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Esophageal Achalasia : Results of Balloon Dilation[1]

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Purpose : To evaluate the clinical effectiveness of fluoroscopically guided balloon dilation in the treatment of esophageal achalasia.

Materials and Methods : Under fluoroscopic guidance, 21 balloon dilation procedures were performed in 14 patients with achalasia. A balloon with a diameter of 20 mm was used for the initial attempt. If the patient tolerated this well, the procedure was repeated with a 10−20 mm balloon, placed alongside at the same session. If, however, the patient complained of severe chest pain and/or a postprocedural esophagogram showed an improvement, the additional balloon was not used. For patients whose results were unsatisfactory, the dilation procedure was repeated at sessions three to seven days apart.

Results : Succesful dilation was achieved in 13 of 14 patients(92.9%), who needed a total of 20 sessions of balloon dilation, ranging from one to three sessions per patient(mean, 1.54 sessions). Esophageal rupture occured in one of 14 patients(7.1%) ; of the 13 patients who underwent a successful dilation procedure, 12(92.3%) were free of recurrent symptoms during the follow-up period of 1−56(mean, 18.5) months. The remaning patient(7.7%) had a recurrence seven months after dilation.

Conclusion : Fluoroscopically guided balloon dilation seems to be safe and effective in the treatment of esophageal achalasia.

Index Words : Achalasia
Esophagus, interventional procedure
Esophagus, rupture
Esophagus, stenosis or obstruction
Interventional procedure, complications

INTRODUCTION

The successful treatment of esophageal strictures with a Greuntzig-type balloon catheter was reported by London et al(1) in 1981. Since then, balloon dilation under fluoroscopic guidance has become a common method of treating a variety of strictures in the esophagus(2−17). Fluoroscopically guided balloon dilation has also proved to be a safe and effective procedure for the treatment of achalasia(2−12).

Only a few studies have been published concerning the long-term effectiveness and recurrence rate of balloon dilation under fluoroscopic guidance in the treatment of achalasia(11, 12).

We reviewed our experience to assess safety and long-term effects in a consecutive series of 14 patients with achalasia.

MATERIALS and METHODS

Between March 1988 and December 1995, we performed 21 fluoroscopically guided balloon dilation procedures in 14 consecutive patients with achalasia. There were five male and nine female patients, aged 13−72(mean, 41) years. Achalasia was diagnosed on the basis of findings of esophagography, endoscopy and esophageal manometry. The symptoms at presentation consisted of dysphasia in all 14 patients, vo-

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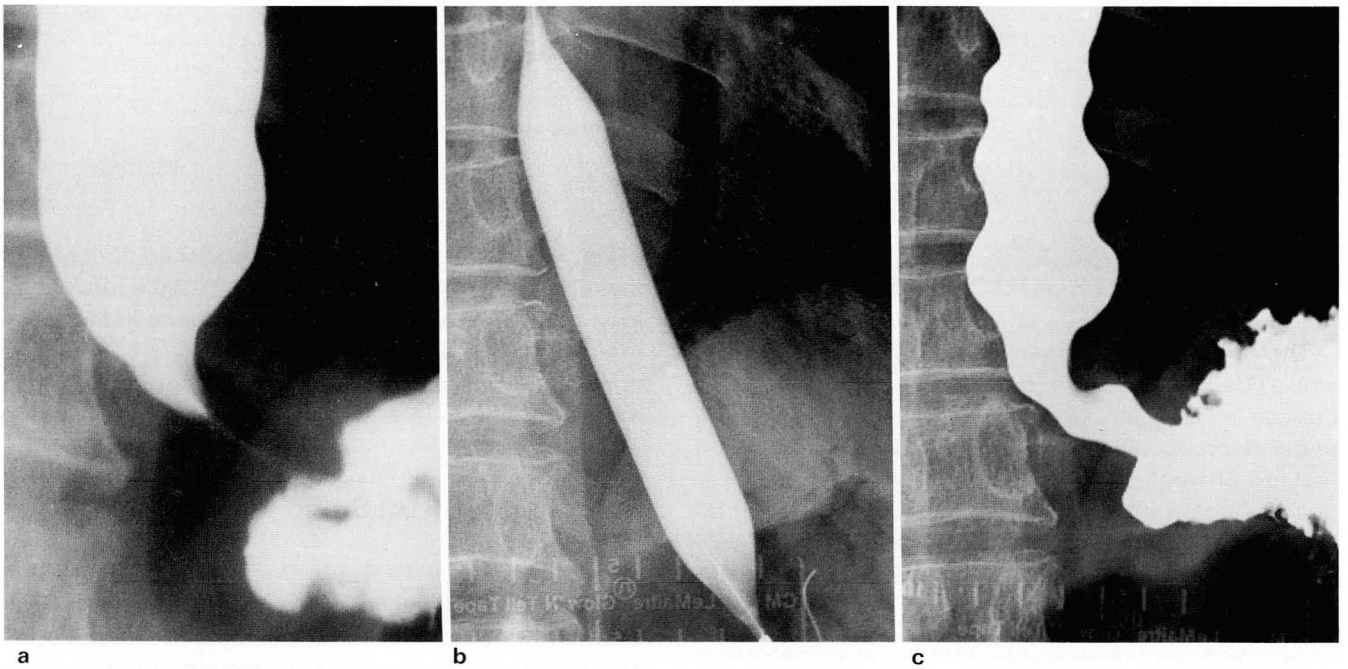
miting or regurgitation in seven, chest pain in three and weight loss in two. The period of these symptoms was varied, with a range of three months to 20 years.

