



Efficacy and safety of Endoscopic Submucosal Dissection in treatment of gastrointestinal early cancers and precancerous lesions: a Single Center Experience

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Background

In recent decades, endoscopic submucosal dissection (ESD) has become increasingly popular in managing early gastrointestinal cancers because of its less invasive and short recovery time. However, scientific reports on complications of ESD in Taiwan population are limited. Therefore, we aim to study ESD's efficacy and safety in managing early gastrointestinal cancers and precancerous lesions (high-grade dysplasia) in Taiwanese population.

Methods

Medical records of all patients who received ESD in Taipei Medical University Hospital (TMUH) from January 2015 to August 2022 were reviewed retrospectively. Excluding those patients with submucosal tumors, advanced cancer, Caucasians in the race, this analysis enrolled a total of 135 patients for investigation and text data of electronic medical records were preprocessed. It is expected to be developed into multinational cooperative research using OHDSI tools and OMOP CDM. Among the 141 lesions, the pathology classified 22 as benign, 53 as low-grade dysplasia, 23 as high-grade dysplasia (precancerous lesions), and 43 as malignancy (early cancer). Data on precancerous lesions and early cancer were collected, meaning 66 patients will become our research targets. Patients' basic information such as age, gender, comorbidity, and medication were collected respectively. Lesion descriptions, such as size, location, histology, and procedure time of each case, were also recorded after surgery. Treatment outcomes were statistically analyzed, including the successful rate of ESD procedure, complete resection rate, and various complications.

Results

A total of 60 patients who underwent ESD for 66 neoplastic lesions were included in the study. Sorted by location, the lesions of a distribution were pharynx & esophagus (n=25), stomach (n=19), and colon (n=22) respectively. In this analysis, ESD successful rate was 100.0% (66/66). In these 66 patients we evaluated, 74.2% (49/66) of the tumors were less than 30 mm in size, 18.2% (12/66) of the tumors' size ranged between 30-50 mm, whereas 7.6% (5/66) of the tumors were more significant than 50 mm, and the procedure time of 3 groups was 99.6, 136.5 and 144.0 minutes respectively.

The complete resection rate was 92.4% (61/66), and the rates for high-grade dysplasia and early cancer were 100.0% (23/23) and 88.4% (38/43), respectively. In this analysis, the higher histopathological grade was associated with incomplete resection. The overall complication rate was 19.7% (13/66), including four major complications and nine minor complications. Post-procedural massive hemorrhages requiring hemostatic interventions or blood transfusion were sorted into major types, with the complication rate of 6.1% (4/66). Three of these hemorrhagic cases were treated by endoscopic hemostasis successfully. The other one underwent transcatheter arterial embolization after a failure of endoscopic hemostasis. All the major complications were managed accordingly, and none of these 13 patients experienced mortality. The minor complication rate was 13.6% (9/66), including bloody tinged stool, abdominal discomfort, chest discomfort, and electro-coagulation syndrome (fever). No perforation occurred in these procedures. The total number of post-procedural bleeding events occurred in anatomical location rich in vessel (3 cases in antrum and 1 case in gastric cardia). In addition, Multivariate analysis revealed age was the risk factor for delayed bleeding, with all of them being relatively old in the group. However, none of the four patients was on antiplatelet therapy.

Table 1. Characteristics of enrolled patients

Characteristics	Value	Percentage
Gender		
Male	34	56.67%
Female	26	43.33%
Age (yr)	65.68	
Organ		
Pharynx & Esophagus	25	37.88%
Stomach	19	28.79%
Colon	22	33.33%
Tumor size (2.0~100.0 mm)	small (29.23)	
Anaesthesia		
ETGA	51	77.27%
IVG	15	22.73%
Awake	0	0.00%

