Bölüm 3

ENDOSCOPIC SUBMUCOSAL DISSECTION

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INTRODUCTION

Colorectal (CRC) and gastric (GC) cancers are among the most common malignancies diagnosed in Europe and America and their prevalence is also increasing in Eastern World in quite a fast manner. According to Globocan 2018 data published by the International Cancer Agency (IARC), the most common gastrointestinal cancers are; CRC (10.2%; is in the 3rd place) and GC (5.7%; is in the 5th place).With respect to this; CRC (9.2%) is in the 2nd place and GC (8.2%) is in the 3rd place in the list of deaths due to cancer. According to the same data in Turkey; if we look at commonly diagnosed cancers; CRC (9.5%) is in the 3rd place and GC (5.7%) is in the 6th place. CRCs are the third most commonly cancer in both sexes, both in the World and in our country. Approximately 1/3 of CRCs are at early stage and one third of the tumors are also at early stage in GC. For this reason, cancer treatment can be done at early stage by means of less invasive treatment methods. Esophageal cancers have lower incidence and are generally diagnosed at advanced stage (1).

Community screening programs for early diagnosis also lead to an increase in detection of colonic polyps (2). Excision of adenomatous polyps endoscopically reduced the incidence of CRC by 76-90% (2). Similarly, with the mass screening programs, gastroscopic screening performed every two years beginning from the age of 40 and as a result of that early diagnosis of GC has increased in South Korea (3).

In spite of the fact that colorectal polyps are less than 10 mm in size most of the time(these lesions can be easily excised endoscopically), 0.8% to 5% of the patients have non-spreading tumors larger than 20 mm or laterally spreading tumors (LST) and polypoid lesions (4). Invasive malignancy can take place more frequently in these kind of large lesions. Large polyps (including those with superficially invasive cancer) can be treated with endoscopic excision, because the risk of lymph node metastasis gained via total resection of the lesions leading negative microscopic margin (R0-resection) is less than 1% (5).

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Histological criteria for evaluating the risk of low lymph node metastasis are as follows:

1. <1.000 μm submucosal invasion lesions,
2. Absence of lympho-vascular invasion
3. Poor differentiation
4. Tumor budding,
5. Tumor free margin > 1 mm (6).

However, these lesions can be difficult to remove, or there may be incomplete excision which will be followed by early recurrence. In addition, scarring makes it more difficult to attempt endotherapy in this category of patients (7).

By means of widespread use of gastrointestinal endoscopy, detection of neoplastic lesions at early stage (gastrointestinal superficial lesions) increased. Although these lesions are generally precancerous, for exclusion of invasion; adequate endoscopic removal is obligatory. Endoscopic biopsies from these lesions do not appear as right choice for proper estimation of malignancy potential. Indeed, endoscopic excision has been documented as an adequate treatment in patients which have gastrointestinal cancer with zero or limited submucosal involvement with no additional risk factors. However, in order to protect these patients from a purposeless and meaningless surgical treatment, the precision of this resection is needed endoscopically and histologically (8).

Therefore, the widespread application of endoscopic resection techniques such as endoscopic submucosal dissection (ESD) and endoscopic mucosal resection (EMR) in our country should be one of our primary goals. Chromoendoscopy, magnifying endoscopy, narrow band imaging and i-Scan technology are new endoscopic imaging techniques that aim to improve the detection and character analysis of lesions and increase the surface mucosal details and microvascularity (9).

ESD and EMR expanded the therapeutic capacity of endoscopic methods and reduced the number of patients who were candidates for surgical resection. Compared with surgery, endoscopic dissection and resection maintains less invasiveness which means quick discharge from the hospital and lesser cost (4).

The purpose of this chapter is to review the use, efficacy, safety and advantages of ESD in the diagnosis and treatment of gastrointestinal superficial lesions (in comparison with the EMR).

For this purpose, answers to the following questions were sought:

1) How have all the developments in ESD of Gastrointestinal Tract appeared until today from the beginning?
2) How is the effectiveness of the technique, en-block resection rate, complete (R0) resection rate, endoscopic clearance rate and recurrence rate?

