	
Total	82 (78.1%)
Subtipos Histológicos	
Carcinoma de Celulas Escamosas	70 (85.4%)
Tasa de Reseccion en bloque	66 (94.2%)
Tasa de Reseccion Completa	51 (72.8%)
Tasa de Reseccion Curativa	38 (54.2%)
Adenocarcinoma	12 (14.6%)
Tasa de Reseccion en bloque	12 (100%)
Tasa de Reseccion Completa	9 (75%)
Tasa de Reseccion Curativa	8 (66.6%)
Lesiones Subepiteliales	
Total	3 (2.9%)
Tumor de Celulas Granulares	3 (100%)
Tasa Global de Resección en bloque (*n*=105)	101 (96.2%)
Tasa Global de Resección Completa(R0)	85 (81.0%)
Tasa Global de Resección Curativa	68 (64.8%)
Invasión tumoral en profundidad	
Intramucoso (T1a)	**55 (67.1%)**
Adenocarcinoma	4 (7.3%)
Carcinoma de células escamosas	51 (92.7%)
Intramucoso M1	26 (47.3%)
Intramucoso M2	8 (14.5%)
Intramucoso M3	21 (38.2%)
Invasión submucosa (T1b)	**27 (32.9%)**
Submucosa superficial (SM1)	**8 (29.6%)**
Adenocarcinoma	3 (37.5%)
Carcinoma de células escamosas	5 (62.5%)
Submucosa profunda (SM2)	**19 (70.4%)**
Adenocarcinoma	5 (26.3%)
Carcinoma de células escamosas	14 (73.7%)
Mediana del tiempo de seguimiento endoscópico (Desviación estándar)	18 meses (*SD* +/- 33.2)
Tasa de recurrencia local	4 (3.8%)
Tasa de lesiones metacrónicas	9 (8.6%)
Tamaño medio del espécimen post-ESD	5.3cm (*SD* +/- 1.8)

Tabla 3: Lista de pacientes con criterios de resección no curativa y plan de tratamiento