Table 2. Descriptions of lesions

Lesion size	small (≤30 mm) n=49 number(%)	medium (30-50 mm) n=12 number(%)	large (>50 mm) n=5 number(%)	total n=66 number(%)	complete resection n=61 number	%
Sex						
male	30	6	3	39	36	92.31%
female	19	6	2	27	25	92.59%
Site						
hypopharynx	1 (1.52%)	0 (0.00%)	0 (0.00%)	1 (1.64%)	1	100.00%
upper esophagus	2 (3.03%)	1 (8.33%)	0 (0.00%)	3 (4.92%)	3	100.00%
middle esophagus	7 (10.61%)	2 (16.67%)	0 (0.00%)	9 (14.75%)	9	100.00%
lower esophagus	6 (9.09%)	3 (25.00%)	1 (20.00%)	10 (16.39%)	8	80.00%
esophago-cardiac junction (ECJ)	1 (1.52%)	0 (0.00%)	0 (0.00%)	1 (1.64%)	1	100.00%
esophagogastric anastomosis	0 (0.00%)	0 (0.00%)	1 (20.00%)	1 (1.64%)	1	100.00%
gastric cardia	4 (6.06%)	1 (8.33%)	0 (0.00%)	5 (7.58%)	5	100.00%
gastric body	2 (3.03%)	0 (0.00%)	0 (0.00%)	2 (3.28%)	2	100.00%
gastric angularis	6 (9.09%)	0 (0.00%)	0 (0.00%)	6 (9.84%)	5	83.33%
gastric antrum	3 (4.55%)	3 (25.00%)	0 (0.00%)	6 (9.84%)	6	100.00%
appendical orifice	1 (1.52%)	0 (0.00%)	0 (0.00%)	1 (1.64%)	1	100.00%
cecum	0 (0.00%)	1 (8.33%)	1 (20.00%)	2 (3.28%)	2	100.00%
ascending colon	5 (7.58%)	1 (8.33%)	0 (0.00%)	6 (9.84%)	5	83.33%
transverse colon	1 (1.52%)	0 (0.00%)	0 (0.00%)	1 (1.64%)	1	100.00%
descending colon	0 (0.00%)	0 (0.00%)	1 (20.00%)	1 (1.64%)	1	100.00%
sigmoid colon	4 (6.06%)	0 (0.00%)	0 (0.00%)	4 (6.56%)	4	100.00%
rectum	6 (9.09%)	0 (0.00%)	1 (20.00%)	7 (11.48%)	6	85.71%
Histology grade						
malignancy	31 (63.27%)	9 (75.00%)	3 (60.00%)	43	38	88.37%
high grade dysplasia	18 (27.69%)	3 (25.00%)	2 (40.00%)	23	23	100.00%
Procedure time (min)	99.62	136.5	144	118.85		

Table 3. Descriptions of major and minor complications

lesion location	case number	percentage	procedure time (min)	major complication	minor complication	patient age (yr)	size (mm)
Pharynx & Esophagus							
hypopharynx	1	1.52%	179.0	0	1 (1.52%)	58.0	30.0
upper esophagus	3	4.55%	190.3	0	1 (1.52%)	62.7	31.0
middle esophagus	9	13.64%	72.5	0	1 (1.52%)	57.3	23.6
lower esophagus	10	15.15%	129.6	0	1 (1.52%)	62.0	32.5
esophago-cardiac junction (ECJ)	1	1.52%	47.0	0	0	61.0	16.0
esophagogastric anastomosis	1	1.52%	223.0	0	0	64.0	68.0
Stomach							
gastric cardia	5	7.58%	173.4	1 (1.52%)	0	65.2	19.6
gastric body	2	3.03%	123.5	0	0	73.0	6.5
gastric angularis	6	9.09%	120.5	0	1 (1.52%)	77.8	27.5
gastric antrum	6	9.09%	75.7	3 (4.55%)	0	73.7	30.7
Colon							
appendical orifice	1	1.52%	131.0	0	0	80.0	30.0
cecum	2	3.03%	194.0	0	0	66.5	50.0
ascending colon	6	9.09%	67.8	0	0	66.2	30.0
transverse colon	1	1.52%	90.0	0	0	68.0	27.0
descending colon	1	1.52%	338.0	0	1 (1.52%)	64.0	60.0
sigmoid colon	4	6.06%	88.3	0	1 (1.52%)	58.5	24.0
rectum	7	10.61%	127.2	0	2 (3.03%)	67.3	33.1

Conclusions

Serving as a less invasive treatment option, ESD is an effective and safe procedure for resection of early cancers and precancerous lesions of the gastrointestinal tract, including the esophagus, stomach, and colon..