Endoscopic Submucosal Dissection (ESD)

EMR is still very important and the main treatment method for intramucosal tumors of gastrointestinal system. However, EMR is not suitable for en-block resection of lesions larger than 20 mm or non-lifting lesions as technically it does not allow sufficient histological examination and reliable diagnosis for such wide or deep lesions. ESD has been developed to overcome these limitations. ESD provides en-block excision of T1N0 early GCs without lymph node metastasis greater than 20 mm, including those with ulcers. ESD allows endoscopist to perform en- block resection regardless of tumor size (8). In a meta-analysis, ESD (compared to EMR) was reported to show less local recurrence with better en-block (holistic) and curative resection rates (10).

EMR is widely used throughout the gastrointestinal tract to remove early neoplastic lesions. It is a well known method for resection of large sessile polyps, adenomas of colon and superficial tumors of colorectal region(11).

Hosokawa and Yoshida accomplished the first gastric ESD procedure by using an insulated diathermic blade (IT knife) in 1998. In 1999, Gotoda et al. made the first research on rectal ESD (12,13).

Gotoda et al established an analysis on 5,265 patients who experienced gastrectomy with lymph node dissection due to early GC in the year of 2000, and observed that none of 1,230 well-differentiated intramucosal cancer under 30 mm diameter was associated with nodal metastases, regardless of ulceration findings. Furthermore, none of the 929 non-ulcerated well-differentiated intramucosal cancers were associated with nodal metastasis. These findings formed the basis of the ESD indication in the treatment of intra-epithelial gastric cancer (14).

ESD was made primarily with the aim of resecting large-sized lesions (> 2 cm) of the stomach, and after than ESD is started to be used in esophageal and colorectal lesions. ESD is now widely used in the treatment of upper gastrointestinal superficial neoplasia in Eastern Asian countries (especially Japan and S. Korea) and has been shown to be a highly effective and safe procedure in these countries. ESD is increasingly attracting attention in Western countries due to technological innovations in this field. However ESD is a difficult process and takes long time. Because of this, ESD needs a broad and deep knowledge based and a high skill level, which will only be achieved with adequate training and experience. In addition, compared to EMR, ESD is a procedure with a high complication rate (8).

ESD has been widely used in East Asia countries for endoscopic excision of non-metastatic early gastric cancer, but the same point of view is not present even in these countries in case of early colorectal cancers or colon polyps. This is partly

due to the complex and challenging nature of this technique, which is carried out in part by skilled and competent endoscopists (15). In addition, relatively high perforation (11.8%) (16) and bleeding rates (33%) have been documented (17).

It is likely that the number of ESDs will increase and become widespread with impulses, such as improving the rate of adenoma diagnosis and resection of early cancers with a minimally invasive technique that eliminates the need for classical surgical methods. Studies about the results of EMR and ESD procedures performed due to colonic polyps put forth conflicting results in terms of recurrence, successful resection and complications. Most of the data is obtained from East Asia, where the ESD technique emerged. Long-term results of colonic ESD are not yet clear (9).

It has been more than 20 years since the first article on endoscopic submucosal dissection was published (18). Today ESD is started to be used more in the treatment of colorectal lesions in Eastern countries (especially in Japan and S. Korea) , although it is still discussed in favor of EMR in Europe and United States. The complexity of the ESD procedure, also started a discussion about the need for a specific training and certification before starting clinical experience (19).

By ESD technique, lesions limited to the submucosa can be removed in one piece. The process consists of several stages: Firstly, the limit of the lesion to be dissected is determined chromoendoscopically. Liquid suitable for submucosa following the marking of the determined limit injection is made. The next step is the dissection of the submucosa under the tumor after the area pre-incision surrounding the marked borders. Generally, glycerol or hyaluronic acid solutions are used for submucosal injection, and publications about the use of a 20% glucose solution have also been reported.

