# Esophageal Steno-Obstruction due to Nonesophageal Tumors

Yoon Kyeong Oh, M.D., Hak Jun Gil, M.D., Soo Mi Chung, M.D.
Sei Chul Yoon, M.D., Kyung Sub Shinn, M.D. and Yong Whee Bahk, M.D.

*Division of Therapeutic Radiology, Department of Radiology, Kangnam St. Mary's Hospital, Catholic University Medical College, Seoul, Korea*

From March, 1983 to March, 1987, 16 patients with esophageal steno-obstruction due to nonesophageal tumors were treated in the Division of Therapeutic Radiology, Kangnam St. Mary's Hospital, Catholic University Medical College. The patient characteristics, effect of radiotherapy (XRT) on esophageal steno-obstruction and survival were evaluated. The most common primary tumor was lung cancer (14/16) and the middle third of the esophagus was most frequently involved (14/16). Improved clinical response was observed in 80% of the patients who finished the planned courses of XRT. The mean radiation dose evoking the improvement of dysphagia was 2,993 cGy given over a period of 3 to 4 weeks. The Kaplan-Meier estimates of survival at 15 and 30 weeks of follow-up were 60% and 46%, respectively. In the completed group who finished the whole planned courses of XRT, survival rates were 77% and 51%, respectively. Four patients were alive over 90 weeks with normal passage of food.

**Key Words:** Esophageal steno-obstruction, Nonesophageal tumors, Radiation therapy

## INTRODUCTION

Dysphagia refers to the sensation of food being hindered in its normal passage from the mouth to stomach. It is convenient and helpful in differential considerations to categorize dysphagia into two broad classes: that due to mechancial obstruction in and around the esophagus, and that due to primary neuromuscular distrubances of the esophagus[1].

The nutritional status of a cancer patient is a factor in prediction of therapeutic response and survival. So dysphagia has important aspects in cancer patients.

Authors evaluated the patient characteristics, effect of radiotherapy (XRT) on esophageal steno-obstruction, and survival in 16 patients with esophageal steno-obstruction due to nonesophageal tumors.

## MATERIALS AND METHODS

Sixteen patients with esophageal steno-obstruction due to nonesophageal tumors, twelve males and four females with age ranging from 34 to 72 years, suffered from dysphagia and/or respiratory problem and were treated in the Division of Therapeutic Radiology, Kangnam St. Mary's hospital, Catholic University Medical College from March, 1983 to March, 1987. They were 1% of total patients treated during the same period. Of these, ten patients finished the planned courses of XRT but six could not finish it because of severe deterioration of general condition or pneumonia (Table 1).

The treated patients consisted of 14 lung cancers, 1 breast cancer, and 1 malignant lymphoma involving intestine, orohypopharynx, and larynx resulting in obstruction of upper airway and cervical esophagus. Pathologic types of lung cancer were squamous cell carcinomas in 6 patients, undifferenetiated carcinomas in 3, small cell carcinoma in 1, and adenocarcinoma in 1. In three patients diagnosis was based on sputum cytology or only on radiological and clinical grounds (Table 2).

According to AJCC division of the esophagus (Table 3)[2], the middle third was involved in 88%. In the middle third, the esophagus is closely apposed to the tracheobronchial tree, azygos vein, and aorta.

The hilar node involvement was observed in 12 cases, and neck node involvement was seen in 6 cases (Table 4).

To represent the degreee of dysphagia, we used functional categories of dysphagia (Table 5)[3]. All patients complained of various degrees of dysphagia before XRT (63% liquid passage only and 19% gastrostomy for alimentation). Average diameter of the narrowed segment was 7 mm in

Category II, 2 mm in Category III, 4 mm in Category IV, 3 mm in Category V, 1 mm in Category VIII (Table 6).

Radiation was delivered by 6 MV photon beam from a linear accelerator, 160-180 cGy daily, 5 times a week, up to 1,200-6,300 cGy (mean: 4,292 cGy) with or without a feeding gastrostomy and chemotherapy. In the completed group, the total dose ranged from 3,780 to 6,300 cGy (mean:5,549 cGy). The radiation field and total dose were detrermined individually.

