multiple SEC 154; previous RT 53. Sixty cases met the criteria of difficult ESD. The procedure time was longer than 120 minutes in 43 (6.3%) cases. Perforations and pneumomediastinum occurred in 8 (1.4%) and 8 (1.4%) cases, respectively. Piecemeal resection occurred in 3 (0.4%) cases. Vertical margin was positive or cannot be assessed in 14 (2.1%) cases. Multivariate logistic regression analysis revealed that left wall in esophagus (OR 2.15 [95% CI 1.17-3.91], p=0.014), circumference of the lesion ≥ 1/2 (OR 5.06 [95% CI 2.40–11.34], p<0.001), were two independent factors related to difficult procedure. Conclusion: Predictive factors for technical difficulty in esophageal ESD were left wall and circumference more than half of the esophagus. These results may contribute to a better selection of suitable lesions according to each endoscopist's skill.

Tu1216

Long-Term Outcome of Endoscopic Resection in Patients With Superficial Esophageal Squamous Cell Carcinoma Invading the Muscularis Mucosae or Superficial Submucosa

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Background: According to the 2012 guidelines by the Japan Esophageal Society, endoscopic resection (ER) is relatively indicated for superficial esophageal squamous cell cancer (SESCC) invading to muscularis mucosae (MM) or superficial submucosa ≤200μm (SM1) given the potential risk of nodal metastasis. However, little is known about the long-term outcomes in those patients with longer than 5-year follow-up periods. Thus, this study aimed to clarify long-term outcomes of ER in patients with SESCC with MM or SM1 in depth. Methods: A total of 1030 patients with SESCC underwent ER with negative deep margin between 2000 and 2012. Of these, this retrospective study included 129 patients who met the following criteria: 1) solitary index SESCC histologically invaded into MM or SM1; 2) no advanced malignancy in other organs. Treatment strategy after ER was determined on a multidisciplinary evaluation by endoscopists, surgeons and gastrointestinal oncologists. In this study, additional surgery or prophylactic chemoradiotherapy (CRT) is considered in patients with LVI or SM invasion. Prophylactic CRT is generally given to radiation therapy of 41.4-45 Gy elective nodal irradiation dose combined with 5FU and CDDP. Those patients were generally followed up with esophagogastroduodenoscopy and computed tomography surveillance on an annual or biannual basis to identify metachronous esophageal squamous cell carcinoma (SCC), lymph node and distant metastasis. Results: Patient characteristics were as follows: median age 66 years, male/female: 107/22, depth of invasion (MM/SM1): 107/22, LVI (+/-): 18/111, 70 and 59 patients underwent endoscopic mucosal resection (EMR) and endoscopic submucosal resection (ESD), respectively. En bloc resection rate was 70.5%. None developed local recurrence after ER during median follow-up period of 66 (range 0-159) months. Among 91 with MM invasion without LVI, 71 were observed without any additional treatment and 20 underwent prophylactic CRT. Of these 91, only 1 recurred nodal and distant metastasis who received prophylactic CRT after piecemeal EMR. Among 16 with MM invasion with LVI, of 7 who were observed, 1 developed nodal metastasis. Of 9 who underwent prophylactic CRT, 2 developed nodal metastasis.

6 out of 22 with SM1 invasion were observed and 16 underwent prophylactic CRT. None developed recurrence.

The 5-year overall survival rates of patients with MM with and without LVI and SM1 cancer were 96.3%, 83.1% and 96.3%, respectively. The 5-year disease specific survival rates were 100%, 90.0% and 100%, respectively. A total of 41 metachronous esophageal SCC were found in 30 patients during the follow up period, the 3-year and 5-year cumulative incidence of metahcrounous esophageal SCC were 17.2% and 24.0%, respectively. Conclusions: ER has curative potential for SESCC that invades MM without lymphovascular involvement.

Long term outcome of patients after ER

	Number	Relapse, n (%)	median follow up(month)	5-year overall surviaval (%)	5-year relapse free survival	5-year cause specific survival (%)
MM, LVI (-)	total (n=91)	1 (1%)	72	96.3	95.2	100
	observed (n=71)	0 (0%)	68	96.8	96.8	100
	prophylactic CRT (n=20)	1 (5%)	84	95	90	100
MM, LVI (+)	total (n=16)	3(19%)	51	83.1	76.9	90
	observed (n=7)	1 (14%)	26	37.5	50	50
	prophylactic CRT (n=9)	2 (22%)	62	100	88.9	100
SM1	total (n=22)	0 (0%)	69	96.3	94.7	100
	observed (n=6)	0 (0%)	41	50	100	100
	prophylactic CRT (n=14)	0 (0%)	78.5	100	93.8	100