After the ESD procedure, the work of the endoscopist continues. The sample removed to help to correct the pathological interpretation is marked and fixed by the colored needle, and then it is examined by the endoscopist by stereoscopy and it is decided whether the lateral borders are clear for tumor. Then the cutting direction on the sample is transferred to the computer by a special image analysis program and sent to the pathologist. Knowing the cutting direction helps the pathologist in the correct interpretation of the state of the lateral borders. The pathologist determines the depth of submucosal invasion, lymphovascular invasion, and tumor at the margins of vertical and lateral resection with serial sections 2 mm apart.

Resection of some gastrointestinal tract tumors in an en-block (holistic) is mandatory and this procedure also provides histological evaluation of the lateral margins of the tumor. When the tumor size is <20 mm, the en-block resection rates in EMR are as high as 66.6% to 80% (20). In some case series, complete resection rates and low perforation rates between 95% and 100% were obtained (21).

However, large and stemless polyps cannot be easily removed by EMR, especially at difficult locations. Also, previous EMR trials can cause fibrosis in the intestine, and therefore difficulties in excising the lesion from the submucosal layer may increase the suspicion of invasive carcinoma and the possibility of surgery (9).

In addition,"piecemeal" resection may be needed in excision of large lesions and this situation increases the risk of recurrent tumor. Recent data reported the rate of incomplete resection to be significantly higher in piecemeal resection compared to en-block resection (18.9% vs. 12.6%, p = 0.01) (22).

Lesions, such as tumors that spread laterally (with high submucosal invasion possibility) must be resected in the form of en-bloc. In particular, there is a risk of submucosal invasion between ≥30 mm nodular mixed type LSTs (laterally spreading tumor) (LST-G, mixed type) and ≥20 mm non-granular type LSTs (LST-NG) between 11.1% and 19% depending on the lesion size. Therefore, EMR has higher risk of incomplete removal in such tumors. Only one type of LST-Gs will be suitable for piecemeal resections since the risk of submucosal invasion is very low (1.8%) (23).

ESD is a minimally invasive technique which is an alternative to surgery. In cases where EMR application is limited and evaluation is unsafe, ESD is recommended for lesions that require resection as an en-bloc in order to perform an adequate histological evaluation. En-block resection provides the evaluation of the curative result, providing a definitive histopathological evaluation of the margins of the removed lesion.

In addition, from a technical point of view, lesions that are very difficult to resect with EMR, lesions with inadequate and insufficient mucosal excision following the submucosal injection, lesions which are being excised after local recurrence and protruding lesions with large sizes are also considered as ESD indications (16)

In the ESD Guideline of the European Society of Gastrointestinal Endoscopy (ESGE); "Endoscopic en-block excision with ESD for the removal of colon and rectal lesions with limited submucosal invasion is based on two main criteria. These are:

1. The lesions larger than 20 mm and
2. The lesions that cannot be resected optimally and radically with trap-based techniques "(8).

Areas of Use of the Endoscopic Submucosal Dissection

Esophageal Cancer

ESGE recommends endoscopic and en-block resection for superficial esophageal squamous cell cancers (SCC), except for those with obvious submucosal involvement. If en-block excision can be achieved and the lesions are less than 10 mm, EMR can be considered in these lesions. However, ESGE recommends ESD to maintain a complete and perfect resection with correct pathology staging and to prevent overlooking important histological findings (8)(Table 1).

There had been a lot of series(15) in which ESD for the superficial esophageal SCC showed 83% to 100% en-block resection rates, 78% to 100% complete resection rates, and 0% to 2.6% local recurrence rates (8).

The risk of lymph node metastasis of m3 or sm1 lesions without lymphovascular invasion has been reported to be as low as 4.7%. In addition, some studies have shown higher morbidity with surgery, especially in the elderly. Therefore, for patients with concomitant diseases or who do not want to undergo esophagectomy (especially elderly patients), ESD should be considered as a suitable alternative for free-margin m3 or sm1 well differentiated cancers without lymphatic or vascular invasion (24).