**Table 1.** Characteristics of Patients

| | |
|---|---|
| Total number of patients | 16 |
| Gender : Male | 12 (75%) |
| Female | 4 (25%) |
| Mean age at treatment | 57 yrs (range 34 – 72) |
| XRT | |
| Completed | 10 (63%) |
| Interrupted * | 6 (37%) |

* 6 patients could not finish the planned courses of XRT because of severe deterioration of general condition or pneumonia from tracheo-esophageal fistula. In 2 patients T-E fistulas were developed during XRT at the dose of 1440 cGy and 4140 cGy.

**Table 2.** Pathologic Types of Cases

| | | |
|---|---|---|
| Lung cancer, stage III | | 14 cases |
| Squamous cell carcinoma | 6 | |
| Undifferentiated carcinoma | 3 | |
| Small cell carcinoma | 1 | |
| Adenocarcinoma | 1 | |
| Class V (sputum cytology) | 1 | |
| Not confirmed pathologically | 2 | |
| Breast cancer, stage IV | | 1 case |
| Undifferentiated carcinoma (Rt supraclavicular LN) | | |
| Malignant lymphoma, stage IV | | 1 case |
| Poorly differentiated lymphocytic | | |

**Table 3.** AJCC Division of the Esophagus

| | | |
|---|---|---|
| Upper | : Cervical esophagus | : C7 – T3 |
| Middle | : Upper and Midthoracic | : T3 – T7 |
| Lower | : Lower thoracic | : T7 – T10 or T11 |

## RESULTS

The effect of XRT on esophageal steno-obstruction was assessed by barium swallow at 2 week intervals and previously mentioned functional categories of dysphagia. The criteria of response to XRT were increase in diameter of the narrowed segment by a factor of 2 or more up to the normal range and improvement of functional categories of dysphagia.

The improvement of dysphagia was noted in 80

**Table 4.** Hilar and Neck Node Involvement

| Hilar | | | Neck node | |
|---|---|---|---|---|
| Ipsilateral | | 7 | Right | 4 |
| Right | 5 | | Left | 1 |
| Left | 2 | | Both | 1 |
| Ipsilateral & contralateral | | 5 | Neither | 10 |
| Neither | | 4 | | |

**Table 5.** Functional Categories of Dysphagia

| | |
|---|---|
| Category I | : Eating normally |
| Category II | : Requires liquids with meals |
| Category III | : Able to take semisolids but unable to take any solid food |
| Category IV | : Able to take liquids only * |
| Category V | : Unable to take liquid but able to swallow saliva * |
| Category VI | : Unable to swallow saliva * |
| Category VII | : Alimentation sustained by a surgical bypass procedure |
| Category VIII | : Alimentation sustained by gastrostomy feedings of external esophagus |

* Indication for surgical palliation

**Table 6.** Dysphagia Category and Average Diameter of Lesion

| Dysphagia category | No. of cases | Average diameter of narrowed segment (mm) |
|---|---|---|
| I | 1 | 7 |
| III | 1 | 2 |
| IV | 10 (63%) | 4 (range 0–10) |
| V | 1 | 3 |
| VIII | 3 (19%) | 1 (range 0 – 3) |

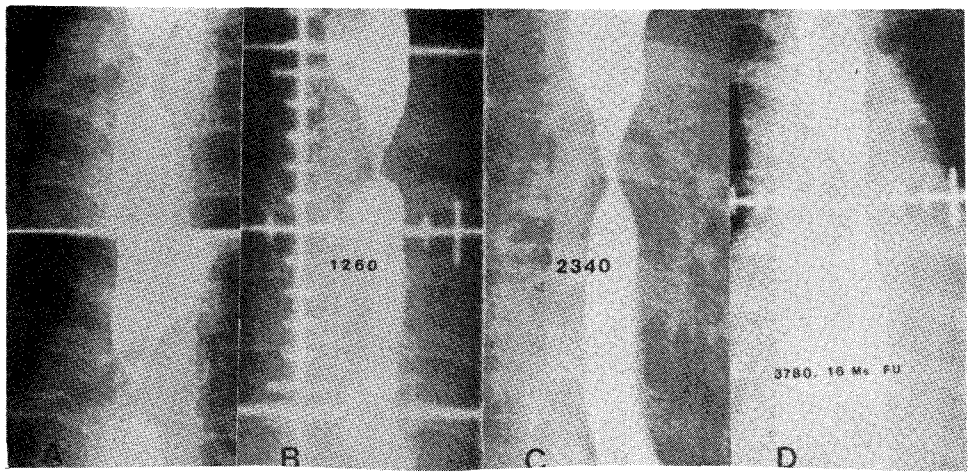


**Fig. 1A.** Esophagogram taken before XRT due to dysphagia. She was a 50-year old woman of recurrent breast cancer with dysphagia and bony metastasis. 7 years before XRT, she underwent radical mastectomy (Lt) and post-operative XRT on left chest.

