The Journal of Laryngology and Otology
March 1999, Vol. **113**, pp. 237–240

Comparison of the endoscopic stapling technique with more established procedures for pharyngeal pouches: results and patient satisfaction survey

S. VAN EEDEN, R. V. LLOYD, F.R.C.S., R. M. TRANTER, F.R.C.S., F.D.S.

Abstract

Pharyngeal pouch surgery by the external approach has been shown to be effective but has a relatively high complication rate. We compared the outcome of 17 patients who had cricopharyngeal myotomy alone or combined with excision/inversion/suspension, simple pouch excision and Dohlman's procedure with 17 patients who had the relatively new Endo GIA-30 endoscopic stapling technique. Results were obtained retrospectively by postal questionnaire and medical records. We conclude that endoscopic stapling shortens the return to normal diet and in-patient stay. These patients also experience better swallowing and are generally more satisfied with the procedure. We have accepted endoscopic stapling as the method of choice for the treatment of pharyngeal pouches.

Key words: Pharynx; Diverticulum; Surgery, endoscopic; Treatment outcome

Introduction

Pharyngeal pouches, or Zenker's diverticula, are out-pouchings of pharyngeal mucosa through Killian's triangle. It is thought that due to a combination of muscular incoordination whilst swallowing, and a higher than normal cricopharyngeal tone, a pulsion diverticulum is formed. As the diverticulum enlarges, it causes increasing symptoms of dysphagia, regurgitation of undigested food, and large diverticula can result in malnutrition. Overspill of pouch contents can lead to recurrent aspiration pneumonia.

Due to these potential risks, once a pharyngeal pouch is diagnosed consideration should be given to repairing the pharynx. Unfortunately, the surgery for pharyngeal pouches has long been associated with a high risk of complications. This is partly due to the type of surgery itself, and partly due to the frailty of the population which needs the surgery. There are essentially two surgical approaches: surgery performed via an external neck incision, to gain access to the pouch, and that performed endoscopically. Both approaches have their risks and complications.

More recently, with the advent of the GIA stapling gun, Martin-Hirsch *et al.* (1993) and Collard *et al.* (1993) described the use of this stapling device to divide the pouch wall endoscopically. Initial reports have shown low rates of morbidity compared to other techniques, albeit on relatively small numbers of patients. It is a quick and relatively straightforward procedure, and we have adopted it as the method of choice in Brighton over the last three years.

The aim of this retrospective study was to assess any difference in complication rate, recovery rate and patient satisfaction with this recently adopted procedure, compared to more established techniques. In this paper we will describe the results of the first 17 patients undergoing Endo-GIA 30 stapling surgery, and compare them with a similar number of patients who had surgery performed by more traditional methods. The data were obtained both from clinical records and a patient satisfaction survey. We found that this survey was necessary, because patients undergoing stapling of their pouches are generally discharged from hospital the day after their surgery and we were keen to find out how they were managing at home.

Patients and methods

Patients included in this study represent all patients who underwent pharyngeal pouch surgery at the Royal Sussex County and the Nuffield Hospitals in Brighton from October 1990 to October 1997. Thirty-seven patients were included in the study. These patients were divided into two groups: those who had their surgery by established techniques (19 patients) and those who underwent stapling with the Endo GIA-30 staple gun (18 patients).

From the Department of Otolaryngology, Royal Sussex County Hospital, Brighton, UK.
Accepted for publication: 30 November 1998.

TABLE I
IN-PATIENT DETAILS

	Established techniques (ET) group	Endoscopically stapled (ES) group
Number of patients	19	18
Patients responded	17	17
Response rate	89.50 %	94.40 %
Males	9	11
Females	8	6
Average age	72.9 years	68.1 years
Average follow-up	43 months	10.2 months

In-patient details were obtained from analysis of the medical records, and patient satisfaction details from the postal questionnaire, which was sent to each patient at a minimum of three months after surgery (Table I). Established techniques (ET) entailed cricopharyngeal myotomy with suspension, inversion or excision of the pouch or Dohlman's procedure or pouch excision only (Table II).

The use of the Endo GIA-30 staple gun has been described in detail elsewhere (Dorion *et al.*, 1994). The technique essentially involves simultaneously stapling and cutting the septum of the pouch, so that the cut edges are sealed with a triple row of staples. Measurement of the depth of the pouch before proceeding to the actual stapling proved to be very useful in determining the positioning of the staple gun in our patients.

None of our patients in the study period were excluded from having their pouches stapled by technical difficulties, but we identified some potentially difficult cases.

These included patients who have a very thick bar between the pouch and oesophagus (anterior wall of pouch), and dentate patients with a relatively small mandible.

Results

The results of the questionnaire are summarized in Table III. Day 1 was taken as the day of operation.