The main criteria for making choice between EMR and ESD is the size of the lesion. In a cancer with a high risk of lymph node metastasis, en-block R0 resection is mandatory in SCC to obtain better disease-free survival. The risk of lymph node metastasis can only be estimated in a holistic, ie, en-block pathological sample; otherwise important pathological features may not be countered. En-block resection and R0 excision of huge lesions may not be done in EMR. In addition, recurrence rates between 9% and 23% were observed following piecemeal excision (26).

According to ishihara et al; there was no difference between cap-assisted EMR (EMRc) and ESD for local recurrence if R0 resection and en-block resection for lesions <15 mm is considered but ESD is reported to be much better if lesions were between 15 to 20 mm. Therefore, they thought that EMRc is a better alternative for small lesions (27). However, in a meta-analysis , Cao et al stated that regional recurrence had been lower with ESD even in lesions smaller than 10 mm (10). Considering all of these researchs, ESGE has declared that ESD should be the preferred technique and that EMR might be an alternative for lesions smaller than 10 mm (8).

ESGE recommends curative endoscopic resection for gross lesions in Barrett's esophagus (strong recommendation, medium quality evidence). For mucosal cancer excision, ESD has not been shown to be superior to EMR and therefore EMR should be preferred for mucosal cancers. ESD can be preferred in selected cases such as lesions larger than 15 mm, weak lifting tumors (+ non-lifting sign) and lesions with submucosal invasion risk (8). (Table2)

Table 1. ESD results for superficial lesions of eosphagus (8).

Tumor type, number of studies, The first author, Year	Squamous cell carcinoma (15 studies)	Adenocarcinoma arising in Barrett's esophagus or esophagogastric junction (6 studies)	Squamous cell carcinoma (superficial) + adenocarcinoma (10 studies)	Tumor not specified (4 studies)	Submucosal tumor (3 studies)	Submucosal tumor (3 studies)	Except for submucos al tumors
Including lesions, n	970	346	678	44	185	2223	2046
En-block resection rate Lesions, n / N (%)	963/970 99% (83.3%–100%) 15/15	336/346 97.1% (81%–100%) 5/6	637/678 93.9% (81.2%–100%) 10/10	41/44 93.1% (88.9%–100%) 4/4	173/185 93.5% (83.3%–94.4%) 3/3	2150/2223 96.7%	1965/2038 96.4% (81%–100%) 37/38
Complete R0 resection rate Lesions, n / N (%)	719/868 82.8% (78%–100%) 14/15	265/336 78.8% (38.5%–97%) 6/6	589/678 86.8% (50%–100%) 10/10	38/44 86.3% (77.8%–100%) 4/4	163/173 94.2% (94.4%–100%) 2/3	1774/2099 84.5%	1611/1926 83.6% (38.5%–100%) 36/38
Curative resection rate Lesions, n / N (%)	528/698 75.6% (69%–100%) 10/15	246/336 73.2% (64.5%–86%) 6/6	560/678 82.6% (50%–97%) 10/10	29/35 82.8% (77%–100%) 3/4	175/185 94.5% (94.4%–100%) 3/3	1538/1932 79.6%	1363/1747 78% (0%–100%) 32/38
Local recurrence rate Lesions, n / N (%)	3/850 0.3% (0%–2.6%) 14/15	0% 6/6	4/359 1.1% (0%–8%) 8/10	0% 3/4	0% 3/3	7/1560 0.4%	7/1375 0.5% (0%–8%) 35/38
Mortality related to ESD	0%	0% 6/6	0%	0%	0%	0%	
Procedural bleeding Lesions, n / N (%)	40/970 4.1% (0%–22.8%) 15/15	4/346 1.1% (0%–2.7%) 6/6	7/678 1% (0%–3.2%) 10/10	5/44 11.3% (0%–18.5%) (1 case of bleeding+perforation) 4/4	0% 3/3	53/2045 2.5%	53/1860 2.8% (0%–22.8%) 38/38
Procedure- dependent perforation Lesions, n / N (%)	37/970 3.8% (0%–4%) 15/15	8/346 2.3% (0%–4%) 6/6	3/678 0.4% (0%–4%) 10/10		9/185 4.8% (0%–10.7%) 3/3	59/2179 2.7%	50/1994 2.5% (0%–10.7%) 38/38
Average operationtime, min	24-160 9/15	70-145 5/6	(67–142) 8/10	77-150 2/4	45–73 3/3	24–160	27/38