**Fig. 1B.** She was taken feeding gastrostomy in the beginning of XRT and concomitant chemotherapy. A barium swallow at the dose of 1,260 cGy.

**Fig. 1C.** A barium swallow at the dose of 2,340 cGy. She reguired liquids with meals.

**Fig. 1D.** A barium swallow at 16 months after XRT of 3,780 cGy. She ate normally.

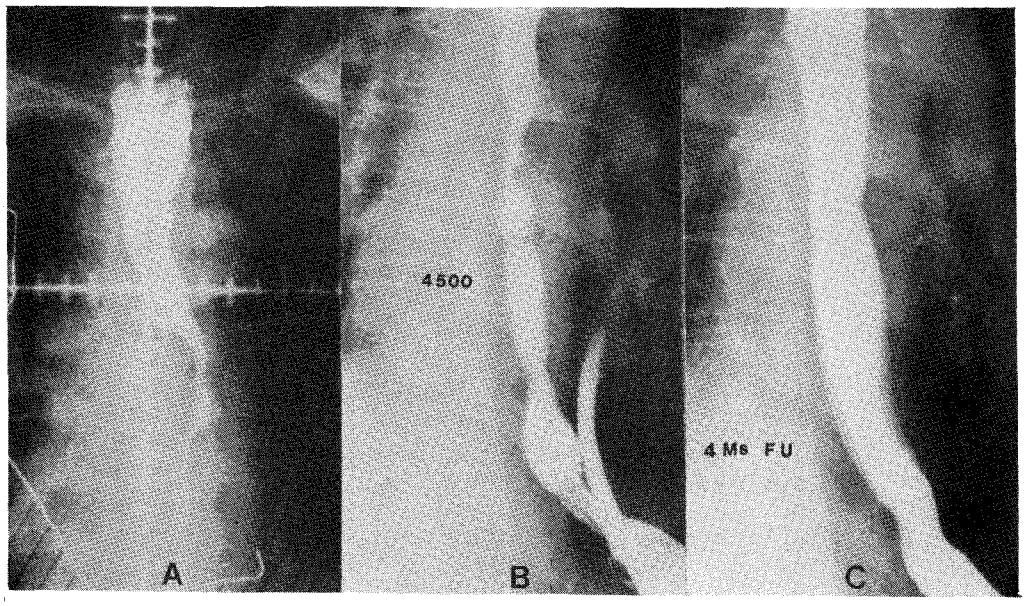


**Fig. 2A.** He was a 59-year old man with lung cancer involving RML bronchus (T3N2MO). By open thoracotomy with biopsy the mass was confirmed as undifferentiated carcinoma. Before XRT he was taken feeding gastrosomy.

**Fig. 2B.** A barium swallow at the dose of 4,500 cGy. He was able to take semisolids.

**Fig. 2C.** A barium swallow at 4 months after XRT of 4,500 cGy. He was taken chemotherapy after XRT. He ate normally at that time.

**Table 7.** Response Rate

| | Response rate (%) | No. of cases |
|---|---|---|
| Completed | 80 | 8/10 |
| Interrupted | 25 | 1*/4 |
| Total | 56 | 9/16 |

* In 1 case, change in functional categories of dysphagia was started at the dose of 2,880 cGy. But he could not finish the planned course of XRT due to T–E fistula.

