啓明醫大學術誌 第29券 2號
Keimyung Med J
Vol. 29, No. 2, December, 2010

A Case of Colon Cancer Developing at the Interposed Graft for Treatment of Benign Esophageal Stricture

Sunyoung Lee, M.D., Eun Soo Kim, M.D., Woo Jin Chung, M.D., Kyung Sik Park, M.D., Kwang Bum Cho, M.D., Jae Seok Hwang, M.D., Hyun Ah Kim, M.D., Tae Yul Kim, M.D., Jae Hyuk Choi, M.D., Mi Jeong Kim[1], M.D., Hye Ra Jung[2], M.D.

Department of Internal Medicine, Department of Radiology[1], Department of Pathology[2], Keimyung University School of Medicine, Daegu, Korea

Abstract

Replacement of the esophagus with a colonic graft is one of the established treatments of benign strictures or malignant tumors of the esophagus. Among various late complications of this procedure, an adenocarcinoma developing in the reconstructed colon graft is an extremely rare condition. We managed a case of this unusual complication occurring 16 years after previous esophagectomy with colon interposition as treatment for benign strictures due to alkaline-induced corrosive esophagitis. This case emphasizes the importance of clinical awareness of the possibility for the development of malignancies in the interposed colon graft.

Key Words : Colon cancer, Corrosive esophagitis, Interposition

Introduction

Benign esophageal strictures resulting from corrosive injuries due to lye ingestion are challenging complications which require serial dilation with the potential risk for perforation. Surgical management of strictures has resulted in favorable outcomes during the last several decades. Despite high surgical morbidity and mortality, since its introduction in 1911, total esophagectomy with colon interposition has become one of the established treatments of esophageal strictures involving not only benign, but malignant etiologies [1-2]. Among several late complications reported, with anastomotic strictures being most common, *de novo* malignancies originating in a colon interposition site has been shown to be very rare [3]. We report a case of colon cancer from a single center which developed in the interposed colon 16 years after colonic

Corresponding Author: Kyung Sik Park, M.D., Department of Internal Medicine, Keimyung University School of Medicine
216, Dalseogno, Jung-gu, Daegu, 700-712 Korea
Tel: +82-53-250-7088 E-mail: dandy813@hanmail.net

esophagoplasty for esophageal strictures due to lye ingestion.

Case Report

A 61-year-old male complained of progressive dysphagia, especially with solid food intake, for 3 months. His medical history was significant for an esophageal benign stricture occurring after lye ingestion, for which he underwent subtotal esophagectomy with interposition of the right colon at 45 years of age. To evaluate the cause of dysphagia, a barium swallow was performed, which showed an "apple-core" narrowing in the lower third of the interposed colon (Fig. 1). A subsequent upper gastrointestinal endoscopic examination revealed a large encircling mass with luminal obstruction 35 cm from the upper incisor (Fig. 2), and a moderately differentiated adenocarcinoma was confirmed with a forceps biopsy specimen (Fig. 3). A computed tomography (CT) and radionuclide positive emission tomography (PET) scan disclosed a T3N2M0 colon cancer. As a curative surgical treatment was not technically possible because of severe anatomic adhesions resulting from the previous colon interposition procedure, conformal radiotherapy (5400-6300 cGy for 7 weeks) was applied following palliative metal, self-expandable, covered stent insertion. When radiotherapy was completed, stent migration to the proximal side occurred and the stent was replaced with an uncovered stent for prevention of migration. Two months after completion of radiotherapy, a follow-up CT showed significant reduction of tumor size. He regained normal swallowing function and was in good condition at the initial follow-up visit.

Fig. 1. Double contrast barium study showing a luminal narrowing, "apple-core" appearance (arrow), in the lower third of the interposed colon.

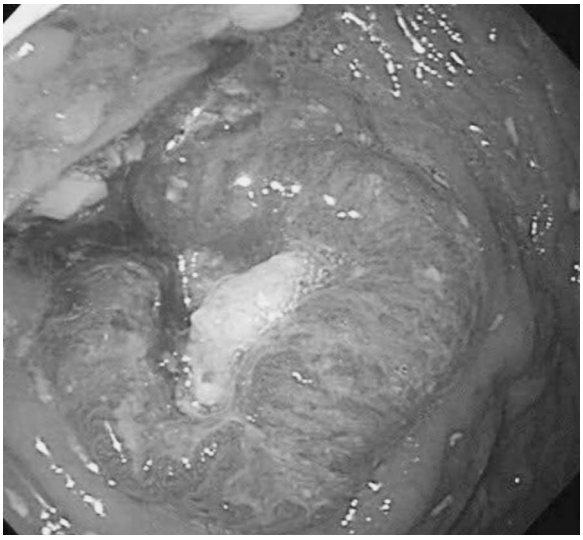

Fig. 2. Upper gastrointestinal endoscopic examination showing a huge encircling mass obstructing the colonic lumen at the level of 35 cm from the upper incisor.