Esophagograms were reviewed to determine the length and the site of narrowing before the balloon dilation procedure. Patients were instructed not to eat or drink for 6—8 hours before the procedure. The study was explained to the patients and each gave informed consent. Topical anesthesia of the pharynx was performed using an aerosol spray(Lidocaine ; Jeil, Taegu, Korea). A patient was asked to say "no more" or to lift his or her left hand when the pain made them unable to tolerate the procedure.

Initially, a technique similar to that described by Song et al(15, 18) was used to insert the balloon catheter through the stricture. A 0.035-inch angled exchange guide wire(Radiofocus wire ; Terumo, Tokyo) was introduced through the mouth across the narrowing into the stomach. A balloon catheter 20 mm in diameter and 8 cm long(Medi-Tech, Watertown, Mass) was passed over the guide wire until it straddled the esophagogastric juntion. The balloon was inflated slowly by injecting diluted water-soluble contrast medium (Conray 43 ; Mallinckrodt, St Louis) until the hourglass deformity created by the stricture at the esophagogastric juntion disappeared from the balloon contour (Fig. 1), provided that the procedure was well-tolerated ; inflation was usually performed twice. After completion of the procedure, a small amount of diluted barium(about 3—10 mm) was introduced through the catheter into the distal esophagus to check for extravasation of contrast media. After the verification of no extravasation, an esophagogram was obtained, using a regular amount of barium(150—200 ml). If the patient tolerated the dilation with this balloon well and was unimproved or slightly improved on immediate post- procedure esophagogram, the caliber of the balloon catheter was increased at the same session to 30—40 mm. Balloon diameter was increased by placing an additional 10—20 mm balloon alongside(double balloon or "kissing balloon" technique(19)(Fig. 2). However, in cases where the patient felt severe chest pain during the procedure with a 20 mm single balloon and/or where there was improvement on postprocedural esophagogram, further intervention was discontinued.

Patients were allowed a soft diet two hours after the procedure and were encouraged to resume intake of solid foods the next day. If patients had no difficulty with these, further dilation was not performed. For those whose symptoms showed only slight or no improvement, however, the dilation procedure was repeated at sessions three to seven days apart. To determine the short-term results of the dilation, esophagography and manometry were performed. Long-term follow-up information was obtained by evaluating the clinical charts of all patients and by means of esophagography on an outpatient basis or by telephone interviews. We defined successful dilation as relief of the patient's sym-



a b c

Fig. 1. Patient 12.

a. Esophagogram obtained before balloon dilation shows marked dilatation of distal esophagus and beak-like deformity at the level of esophagogastric junction.

b. Dilation with a balloon catheter of 20 mm in diameter.

c. Esophagogram obtained immediately after the procedure shows marked improvement of the distal esophagus.

ptoms and recurrence as reappearance of the specific complaint(s) that had first caused the patient to seek medical attention(6).