**Table 8.** Range of Radiation Dose Evoking Improvement of Dysphagia

| Radiation dose (cGy) | No. of cases |
|---|---|
| 1,000 – 1,999 | 1 |
| 2,000 – 2,999 | 4 |
| 3,000 – 3,999 | 3 |
| 4,000 – 4,999 | 0 |
| 5,000 – 5,999 | 0 |
| 6,000 – | 1 |

**Table 9.** Longterm Suvivors without Recurrence of Dysphagia

| Diagnosis (stage) | Pre-XRT dysphagia category | Survival (wk) |
|---|---|---|
| Malignant lymphoma (IV) | IV | 193 |
| Breast cancer (IV) | VIII | 182 |
| Lung cancer (III) | V | 97 |
| Lung cancer (III) | IV | 91 |

**Table 10.** Combined with Chemotherapy and/or Feeding Gastrostomy

| Combined modality | Survival (wk) |
|---|---|
| Chemotherapy | |
| Malignant lymphoma | 193 alive |
| Breast cancer | 182 alive |
| Lung cancer | 35 * |
| Feeding gastrostomy | |
| Lung cancer | 35 * 5, 13 |

* Same patient : Lung cancer with metastasis to adrenal glands

% of patients who finished the planned courses of XRT (Table 7) (Fig. 1, 2).

Radiation dose evoking improvement of dysphagia ranged from 1,000 cGy to 6,010 cGy according to the pathlogic types. The median was 2,880 cGy and the mean was 2,993 cGy. Most of patients showed a positive response to the dose ranging from 2,000 to 3,999 cGy (Table 8).

Survival was calculated from the time of intiation of XRT and that ranged from 2 to 193+ weeks. The Kaplan-Meier estimates of survival at 15 and 30 weeks of follow-up were 60% and 46%, respectively[4]. In the completed group the survival rates were 77% and 51%, respectively. Four patients were alive with normal passage of food after 193, 182, 97 and 91 weeks of follow-up, and 2 patients were alive at 12 and 15 weeks after XRT.

## DISCUSSION

Esophagus is a muscular tube without serosa and its length from pharynx to stomach, ranges from 23 cm to 30 cm. In an adult, the esophageal lumen can distend to a diameter of well over 4 cm because of the elasticity of the esophageal wall. When the esophagus cannot dilate to more than 2.5 cm in diameter, dysphagia can occur, but it is always present when it cannot distend beyond 1.3 cm. Circumferential lesion produce dysphagia more consistently than eccentric lesions. Eccentric benign tumors and lesions causing extrinsic compression cause dysphagia infrequently[5].

To represent the degree of dysphagia we used functional categories of dysphagia (Table 5). All patients complained of various degrees of dysphagia before XRT. There were 1 case in Category II, 1 case in Category III, 10 cases in Category IV (liquid passage only), 1 case in Category V, and 3 cases in Category VIII (gastrostomy for alimentation). Average diameter of narrowed segment in millimeter was as follows: in Category II, 7 mm, in Category III, 2 mm, in Category IV, 4 mm, in category V, 3 mm, and in Category VIII, 1 mm (Table 6). In all cases, the esophagus could not distend beyond 1.3 cm, so dysphagia was always present.

Dysphagia is categorized into two broad classes: that due to mechanical obstruction in and around the esophagus and that due to primary neuromuscular distrurbances of the esophagus. Mechanical disorders resulting in dysphagia include three major intrinsic lesions: peptic stricture, lower esophageal ring, and carcinoma. Other

less common causes of dysphagia include vascular lesions, esophageal webs, and extrinsic compression of the esophagus by tumors, arthritic bony spurs or esophageal diverticula[1,5].

We only evaluated malignant esophageal steno-obstruction due to nonesophageal tumors. This rare circumstance was seen in 1% of total patients we treated during this period. There has been no certain report about the incidence of this circumstance, yet.

Any mass lesion adjacent to the esophagus that arise within the mediastinum, lung, trachea, or-lymph nodes can compress the barium-filled esophagus. Depending on the site and position of the mass, there can be a focal or broad compression on the esophagus and displacement of the esophagus in any direction. The most common entities producing esophageal impression by this mechanism are inflammatory and metastatic lesions involving lymph nodes in the carinal and subcarinal region[6]. Various metastatic carcinomas to the mediastinal lymph nodes, such as cancer of the lung and cancer of the breast, may cause dysphagia[7]. In our cases, lung cancer was the most frequent cause (14/16) and breast cancer and malignant lymphoma were seen individually.

In the middle third of the esophagus, the esophagus is closely apposed to the tracheo-bronchial tree, azygos vein, and aorta[8]. The thoracic esophagus begins at the thoracic inlet and ends at T10. As the esophagus passes down the posterior mediastinum toward the left of the midine, it lies close behind the tracheal bifurcation and left mainstem bronchus. This occurs at the level of T4 or T5, about 23 cm from the central incisors[9]. In our cases, the middle third of the esophagus was the most frequently involved segment (14/16).