Tu1217

The Use of Convolutional Neural Artificial Intelligence Network to Aid the Diagnosis and Classification of Early Esophageal Neoplasia. A Feasibility Study

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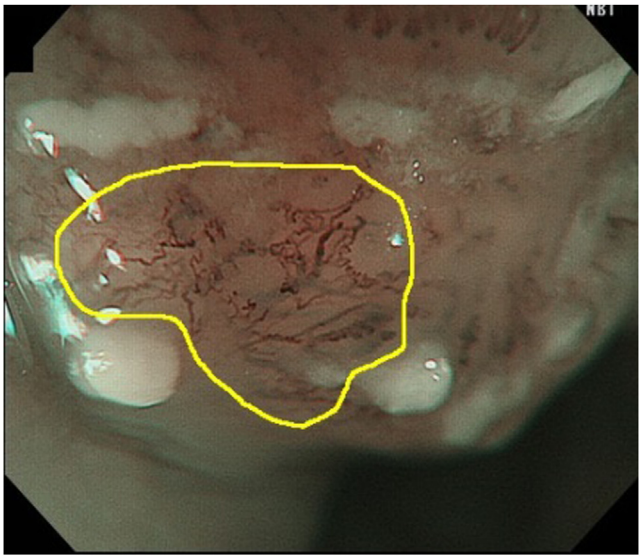
Introduction: The diagnosis and classification of early esophageal neoplasia by the novice endoscopist is difficult. Recently, the use of artificial intelligence to aid in pattern recognition and image analysis is becoming popular. The aim of the current study is to assess if a convolutional neural artificial intelligence network could aid the diagnosis and classification of early esophageal neoplasia. Methods: The endoscopic images in patients with normal esophagus or those suffering from early esophageal neoplasia were obtained using narrow band imaging and magnifying endoscopy (GIF-FQ260Z, Olympus Medical, Japan) and (GIF-HQ290 Olympus Medical, Japan). The images were classified according to the Japan Esophageal Society into Type A, B1, B2 and B3 vessels and confirmed by histological assessment on endoscopic or surgical resection. An experienced endoscopic then identified regions of Interest (RoI) in the endoscopic images. The images were then computer processed by randomly sampling 1000 patches of size 50 x 50. A patch is in RoI category if it contains more than 50% RoI pixels, otherwise it is in background category.

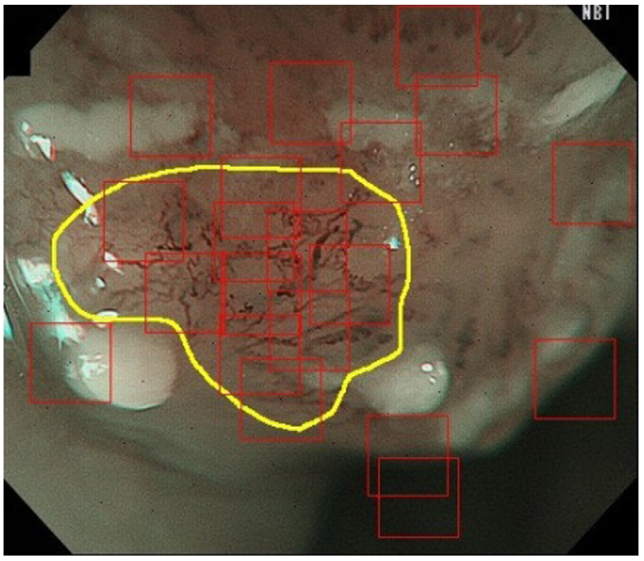
Supervised Learning via Convolutional Neural Network.

A supervised learning task takes training patches and their category labels as input, and produces an algorithm that predicts the label for a new patch. For the patch classification task, we use convolutional neural network (CNN), which is proven to be very effective for image classification. The process of training is to modify the network's weights to better align with the training data. The input layer is of dimension 3 x 50 x 50, because the patch is of size 50 x 50 and it has three color channels (red, green and blue). Each 3 x 5 X 5 small window in the input layer produces a single data entry in the second layer. The next layer is due to max-pooling, which summarizes the features to make the classification result insensitive to shift and rotation. The same convolution and pooling method is applied again in the next two layers. The last 5 layers are fully connected. Two entries in the last layer are the output of the neural network. Results: A total of 218 endoscopic images of normal and neoplastic esophagus were obtained. 218000 patches (80740 RoI patches and 137260 background patches) were generated. Among the 218000 patches, 90% of them are selected to be training set and the rest were used for testing. The network takes 2.5 days to train on a GTX 980 Ti GPU.