The results on the length of post-operative stay in hospital was obtained from medical records. In the endoscopically stapled (ES) group, twelve patients (70.6 per cent) were discharged after 24 hours (or on day two) from hospital. Only one patient (5.9 per cent) in the established techniques (ET) group were discharged on day two. The average post-operative stay for the ES group was 2.26 days (54 hours) compared to four days (96 hours) for the ET group.

TABLE II
DETAILS OF ESTABLISHED TECHNIQUES (ET)

	Number of patients in established technique (ET) group
Cricopharyngeal myotomy and suspension of pouch	5
Cricopharyngeal myotomy and inversion of pouch	2
Cricopharyngeal myotomy and excision of pouch	2
Cricopharyngeal myotomy only	4
Dolman's procedure	2
Pouch excision only	2

Discussion

Since introducing the use of the Endo Gia-30 staple gun for treatment of pharyngeal pouches, patients have been discharged earlier in the post-operative period than with previous techniques (Table II), because they commence a soft diet earlier after their operation.

The two main aims of the study were therefore: 1) to compare the rates of complications, length of stay in hospital and time taken to resume soft and normal diets between the two groups; 2) to assess patients' satisfaction with their treatment regarding change in their swallowing and any other related post-operative problems encountered at home after discharge. Although this assessment technique is subjective, we felt it to be an equally important part of the review, and one that is often overlooked.

After the Endo GIA-30 stapling technique (ES) was adopted, it was the sole method of treating pharyngeal pouches (n = 18), and we thus compared a similar number of the consecutive patients treated prior to the introduction of stapling with more established techniques (ET) (n = 19, Table I).

Early post-operative complication rates were significantly different between the two groups, with only one patient (5.9 per cent) in the stapled group, compared to four patients (23.5 per cent) in the ET group. The only complication in the stapled group, was a patient who developed a fistula and needed a prolonged (18 day) stay in hospital. There was also an oesopharyngeal perforation in the earlier group and other complications included wound leakage, significant pain and pyrexia.

No significant late post-operative complications were recorded in the stapled (ES) group (although one patient reported gingivitis). There were no re-admissions in this group. One patient (5.9 per cent) in the earlier group had pain severe enough to necessitate re-admission after discharge. These results are similar to previous reports by Todd (1974), Tribble (1975) and Mackay (1976). All these studies report a higher complication rate with external approach procedures compared to endoscopic procedures.

Time from operation to starting a soft diet does not appear significantly different between the two groups in this study (three versus 3.6 days). This is partly due to the one patient who developed a fistula and partly due to our management of the patients on embarking on this stapling technique. Now all patients are started on a soft diet on the first post-operative day and are generally discharged that same day unless there are complications. There has not been any increased incidence of complications with this management.

There was minimal difference in numbers of patients reaching a normal diet by one week (65.3 per cent in ES group versus 53 per cent in ET group), but 41.7 per cent of patients in the stapled

https://doi.org/10.1017/S0022215100143658 Published online by Cambridge University Press

TABLE III
RESULTS OF QUESTIONNAIRE

	Combined questionnaire results of the established techniques (ET) group		Questionnaire results of the endoscopically stapled (ES) group	
	Values	Percentage %	Values	Percentage %
Soft diet on: day 1	3	17.60	3	17.60
day 2	4	23.50	11	84.70
day 3	5	29.40	1	5.90
day 4 or more	3 (4, 9, 11)	17.60	2 (4, 18)	11.80
Not sure	2	11.80	0	0
Soft diet start average	3.6 days		3 days	
Normal diet: < 3 days	2	11.80	7	41.80
4–7 days	7	41.80	4	23.50
8–14 days	5	29.40	5	29.40
> 14 days	1 (30 days)	5.90	1 (18 days)	5.90
Not sure	2	11.80	0	0
Post-operative complications as in patient:				
• None	13	76.50	16	94.10
• Pyrexia	2	11.80	0	5.90
• Significant pain	1	5.90	0	0
• Wound leak/Perforated oesophagus	1	5.90	1	5.90
Total number leaving complications	4	23.50	1	5.90
Post-operative complications after discharge:				
• None	16	94.10	16	94.10
• Significant pain	1	5.90	0	0
• Gingivitis	0	0	1	5.90
Sought medical advice	1	5.90	1	5.90
Readmissions	1	5.90	0	0
Quality of swallowing				
• Completely normal	6	35.30	9	52.90
• Better but not normal	6	35.30	6	35.30
• No change	4	23.50	1	5.90
• Worse	0	0	1	5.90
Not sure	1	5.90	0	0
General Health:				
• Improved	5	29.40	5	29.40
• Unchanged	11	64.70	11	64.70
• Worse	1	5.90	1	5.90
Satisfaction with operation				
• Pleased	10	58.80	14	82.40
• Sorry having had it	6	35.30	3	17.60
Not sure	1	5.90	0	0

group was eating normally by three days, compared to 11.8 per cent of patients in the earlier group. These results differ significantly from previous reports by Scher and Richtsmeier (1996), whose patients took an average of nine days to return to a full diet. Length of stay was also shorter in the stapled (ES) group (an average of 2.3 days versus four days). Of the patients in the stapled group, 70.6 per cent were discharged after one post-operative day (day 2).