Stomach

According to ESGE recommendations, endoscopic resection should be considered for gastric superficial neoplastic lesions with very low risk of lymph node metastasis. EMR is an alternative for lesions smaller than 10-15 mm with a very low probability of advanced histology (Paris 0-IIa). ESGE prefers ESD as the treatment of choice for the vast majority of gastric superficial neoplastic lesions (8).

The most important issue in deciding gastric ESD is the right patient selection. The most important criteria in this regard is the determination of whether there is lymph node metastasis. Methods such as endoscopic USG, CT and PET which are still used in staging are insufficient in the correct diagnosis of lymph node metastasis.

Various researchs interprete ESD as the treatment of choice in gastric superficial neoplastic lesions (low or high grade non-invasive neoplasia, adenocarcinoma with no evidence of deep submucosal infiltration), because ESD determines a high rate of en-blocking R0 curative resection rate with a good safety margin compared to other treatments (13). Due to all these facts, ESD is now estimated as the first treatment choice for early GC in Japanese stomach cancer guidelines.

The lesions that should be considered for endoscopic resection depending on the fact of very low lymph node metastasis probability are:

1. Non-invasive neoplasia independent of size (dysplasia)
2. Non-ulcer intramucosal differentiated-type adenocarcinoma (≤2 cm size absolute indication,> 2cm common indication)
3. ≤ 3 cm ulcerated intramucosal differentiated-type adenocarcinoma (common indication)
4. ≤ 2 cm intramucosal undifferentiated - type adenocarcinoma (common indication)
5. Differentiated-type adenocarcinoma (common indication) with superficial submucosal invasion (sm1, ≤500 μm) and ≤3 cm size. (JGCA, 2011).

Although Japanese guidelines accept just lesions with ≤ 2 cm size as an absolute indication for ESD, several recent studies have concluded clinical results following ESD to be similar for absolute and common indications (14).

In fact, several retrospective studies whose data were grouped in three meta-analyzes compared EMR and ESD for early GC treatment. (Table 2). These studies included higher en-block resection rates (92% vs. 52%; odds ratio, OR) 9.69, 95% CI 7.74 - 12.13), histologically complete resection rates (82% vs. 42%; OR 5.66, 95% CI 2.92 to 10.96) and lower recurrence frequency (1% to 6%; OR

0.10, 95% CI 0.06 - 0.18). Importantly, these benefits have been preserved even in lesions less than 10 mm. Unfortunately these are better results, but also longer processing times (more than 59.4 min; 95% CI 16.8 - 102) and higher risk of perforation (1% vs. 4%; OR 4.67 , 95% CI 2.77 - 7.87). The vast majority of the ESD-related perforations in these studies were managed conservatively without death. There was no difference in severe bleeding rates (9% in both of the cohorts). Finally, ESD is shown to be better than EMR for gastric neoplastic lesions treatment together with a slightly higher perforation risk(27).

The extended ESD indication criteria in early GC are:

1. non-ulcerated and well-moderately differentiated mucosal cancer (tumor diameter is not important),
2. Well-moderately differentiated mucosal cancer of less than 3 cm ulcer and 3 cm small minimal submucosal invasive (500 μm) well-moderately differentiated cancer.
3. In other words, ESD is technically difficult and curative resection rate is low in ulcerated and diffuse type tumors larger than 3 cm (28).

Another indication for ESD is submucosal tumors of the upper gastrointestinal system. ESD may also be applied in the treatment of submucosal tumors of the esophagus, stomach and duodenum, within certain criteria. According to Endoscopic USG examination data; ESD can be performed for the hypoechoic, prominent lesions and those larger than 2 cm all of which are limited to submucosa and muscularis propria and furthermore to the sessile, hypoechoic, prominent lesions invading muscularis propria.