The overall diagnostic accuracy was 79.38%. The sensitivity, specificity, positive predictive value, negative predictive value were 73.41%, 83.54%, 72.09%, 84.44% respectively. Conclusions: The use of convolutional neural artificial intelligence network to aid the diagnosis and classification of early esophageal neoplasia is feasible. The results could be further improved with a larger archive of endoscopic images.



RoI indicated by the yellow circle



Sampled patches

Tu1218

Incidence,Admission Rate and Economic Burden of Adult Emergency Visits for Esophageal Forgein Body Impaction : Data From the National Emergency Department Sample From 2006 and 2012

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Introduction: Although the incidence of esophageal foreign body impaction (EFBI) in the general population is rare, it is an important emergency that results in significant morbidity and mortality. There is a scarcity of data in regards to emergency department (ED) utilization for EFBI. This study examines the National Emergency Department Sample (NEDS), which includes a large number of ED visits for EFBI, to evaluate ED use, financial charges, rates of admission, and risk factors for admission in EFBI patients. Methods: The NEDS was queried to evaluate the temporal trends in adult ED visits for a primary diagnosis of EFBI (ICD9 CM code 935.1) from 2006-2012, as well as rates of hospital admission and total charges. A survey logistic regression model was used to determine the predictive value of selected variables for admission. All statistical analyses were performed using SAS (Version 9.4, The SAS institute, Cary, NC). Results: There were a total of 478,475 ED visits for EFBI from 2006 to 2012. Number of visits for EFBI increased by 17% from 62,528 in 2006 to 73,002 in 2012 (p< 0.0001). ED charges rose from $2,413 in 2006 to $4,479 in 2012 (p< 0.0001). Charges for hospitalization similarly increased from $15,438 to $25,389 over this time interval. However, the proportion of EFBI patients admitted did not significantly change(p=0.26). Length of stay (LOS) averaged 2.3 days and percent admitted averaged 6.4% during the time period, and the LOS did not change over the time period (p=0.46). Independent risk factors for inpatient admission from ED were: female sex {OR 1.18 (95% CI 1.11-1.25) p<0.0001}, age group >84 {2.05 (1.8-2.3) p<0.0001}, smoking {1.93 (1.74-2.13) p<0.0001}, alcohol use {5.22 (4.25-6.42) p<0.0001}, obesity {4.95 (4.10-5.98) p<0.0001}, increased Charlson comorbidity index {1.72 (1.67-1.78) p<0.0001}, and residing in a zip-code where average income falls in the lowest quartile {1.24 (1.10-1.40) p<0.0001}. Conclusion: ED visits and associated charges for EFBI have increased between 2006 and 2012. Even though rates of admission haven't changed substantially, charges for an admission have substantially increased. In addition, this study was able to identify certain independent risk factors for admission for EFBI. These include female sex, advanced age, smoking, alcohol use, obesity, increased comorbidities, and living in a zip code with lower mean income. Identification of these risk factors may lead to development of educational or medical interventions to address these issues.

Predictors of admission to hospital from ER for patients with Esophageal foreign body impaction

Variable	Reference		OR	LCI	UCI	p value
Sex	Male	Female	1.181	1.113	1.254	<.0001
Age	18-44	45-64	1.041	0.956	1.134	0.3529
		65-84	1.114	0.986	1.258	0.0836
		>84	2.05	1.8	2.334	<.0001
Payer	Medicare	Medicaid	1.141	0.99	1.315	0.0694
		Private insurance	0.575	0.515	0.641	<.0001
		Uninsured/other	0.824	0.721	0.941	0.0044
Index admission on weekend	No		0.967	0.912	1.025	0.2577
Smoking	No		1.931	1.749	2.132	<.0001
Alcohol use	No		5.223	4.249	6.421	<.0001
Weight	Normal weight	Obesity	4.954	4.101	5.983	<.0001
		Morbid Obesity	5.594	3.62	8.645	<.0001
Average income in zipcode	Zipcode in 1st quartile of income	Zipcode in 2nd quartile of income	0.863	0.785	0.949	0.0023
		Zipcode in 3rd quartile of income	0.882	0.797	0.976	0.0149
		Zipcode in 4th quartile of income	1.239	1.098	1.398	0.0005
Charlson Co-morbidity score	<1		1.728	1.674	1.783	<.0001
Metropolitan & teaching status	Metropolitan teaching hospital	Metropolitan non-teaching hospital	0.856	0.756	0.97	0.0145
		Non-metropolitan hospital	0.492	0.424	0.571	<.0001

Number of ED visits for Esophageal foreign body ingestion