RESULTS

A total of 21 sessions of balloon dilation were performed in 14 patients. In 13 cases(92.9%), a good response was noted shortly after completion of the procedure; all these 13 patients needed a total of 20 sessions, with a range of one to three sessions per patient(mean, 1.54 sessions).

Ten of the 13 patients underwent the double balloon technique and three the single balloon technique(Table 1). Four of nine patients treated with double balloons were asymptomatic after one session, five of nine patients after two sessions and one of nine patients after three sessions. The remaining three patients showed good results after one session of single balloon dilation. A postdilation esophagogram in successful cases showed recovery of the peristaltic wave, no stasis or good patency of contrast media and widening of the narrowed site.

Rupture of the esophagus occured in one(patient 3) of 14 patients(7.1%) during the first session of the procedure. Dilation had been performed with double ba-

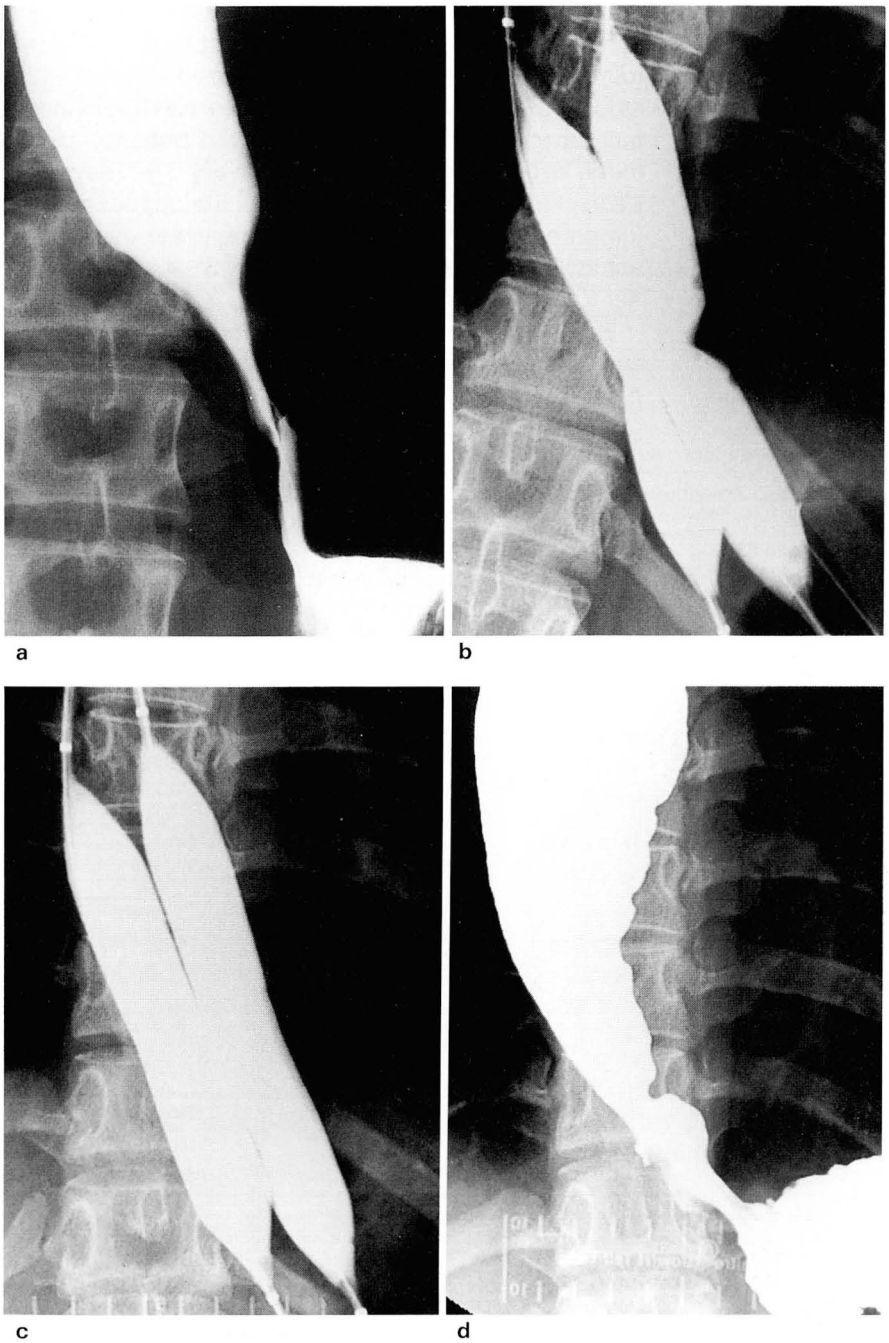


Fig. 2. Patient 11.
a. Esophagogram obtained before balloon dilation shows distal esophageal norrowing and proximal dilatation.
b, c. Double balloons 20 mm in diameter were placed side by side. Notice hourglass deformity on the balloon contour during balloon dilation(b) and disappearance after balloon dilation(c).
d. Follow-up esophagogralm at 9 weeks after two sessions of double balloon dilation shows good patency of barium and reduction of narrowing.

lloons 20 mm in diameter, but we stopped the procedure because the patient complained of severe chest pain. An esophagogram was taken and revealed a rupture of the distal esophagus. A chest radiograph showed a pneumomediastinum ; the patient developed fever and leukocytosis and underwent emergency surgery on the same night. During a thoracotomy, a longitudinal tear 1.5 cm in length was found in the distal esophagus. The patient was treated with antibiotics for two weeks and discharged without specific problems.

Of 13 patients(excluding the one who had an operation after esophageal rupture), 12(92.3%) were free of recurrent symptoms of dysphagia during the follow-up period of 1 —56(mean, 18.5) months. In the remaining patient(patient 7), recurrence of symptoms developed seven months after final dilation.

DISCUSSION