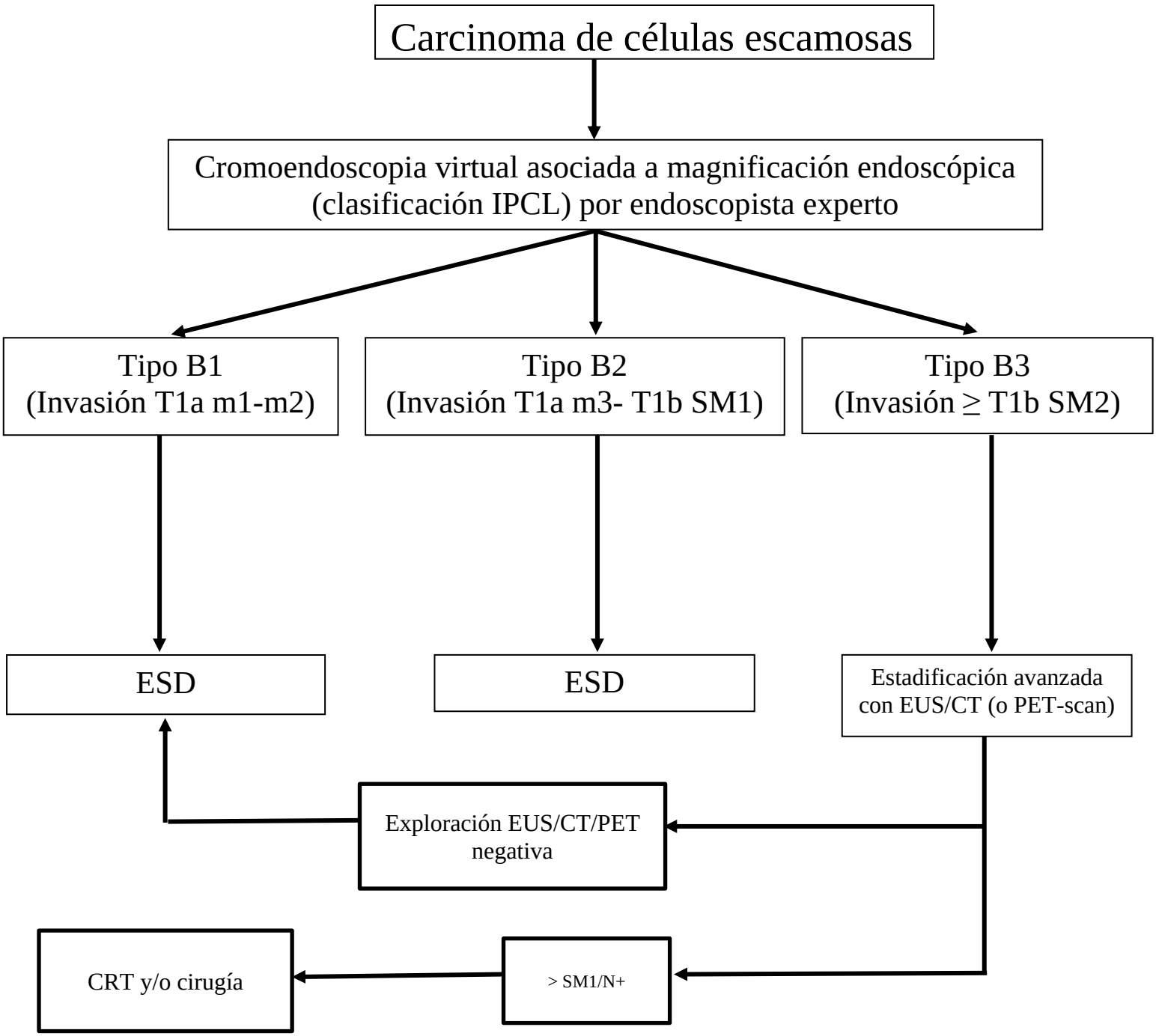
Lista de casos	Criterios para la resección no curativa	Plan de manejo
8,23,24,40,59	CCE con compromiso de los márgenes laterales	Seguimiento endoscópico
52,58,86	HGD con compromiso de los márgenes laterales	Seguimiento endoscópico
93	HGD con compromiso de los márgenes laterales	Quimiorradioterapia
39,43,71	CCE con resección R0 con invasión SM2	Seguimiento endoscópico
30,54,73,92	CCE con resección R0 con invasión SM2	Quimiorradioterapia
28,85,87	CCE con resección R0 con invasión SM2 + invasión linfática/vascular	Seguimiento endoscópico
3, 6,49	CCE con compromiso de los márgenes laterales (convertido en resección piecemeal)	Seguimiento endoscópico
72	CCE con compromiso de los márgenes laterales (convertido en resección piecemeal)	Quimiorradioterapia
5	Adenocarcinoma con compromiso de márgenes laterales + margen profundo comprometido	Seguimiento endoscópico
12	Adenocarcinoma con invasión SM2 (1500 μ) + compromiso de margen profundo + compromiso de márgenes laterales.	Esofagectomía
25	Adenocarcinoma con resección R0 con invasión SM2 (2000 μ) + invasión linfática/vascular.	Seguimiento endoscópico
35	CCE con resección R0 con invasión SM2 (760 μ) + invasión linfática/vascular	Seguimiento endoscópico
42	Adenocarcinoma con invasión SM2 + invasión linfática/vascular + compromiso del margen profundo + compromiso de los márgenes laterales	Quimiorradioterapia
70	CCE indiferenciado con invasión SM2 + compromiso de los márgenes laterales	Esofagectomía
88	CCE con invasión SM2 + compromiso del margen profundo	Esofagectomía
17	HGD con resección R0 + células en anillo de sello	Seguimiento endoscópico
74	CCE con resección R0 con invasión linfática/vascular	Seguimiento endoscópico
78,95	CCE indiferenciado con resección R0 + invasión linfática/vascular	Quimiorradioterapia
100	CCE indiferenciado con invasión SM2 (350 μ)	Quimiorradioterapia
102	CCE con compromiso del margen profundo + compromiso de los márgenes laterales	Quimiorradioterapia
105	Adenocarcinoma asociado a carcinoma neuroendocrino indiferenciado con invasión SM2 (2800 μ) + compromiso del margen profundo.	Esofagectomía

CCE: carcinoma de células escamosas; HGD: displasia de alto grado; M1: intramucoso M1; M2: intramucoso M2; M3: intramucoso M3; SM1: submucosa superficial; SM2: submucosa profunda.