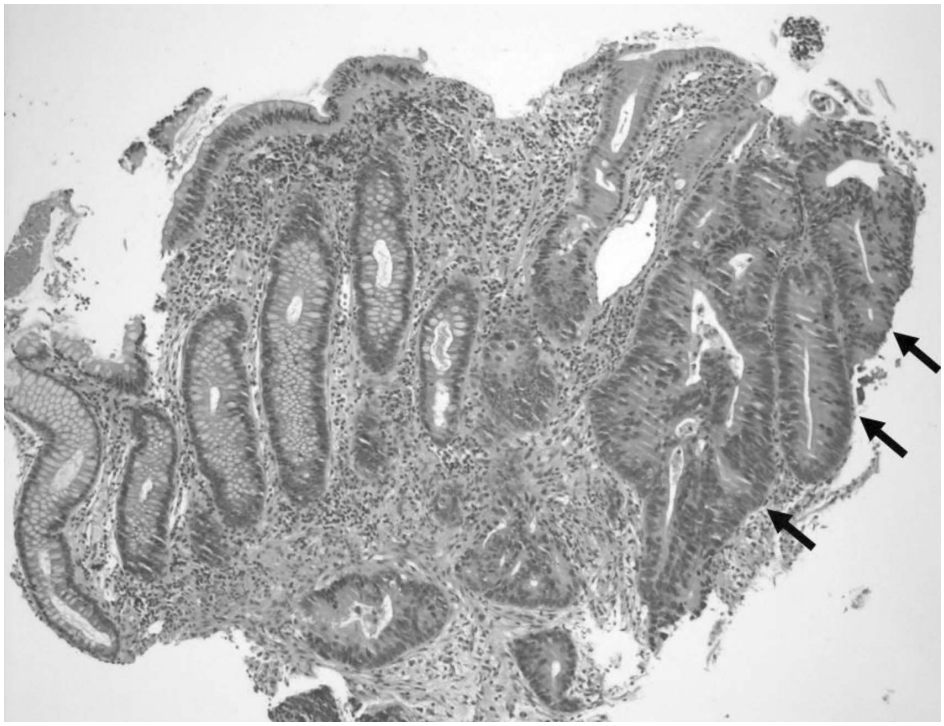

Fig. 3. Microscopic finding of the specimen from the mass of interposed colon graft showing moderately differentiated adenocarcinoma infiltrating stroma (arrow) (H&E stain, X100).

Discussion

Corrosive esophageal injuries due to strong acid or alkaline ingestion eventually result in esophageal strictures. This complication usually requires reconstruction of the esophagus to restore normal swallowing function. Since its first application in 1911, the colon has been one of the most commonly used organs for esophageal replacement because it has a sufficient length enough for transplant and an good blood supply [4-5].

The mortality rate of colon interposition for the treatment of esophageal caustic strictures has been reported to be 4.16% - 4.90%, which is less than that for the treatment of malignant obstruction [5-6]. In the study of 336 patients with corrosively scarred esophagus, late post-operative complications were present in 13.44% of patients, with proximal anastomotic strictures being most common [5]. Other late complications included peptic colon ulceration, colopericardial fistulas, colobronchial fistulas, thoracic outlet obstruction, and colon transplant redundancy. Development of primary carcinoma in the reconstructed colon after esophageal resection is extremely rare, especially for treatment of corrosive esophageal injuries. There have been only 4 reported cases of primary adenocarcinoma in the interposed colon graft following esophageal resection for benign strictures (Table 1). Among the cases, a corrosive esophageal injury was clearly identified as the cause of the stricture in only 2 cases. We present a case of colon cancer arising in the

Table 1. Reported cases of adenocarcinoma occurring at the interposed colonic graft as treatment of benign esophageal stricture

Reference	Age	Sex	Original disease	Main symptom/sign	Time since graft (year)	Location
Licata *et al*. 1978	51	Male	Benign stricture due to lye ingestion	Upper thorax discomfort	11	Middle part of graft
Houghton *et al*. 1989	64	Male	Benign stricture	Progressive dysphagia	20	Upper esophagocolonic junction
Altorjay *et al*. 1995	65	Male	Benign stricture	Recent dysphagia	5	Middle part of graft
Hsieh *et al*. 2005	57	Male	Benign stricture due to lye ingestion	Growing mass of the xyphoid process	37	Lower neoesophagus with intact colonogastric junction

graft colon 16 years after esophageal resection for the treatment of corrosive esophageal injury due to alkaline ingestion.