Complications of ESD in early GC are bleeding and perforation. In the study of Cho et al mentioned above, the bleeding rate that required blood transfusion or caused a decline of 2 g / dL in hemoglobin was 19.3% and the perforation rate was 8% in the entire patient group (29).

As a result, ESD in early GC without lymph node metastasis is a method frequently used in South Korea and Japan, and multicenter prospective studies are required to determine the correct indications and global guidelines.

Table 2. Endoscopic submucosal dissection (ESD) results (meta-analysis data) for gastric superficial lesions (8). * Considered to be histologically complete resection by the author (distinction was not defined between complete R0 and curative resection)			
Meta-analysis First author, Year (number of studies)	**Park 2011 (12 studies)**	**Lian2012 (9studies)**	**Facciorusso 2014 (10 studies)**
Including lesions, n	1734	1495	1916
En-block resection rate Lesions, n / N (%)	1055/1150 (92%)	1328/1437 (92%)	1328/1437 (92%)
Complete R0 resection rate Lesions, n / N (%)	1287/1401 (92%)	1227/1495 (82%)*	1227/1495 (82%)*
Curative resection rate Lesions, n / N (%)	774/973 (80%)		
Local recurrence rate Lesions, n / N (%)	13/1592 (<1%)	11/1438 (<1%)	12/1859 (<1%)
Mortality related to ESD	0	0	0
Procedural bleeding Lesions, n / N (%)	116/1642 (7%)	82/876 (9%)	62/1438 (4%)
Procedure-dependent perforation Lesions, n / N (%)	80/1762 (5%)	62/1438 (4%)	62/1438 (4%)
Average operation time, min	33–84	34–116	34–116

Duodenum and Small Intestine

Standart use of ESD in small intestinal lesions is not adviced by ESGE because of the high risk of perforation (strong recommendation, evidence of medium quality). Polypectomy, EMR and piecemeal EMR are alternative and logical treatments for superficial lesions of small intestine(including duodenum) with a good safety profile (strong recommendation, proof of medium quality). In spite of the fact that there is not any scientific evidence, management of the treatment following endoscopic resection in the presence of carcinoma in the specimen, especially in case of submucosal infiltration, should be personalized (strong recommendation, low quality evidence) (8).

In some studies, it has also been described that ESD could be accomplished if there is superficial lesions of duodenum. Although success rates (> 70% - 80%) for en-block resection were significant via ESD in these lesions, it was noteworthy that the perforation rate was high (> 30%) and some of the perforations were delayed type obliging surgery. In addition, in a study conducted in comparison with EMR, it was shown that although ESD presents higher rates for complete excision, there appears to be not much difference in long-term results and survival. For these reasons, ESGE does not recommend routine use of ESD in case of superficial lesions of duodenum (30).

ESD in Lower Gastrointestinal Canal Cancers

ESGE declares that most of the superficial lesions of colon and rectum can be satisfactorily resected by standard polypectomy and / or EMR (strong recommendation, medium quality evidence). On the other hand, ESD may be taken into consideration for removal of colorectal lesions with the suspicion of limited submucosal infiltration. This suspicion depends on two factors mainly; poor morphology and irregular or non-granular surface layout, and especially if the lesions are larger than 20 mm and when colorectal lesions cannot be resected optimally by snare-based techniques (strong recommendation, medium quality evidence) ESD should be done (8).

To provide precise pathology staging and high curative resection chance, the indications for colorectal ESD are:

1. LSTs larger than 1 - 2 cm (especially pseudo-depressed type)
2. Morphological factors such as Paris classification 0 - IIa + c or 0-III
3. Non-granular surface
4. Large raised lesions with a high probability of mlignancy
5. Lesions likely to have submucosa infiltration
6. Mucous lesions that are fibrotic due to a previously taken biopsy
7. Local residual early cancers after endoscopic resection
8. Tumors with a type V1 pitpattern
9. Sporadic tumors in ulcerative colitis (31).