Tabla 4: Tabla comparativa de los resultados mundiales de la ESD esofágica

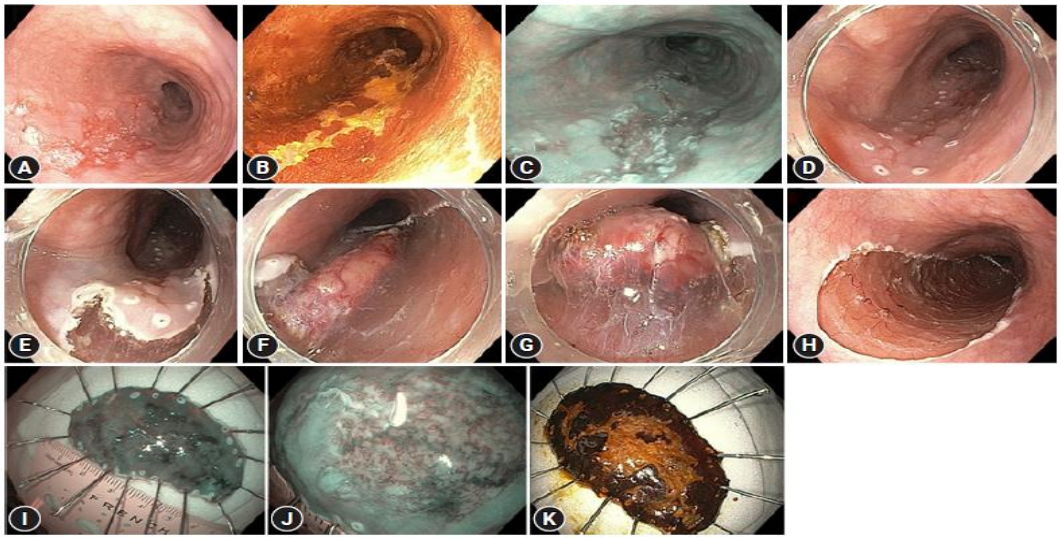
	Tasa de Resección en bloque	Tasa de Resección Completa (R0)	Tasa de Resección Curativa	Tasa de Complicaciones	Tasa de Estenosis esofágica post-ESD
Arantes *et.al* [6] 2022	96.2% (101/105 lesiones)	81.0% (85/105 lesiones)	64.8% (68/105 lesiones)	5.7% (6/105 lesiones)	2.9% (3/105 lesiones)
Furue *et.al*. [26] 2018	91.6% (251/274 lesiones)	91.6% (251/274 lesiones)	84.9% (238/274 lesiones)	6.2% (17/274 lesiones)	7.3% (20/274 lesiones)
Tsujii et.al. [27] 2015	96.7% (356/368 lesiones)	84.5% (311/368 lesiones)	76.2% (272/357 lesiones)	6.7% (25/368 lesiones)	7.1% (26/368 lesiones)
Park *et.al*. [29] 2016	97.2% (35/ 36 lesiones)	91.7% (33/36 lesiones)	80.6% (29/36 lesiones)	11.2% (4/36 lesiones)	13.9% (5/36 lesiones)
Yamashina et.al. [28] 2012	100% (39/39 lesiones)	92% (36/39 lesiones)	70% (23/33 lesiones)	2.6% (1/39 lesiones)	28% (11/39 lesiones)

Figura 1



Esquema del proceso de selección. IPCL: asa capilar intrapapilar; M1: intramucoso M1; M2: intramucoso M2; M3: intramucoso M3; SM1: submucosa superficial; SM2: submucosa profunda; ESD: disección endoscópica de la submucosa; EUS: ultrasonografía endoscópica; CT: tomografía computarizada; PET: tomografía por emisión de positrones; CRT: quimiorradioterapia. N+ metástasis linfática locorregional.

Figura 2



Caso ilustrativo de disección endoscópica de la submucosa esofágica (ESD). (A) Caso clínico ilustrativo de un varón de 68 años con una lesión eritematosa plana (Tipo II-b) en el esófago distal vista con endoscopia de luz blanca. (B) Cromoendoscopia con Lugol que demuestra la extensión de la lesión. Los hallazgos de la biopsia eran compatibles con los de un carcinoma de células escamosas. (C) Vista con imagen de banda estrecha (NBI) revela una neoplasia plana típica Lugol-negativa con márgenes claros y una buena indicación de resección endoscópica. (D) Se colocaron marcas. (E) Tras la inyección submucosa con hialuronato sódico, se inició la incisión oral. (F) Tras la incisión circunferencial y la disección submucosa, se creó un colgajo hacia el lado de la gravedad. (G) Se realizó la ESD en dirección oral-anal. Se observó una visión clara del espacio submucoso para el corte. (H) La ESD se realizó con éxito con un defecto final que ocupaba el 50% de la circunferencia y 8 cm de extensión longitudinal. (I) Se fijó la muestra de 60 mm para su evaluación histológica. La vista con NBI muestra todas las marcas en el interior del espécimen. (J) NBI muestra un patrón microvascular B1 mixto con áreas avasculares mínimas. (K) Cromoendoscopia con Lugol de la muestra que revela un tumor con márgenes libres. La histología reveló un carcinoma de células escamosas con invasión de la lámina propia (M2), márgenes libres y sin invasión linfática/vascular. La ESD se considero curativa y se recomendo un seguimiento endoscópico.