Because of the scarcity of cases, the mechanism of cancer development in the interposed colon graft has not been established. Nevertheless, sustained exposure of interposed colonic mucosa to undigested food and acid reflux for a long time could contribute to the development of cancer. Whereas it has been suggested that the mucosa of interposed colon were mostly normal macroscopically and microscopically after a mean follow-up of 57 months [7], another study demonstrated that histologic dysplasia and DNA aneuploidy were found in the distal part of the transplanted colon [8]. If environmental predisposing factors contributed to the progression of cancer, the most likely location of cancer might be the distal part of the graft. However, none of the previously reported cases developed at the distal colono-gastric anastomosis site. The tumor of our case also was not located in the distal, rather the middle part of the graft colon. In agreement with this feature, Lindahl *et al* [8]. reported that gastric metaplasia was observed in the middle of the colon transplant and it was suggested that the leading cause of structural changes in the interposed colon might be related to prolonged stasis of food and delayed emptying [9].

Not all patients presented with progressive dysphagia, a typical manifestation of esophageal cancer. In the literature review (Table 1), among four patients with interposed colon grafts for benign esophageal strictures, two exhibited recent onset dysphagia [10-11], one showed upper thorax discomfort [12] and one presented with a growing mass of the xyphoid process [3]. In our case, the patient had progressive dysphagia for 3 months. The diameter of the colonic lumen is wide compared to the esophagus, so it might take considerable time for the tumor to occupy and obstruct the

whole lumen of the interposed colon. Given that various conditions under an interposed colon graft, including food stasis due to a redundant colon segment and an anastomosis site stricture, could mimic the malignancy-related dysphagia symptom, the correct diagnosis is difficult for physicians. A barium esophagogram and CT have been reported to play a limited role in detection of primary cancers under the setting of various surgical procedures and the post-operative appearance [13]. Endoscopy has been shown to be an excellent method by allowing full evaluation of the mucosa and obtaining biopsy specimens for pathologic assessment [13]. In our case, the lesion was detected with a barium esophagogram and confirmed by subsequent endoscopy with forceps biopsy.

In summary, we have presented a rare case of primary carcinoma arising in the interposed colon graft a long time after esophageal resection performed for benign strictures. As the esophageal reconstruction with colon interposition may allow excellent function results and an expectation of long-life to patients with benign strictures, there might be an emerging concern of a potential for development of new cancer in the interposed colon graft. To provide a correct early diagnosis and proper management, increased awareness of the possibility of this rare complication should be kept in mind.

References

1. Isolauri J, Markkula H, Autio V. Colon interposition in the treatment of carcinoma of the esophagus and gastric cardia. *Ann Thorac Surg* 1987;**43**:420-4.
2. Wilkins EW, Jr. Long-segment colon substitution for the esophagus. *Ann Surg* 1980;**192**:722-5.
3. Hsieh YS, Huang KM, Chen TJ, Chou YH, OuYang CM. Metachronous adenocarcinoma occurring at an esophageal colon graft. *J Formos Med Assoc* 2005;**104**:436-40.
4. Wain JC, Wright CD, Kuo EY. Moncure AC, Wilkins EW Jr, Grillo HC, *et al*. Long-segment colon interposition for acquired esophageal disease. *Ann Thorac Surg* 1999;**67**:313-7;discussion 317-8.
5. Knezević JD, Radovanović NS, Simić AP. Kotarac MM, Skrobić OM, Konstantinović VD, *et al*. Colon interposition in the treatment of esophageal caustic strictures: 40 years of experience. *Dis Esophagus* 2007;**20**:530-4.
6. Postlethwait RW. Colonic interposition for esophageal substitution. *Surg Gynecol Obstet* 1983;**156**:377-83.
7. Isolauri J, Helin H, Markkula H. Colon interposition for esophageal disease: histologic finding of colonic mucosa after a follow-up of 5 months to 15 years. *Am J Gastroenterol* 1991;**86**:277-80.
8. Lindahl H, Rintala R, Sariola H, Louhimo I. Long-term endoscopic and flow cytometric follow-up of colon interposition. *J Pediatr Surg* 1992;**27**:859-61.
9. Eleftheriadis E, Dadoukis J, Kotzampassi K, Aletras H. Long-term results after esophagoplasty with colon. An endoscopic study. *Int Surg* 1987;**72**:11-2.
10. Altorjay A, Kiss J, Vörös A, Szanto I, Bohak A. Malignant tumor developed in colon-esophagus. *Hepatogastroenterology* 1995;**42**:797-9.
11. Houghton AD, Jourdan M, McColl I. Dukes A carcinoma after colonic interposition for oesophageal stricture. *Gut* 1989;**30**:880-1.
12. Licata AA, Fecanin P, Glowitz R. Metastatic adenocarcinoma from oesophageal colonic interposition. *Lancet* 1978;**1**:285.
13. Goyal M, Bang DH, Cohen LE. Adenocarcinoma arising in interposed colon: report of a case. *Dis Colon Rectum* 2000;**43**:555-8.