Fluoroscopically guided balloon dilation is well known as an effective procedure for treating esophageal achalasia. Procedures for dilation and optimal luminal diameter acieved have varied according to different authors. The experience of most has been that multiple, serial redilations are commonly required to obtain a good clinical response.

Starck et al(3) reported that in the first session dilation of up to 20 mm was performed with one balloon and in the second or third session, dilation was extended by 20 mm per balloon with two balloons in tandem up to an oval of 30 —40 mm. They performed a total of nine sessions(mean, 2.25 sessions) of balloon dilation in four patients and dilation procedure was repeated at sessions 3 —5 days apart. Maynar et al(7) performed multiple dilations with a 20 mm diameter balloon, unless overdilation of the narrowing site was required, in which case two 20 mm balloons were used side by side. They pereformed an average of 6.33 redilations in three patients on the third day after the procedure. In the report by Chon et al(11), symptoms of all six patients either improved slightly or unimproved using a single 20 mm balloon, but improved remarkably with the use of a 30 mm single balloon or two 20 mm balloons. Shin et al(12) reproted that a balloon 19 —25 mm in diameter was used in the first session and balloon size was gradually increased to 30 —35 mm with a single balloon. They performed three to five sessions of balloon dilation per patient in seven patients and dilation procedure was repeated every 3 —7 days. McLean et al(5) reported that patients dilated routinely to a lumen of 20 mm in the region of the lower esophageal sphincter required redilation every 3 —4 months in order to remain symptom-free.

Rupture is the most severe complication that can occur during the esophageal balloon dilation procedure ; a rate of 0 —12%(average approximately 3.4%) has

Table 1. Patients, Number and Results of Dilation Procedures, and Follow-up

Patient No./ Age(y)/Sex	No. of Dilation Sessions	Balloon Size Used(mm)	Successful Dilation	Follow-up Period(mo)	Recurrence
1.19/F	1	20 + 20	Yes	56	No
2.13/F	1	20 + 10	Yes	37	No
	2	20 + 10			
3.33/F	1	20 + 20	Rupture		
4.53/F	1	20 + 20	Yes	30	No
	2	20 + 20			
5.40/M	1	20 → 30	Yes	26	No
6.62/F	1	20 + 15	Yes	23	No
	2	20 + 20			
7.24/M	1	20 + 15	Yes	19	Yes
	2	20 + 20			
8.25/F	1	20 + 20	Yes	16	No
	2	20 + 20			
	3	20 + 20			
9.39/M	1	20 + 20	Yes	15	No
10.48/F	1	20 + 20	Yes	15	No
11.22/F	1	20 + 20	Yes	9	No
	2	20 + 20			
12.59/M	1	20	Yes	7	No
13.72/M	1	20	Yes	5	No
14.67/F	1	20 + 10	Yes	1	No