Due to the risk of cancer at early stage, LSTs (> 20-30 mm), and due to the high morbidity of the standard surgical method, and with the experience gained from colonic ESD procedures previously, ESD can be extended to rectum indications for all major (>20mm) non-granular or granular lesions. In various studies, there currence of colon polyps and LSTs larger than 20 mm after standard snare polypectomy and piecemeal EMR is given between 2.7-14.3%.

ESD may also be applied to the rectal lesions that have undergone endoscopic resection several times before. In these patients, repetation of standard endoscopic treatment is useless most of the time. However, it should be taken into consideration that the risk of fibrous perforation may increase significantly in this case. Video-assisted trans-anal surgical approaches for rectal lesions exhibit positive results similar to ESD and should be encountered as an alternative to endoscopic treatment depending on the experience of the endoscopist. “Hybrid techniques” (partial / peripheral ESD followed by EMR) may also be an additional option in some cases; but we should not ignore that there is not yet sufficient evidence for making certain recommendations about these techniques (19).

In general, the vast majority of colonic superficial pathologies are benign. Therefore, they can be curatively removed by standard polypectomy and EMR. ESGE states that ESD is better than EMR for en-block R0 resection of superficial lesions of colon larger than 20 mm. Unfortunately, this benefit and superiority can only be clinically significant in a small number of lesions. In addition, colonic ESD is technically more difficult and few endoscopists in Western countries have enough experience to achieve the results described in the previous studies. In addition, surgery is the gold standard of treatment in EMD-fit lesions (IIa + c, IIc, III, non-lifting lesions or non-granular LSTs> 20 mm) rather than EMR. There is not any study that defines ESD to have better results than surgery.

The only exception to this situation may be lesions located at rectum. In this segment, the complexity of the classical surgical method, functional dysfunction and the high possibility of abdominoperineal resection are great problems for the surgeon. These risks may cause the surgeon to choose ESD instead of surgery. Furthermore, even in these cases, a surgical trans-anal approach can be a game changer alternative.

According to the opinion of ESGE; ESD needs to have a more definite indication profile and for maintaining this, further detailed studies are required for comparing surgical approaches with ESD in cases in which suspicion of submucosal malignancy is present. (8)

In fact, a definitive conclusion as whether ESD is superior to EMR should be given taking into account that if there is a real need for advanced surgical intervention for complications management and oncological indications. While long-term follow-up researches are expected to focus on the absence of a similar assessment and oncological competence of treating colorectal lesions with ESD and EMR, short-term safety and treatment effects analysis can be performed on existing data.

According to the results of a recent study in 13 centers in Japan, the complete en-block resection and perforation rates of colonic ESD were 82.8% (61-98.2%) and 4.7% (1.4-8.2%) respectively. Since the perforations were small, surgical therapy was rarely required and in most of the cases; endoscopic intervention by using clips and conservative treatment was sufficient. Postoperative bleeding was observed in an average of 1.5% (0.5-9.5%)cases.

However, colonic ESD is a very difficult procedure, especially in cases of severe fibrosis and lesions with difficult location (right colon); the ability of the endoscopist and the estimated duration of the procedure should be considered along with the endoscopic evaluation in choosing the most appropriate treatment (piecemeal EMR, ESD, surgery).

Those who favor the ESD technique argue that in addition to clearing the lateral and deep resection margins, en-block excision is required for an accurate oncological assessment of the lesion and deep submucosal invasion. According to hermanek; fragmentation may be responsible for an insufficient pathologic examination which will lead to inproper evaluation of the lesions with"low risk of recurrence". After the emergence of ESD; use of flexible endoscopy;gives us an option and alternative (a technique similar to surgery)to EMR ; by which en block resection of superficial lesions of digestive system maybe possible (targeting en-block R0 excision even for lesions of colon and rectum) (19).

Conclusion

There is a substantial amount of progression in minimally invasive techniques and ESD provides a higher en-block resection rate compared to EMR. This means higher curative resection together with a lower recurrence rate.

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