When carcinoma of the non-esophageal or esophageal origin is associated with weight loss and dysphagia, the carcinoma is already advanced and there is no satisfactory treatment[10]. An operation provides the best palliation, but mortality may be high. Radiation therapy can give temporary relief, but the obstructive symptoms usually recur if the patient lives longer than 6 months. An esophageal tube introduced through a gastrostomy allows the therapist to view the mass and take a biopsy for staging the perigastric or portal nodes. The use of tubes is not suitable for high esophageal lesions. Gastrostomy for feeding purposes does not prevent the morbidity of aspiration. Endoscopic laser therapy is a practical alternative to maintain patency or to allow placement of an intraluminal prosthesis[11].

Chemotherapeutic agents may be considered. If there is no response after two courses, the chemotherapy should be discontinued. If a response occurs, subsequent palliative irradiation may be helpful in prolonging duration of tumor regression. The choice of drugs is either a fluorouracil-mitomycin combination or cisplatin combined with videstine, bleomycin sulfate, vincristine sulfate, or fluorouracil[10,12].

Because most of our cases were treated due to inoperable lung cancers and the others were responsive tumors to chemotherapy and radiotherapy, resection or bypass for palliation applicable to patients who have at least Category IV dysphagia were not considered and radiation was delivered with or without chemotherapy for feeding gastrostomy[3,13].

A criteria of response to XRT was increased diameter of narrowed segment over two times or up to normal range and improvement of functional categories of dysphagia[11]. The response rate was 80% in patients who finished the planned courses of XRT, and radiation dose evoking the improvement of dysphagia ranged from 1,000 cGy to 6,010 cGy. The median was 2,880 cGy, and the mean was 2,993 cGy.

In esophageal cancer palliative radiation can be used to control the primary disease as well as distant metastasis. The resolution of symptoms, especially pain and dysphagia, can reach 80%. Palliative regimens range from 3,000 cGy over 2 weeks, to 5,000 cGy over 5 weeks or 6,000 cGy over 6 weeks. These can be continous or split course regimens[10]. In our cases the response rate was also high (80%) as compared with palliative XRT of advanced esophageal cancers, and with the usual fraction size such as 180-200 cGy/day, 4,000 cGy may be enough for palliative XRT for dysphagia in extrinsic compression of esophagus.

Finally, to eveluate the prognostic value of esophageal steno-obstruction in nonesophageal tumors, the survival was calculated from the time of initiation of XRT and that ranged from 2 to 193+ weeks. The Kaplan-Meier estimates of the survival at 15 and 30 weeks of follow-up were 60% and 46 %, respectively. In completed group they were 77% and 51%, respectively, but it is impossible to demonstrate the difference in survival statistically between the completed group and interrupted group because of small size and non-randomization of samples.

Especially, 4 patients were alive over 90 weeks

with normal passage of food, as like 193, 182, 97 and 91 weeks and 2 patients were alive at 12 and 15 weeks after XRT.

This finding is encouraging because the many authors have thought that XRT can give temporary relief, but the obstructive symptoms usually recur if the patient lives longer than 6 months[10]. In long term survivors among our cases dysphagia did not recur.

## CONCLUSIONS

A total of 16 patients with esophageal steno-obstruction due to nonesophageal tumors was treated in the Division of the Therapeutic Radiology, Kangnam St. Mary's Hospital, Catholic University Medical College, from March, 1983 to March, 1987.

The patient characteristics, effect of XRT on esophageal steno-obstruction, and survival were evaluated retrospectively.

1. The incidence of esophageal steno-obstruction due to nonesophageal tumors was 1% of total patients we treated during this period (16/1400).

2. The most common primary tumors was lung cancer (14/16) and the middle third of the esophagus was the most frequently involved segment (14/16).

3. Response to XRT was seen in 80% of the patients who finished the planned courses of XRT, and radiation dose evoking the improvement of dysphagia ranged from 1,000 cGy to 6,010 cGy. The median was 2,880, cGy. The mean was 2,993 cGy.

4. the Kaplan-Meier estimates of survival at 15 and 30 weeks of follow-up were 60% and 46%, respectively. In the completed group who finished the whole planned courses of XRT, survival rates were 77% and 51%, respectively. Four patients were alive over 90 weeks, with normal passage of food.