been reported(20, 21). Esophageal rupture in achalasia may be more serious than in other cases of esophageal stricture because of abundant retained food in the markedly dilated esophagus. In our series of dilations, esophageal rupture occured in one patient during the first session of double balloon dilation. Shaffer et al(22) suggested the following guidelines for the selective use of nonoperative treatment : (a) clinically stable patients ; (b) the presence of instrumental perforations detected before the occurrence of major mediastinal contamination, or perforations with such a long delay in diagnosis that the patient has already demonstrated tolerance for the perforation without the need for surgery ; (c) esophageal disruptions well-contained within the mediastinum or pleura ; no crepitus, pneumothorax, pneumoperitoneum or intraperitoneal extravasation. They also believed that surgery generally remained the preferred treatment under the following circumstances : (a) patients in an unstable condition, with systemic sepsis, respiratory failure, or shock ; (b) large perforations with widespread contamination ; (c) perforations of the intra-abdominal portion of the esophagus ; (d) perforations with pneumothorax ; (e) perforations with retained foreign bodies. In addition, Song et al(15) ssatedthat deterioration of clinical status(fever, leucocytosis) would indicate the absolute necessity of surgical treatment. Our patient underwent surgery within 24 hours of esophageal rupture because an immediate postprocedural esophagogram revealed a mediastinal spillage of barium and her clinical status had gradually deteriorated.

In our opinion, it is not necessary to routinely dilate the esophageal balloon up to 30—40 mm, not only because the esophageal rupture rate was relatively high using this method but also because some patients with whom a single 20 mm balloon was used were free of recurrent symptoms.

A few studies have explored the long-term efficacy and recurrence rate in radiologically-guided balloon dilation of achalasia. Shin et al(12) reported a recurrence rate of 29%(two of seven patients) during a follow-up period of 12 to 39 months after final dilation, while Chon et al(11) reported a recurrence rate of 17% (one of six patients). In our series, the recurrence rate of 7.7%(one of 13 patients) during a follow-up period of 1 to 56 months was lower than those reported previously.

In conclusion, our results indicate that fluoroscopically guided balloon dilation is safe and reasonably effective in the treatment of achalasia.

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식도 무이완증:풍선 확장술의 결과[1]

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기원우 · 강성권 · 윤권하 · 김남현 · 이효정 · 윤현기 · 성규보 · 송호영

목 적:식도 무이완증의 치료에 있어서 풍선 확장술의 유용성에 대해 알아보고자 하였다.

대상 및 방법:14명의 식도 무이완증 환자에서 투시유도하에 21회의 풍선확장술을 시행하였다. 처음에 직경 20mm 단일 풍선을 이용하여 확장을 시도하였다. 이 시술 과정에 환자가 잘 견디는 경우에는 같은회에 직경 10-20mm 풍선을 부가적으로 사용하여 확장을 시행하였다. 그러나, 20mm 단일 풍선 확장술중 심한 통증을 호소하거나 시술후 식도 조영술상 호전을 보인 경우에는 추가 확장은 시도하지 않았다. 시술후 만족할 만한 결과를 얻지 못한 경우 3-7일 이내에 풍선 확장술을 재시도하였다.

결 과:풍선 확장술을 시행한 14명중 13명은(92.9%) 총 20회, 환자당 1-3회의(평균, 1.54회) 시술로 성공적인 결과를 얻었다. 나머지 1명(7.1%) 에서는 시술도중 식도천공이 발생하였다. 풍선 확장술이 성공적이었던 13명에 대한 1-56개월의(평균, 18.5개월) 추적기간동안 12명은(92.3%) 증상의 재발이 없었으나, 1명은(7.7%) 추적 7개월에 재발되었다.

결 론:투시유도하에서 시행하는 풍선 확장술은 식도 무이완증 치료에 안전하고 유용한 것으로 사료된다.