As for longer-term improvement in swallowing, the stapled (ES) group reported completely normal swallowing in nine patients (53 per cent), and improved swallowing in five (35.3 per cent), giving a combined total of 88.3 per cent for better/normal swallowing. One patient (5.9 per cent) reported no change, while one patient (5.9 per cent) reported a worsening of swallowing. In the earlier (ET) group, six (35.3 per cent) reported normal swallowing and six (35.3 per cent) improved swallowing, giving a total of 70.6 per cent better or normal swallowing. Four patients (23.5 per cent) reported no change, but none reported worsening of their swallowing. There is thus a substantial difference between the two groups. This may be partly due to the longer follow-up time in the earlier (ET) group – an average of 43 months compared to 10.2 months in the stapled group (ES) group. Long-term follow-up in the stapled group is essential to assess any significant differences in swallowing outcome. Complete resolution of symptoms in other studies of endoscopic stapling is reported as 85.7 per cent by Koay and Bates (1996) and 83.34 per cent by Collard *et al.*, 1993).

Three patients (17.6 per cent) in the ET group required revision surgery for residual symptoms, compared to one (5.9 per cent) in the ES group. Other studies have shown revision rates of between three per cent and 34 per cent following pouch excision and between 10 per cent and 79 per cent after Dolman's procedures (Mackay, 1976; Juby, 1978; Maran *et al.*, 1986; Freeland and Bates, 1987; Scher and Richtsmeier, 1996). Again, it is possible that the higher rate in the older techniques may

https://doi.org/10.1017/S0022215100143658 Published online by Cambridge University Press

simply be due to longer follow-up time in these patients and only further assessment in future will resolve this matter.

Of interest is the fact that there was little difference in how patients in either group felt their general health had improved (31 per cent in each group). However, 82.3 per cent of the stapled (ES) group were pleased that they had the operation, compared to 58.8 per cent of the established technique (ET) group.

Conclusion

Comparing various outcome measures of patients with pharyngeal pouches who have been treated with the relatively recently adopted technique of the Endo GIA-30 staple gun, there were no increased complication rates – either before or after discharge. Patients are started on soft diets and reach normal diets more quickly than with the earlier techniques used. They are also discharged home more quickly. Substantially more patients report normal swallowing and are more pleased with their operation than with the earlier techniques.

We will need to re-audit the endoscopically stapled patients in the future to ensure that these mid-term results are lasting, but in the meantime we have adopted the Endo GIA-30 staple gun technique as our preferred method of treating pharyngeal pouches.

Acknowledgements

We would like to thank Mr Peter Hale, F.R.C.S. and Mr Andrew Clark, F.R.C.S. for their help with the use of the Endo-GIA 30 stapling device.

References

Collard, J. M., Otte, J. B., Kestens, P. J. (1993) Endoscopic stapling technique of esophagodiverticulostomy for Zenker's diverticulum. *Annals of Thoracic Surgery* **56:** 573–576.

Dorion, D., Brown, D. H., Gullane, P. J. (1994) How I do it: Zenker's stapler diverticulectomy. *Journal of Laryngology and Otology* **23:** 145–147.

Freeland, A. P., Bates, G. J. (1987) The surgical treatment of pharyngeal pouch: inversion or excision? *Annals of the Royal College of Surgeons of England* **69:** 57–58.

Juby, H. B. (1978) The treatment of pharyngeal pouches. *Journal of Laryngology and Otology* **92:** 1101–1115.

Koay, C. B., Bates, G. J. (1996) Endoscopic stapling diverticulotomy for pharyngeal pouch. *Clinical Otolaryngology* **21:** 371–376.

Mackay, I. S. (1976) The treatment of pharyngeal pouch. *Journal of Laryngology and Otology* **90:** 183–190.

Maran, A. G. D., Wilson, J. A., Al Muhanna, A. H. (1986) Pharyngeal diverticula. *Clinical Otolaryngology* **11:** 219–255.

Martin-Hirsch, D. P., Newbegin, C. J. R. (1993) Autosuture GIA gun: a new application in the treatment of hypopharyngeal diverticula. *Journal of Laryngology and Otology* **107:** 723–725.

Scher, R. L., Richtsmeier, W. J. (1996) Endoscopic staple-assisted eso-phagodiverticulostomy for Zenker's diverticulum. *Laryngoscope* **106:** 951–956.

Todd, G. B. (1974) The treatment of pharyngeal pouch. *Journal of Laryngology and Otology* **88:** 307–315.

Tribble, W. M. (1975) The surgical treatment of Zenker's diverticulum: endoscopic vs. external operation. *Southern Medical Journal* **68:** 1260–1262.

Address for correspondence:
Mr R. M. Tranter, F.R.C.S.,
Department of ENT,
Royal Sussex County Hospital,
Eastern Road,
Brighton.