## REFERENCES


1. **Castell DO, Knuff TE, Brown FC, et al:** Dysphagia. Gastroenterol 76:1015-1024, 1979
2. **Beahrs OH, Myers MY:** Manual for staging of cancer. 2nd ed. Philadelphia, JB Lippincott Co 1983, pp 61-66
3. **Lafontaine ER, DeMeester TR:** Carcinoma of the Esophagus. "In" Surgical Oncology, Copeland EM, New York, A Wiley Medical Publication 1983, pp 275-308
4. **Simon RM:** Design and Conduct of Clinical Trials. "In" Cancer, 2nd ed, DeVita VT, Philadelphia, JB Lippincott Co 1985, pp 329-350
5. **Goyal RK:** Dysphagia. "In" Harrison's Principles of Internal medicine, 10th ed, Petersdorf RG, New York, McGraw-Hill Book Co 1983, pp 188-190
6. **Eisenberg RL:**Extrinsic Imprssions on the Thoracic Esophagus. "In" Gastrointestinal Radiology, Eisenberg RL, Philadelphia. JB Lippincott Co 1983, pp 30-46
7. **Holyoke ED, Nemoto T, Dao TL:** Esophageal metastases and dysphagia in patients with carcinoma of the breast. J surg Oncol 1:97, 1969
8. **Hancock SL, Glatstein E:** Radiation therapy of esophageal cancer. Seminars Oncol 11:144-158, 1984
9. **Rosenberg JC:** Cancer of the esophagus. "In" Cancer, 2nd ed, DeVita VT, Philadelphia, JB Lippincott Co 1985, pp 621-657
10. **Aste H, Munizzi F, Martines H, et al:** Esophageal dilation in malignant dysphagia. Cancer 56:2713-2715, 1985
11. **Kagan AR:** Radiotherapeutic management of the patient for palliation. "In" Radiation Oncology, Perez CA, Philadelphia, JB Lippincott Co 1987, pp 1271-1282
12. **Resbeut M, Prise-Fleury EL, Ben-Hassel M, et al:** Squamous cell carcinoma of the esophagus. Cancer 56:1246-1250, 1985
13. **Yoon SC, Kwon HC, Bahk YW, et al:** Esophageal obstruction due to nonesophageal carcinoma. J Korean Cancer 16:67-72. 1984

국문초록 =

# 비식도 종양에 의한 식도의 협착 및 폐쇄

가톨릭대학 의학부 강남성모병원 방사선치료실

오윤경 · 길학준 · 정수미 · 윤세철
신 경 섭 · 박 용 휘

암 환자에 있어서 영양상태는 치료에 대한 반응과 생존기간에 영향을 미치는 인자가 된다. 그래서 연하곤란은 암 환자에 중요한 영향을 끼친다고 할 수 있다. 저자들은 1983년 3월부터 1987년 3월까지 가톨릭의대 강남성모병원 방사선치료실에서 방사선 치료를 받은 1,400명의 환자 중 연하곤란 및 호흡기계 문제로 방사선 치료를 받았던 식도암 이외의 암에 의한 식도의 협착 및 폐쇄를 일으킨 환자 16예를 대상으로 이들의 특성과 식도의 협착 및 폐쇄에 대한 방사선 치료의 효과 및 생존기간을 후향성으로 분석하여 보았다.

1. 방사선치료를 받은 환자 중 빈도는 1%이었다.

2. 가장 빈번한 원인은 폐암(14/16)이었고, 식도 중부(14/16)가 가장 흔하게 침범되는 부위였다.

3. 방사선 치료에 대한 반응은 연하곤란의 정도와 2주간격으로 촬영한 바륨조영사진으로 평가하였는데 계획된 방사선 치료를 종료한 환자들의 80% (8/10)에서 반응을 보였다.

4. 반응이 시작되는 선량은 1,000 cGy-6,010 cGy의 범위에 들어 있으며 중앙치는 2,880 cGy였고 평균치는 2,993 cGy였다.

5. Kaplan-Meier 방식에 의한 15주와 30주 생존율은 전예에서는 60%와 46%였고 계획된 방사선 치료를 종료한 환자들에서는 77%와 51%였다.

6. 4예에서는 연하곤란의 재발없이 90주 이상 생존하고 있다.