Medical audit

A retrospective review of pharyngeal pouch surgery in 56 patients

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We retrospectively reviewed 56 consecutive patients treated surgically for a pharyngeal pouch at our institution between 1989–1999 (10 years). Various surgical procedures were performed including endoscopic stapling (20), external excision (23), Dohlman's procedure (9), pouch inversion (3), cricopharyngeal myotomy only (3), and pouch suspension (1). There were 12 patients (18%) with complications and one mortality (2%). Four patients (7%) had a recurrence with 2 requiring further surgery. Over the latter 3 years, endoscopic stapling has emerged as the primary procedure for pharyngeal pouch surgery in our unit; with the advantages of an earlier commencement of diet and earlier hospital discharge. However, results were not as good as for external excisions. Furthermore, there were difficulties with 3 cases that commenced as endoscopic stapling procedures but had to be converted to external excisions due to inaccessibility in one case and iatrogenic perforations in two cases. As with any new technique, problems may occur and a learning curve has been appreciated in our unit. Surgeons must be prepared, with informed consent, to convert to an external approach should difficulties arise during endoscopic stapling. Elderly and frail patients who are at risk from a general anaesthetic may benefit from endoscopic stapling. External excision of pharyngeal pouches may be more appropriate in the young, the medically fit, and when malignancy is a concern.

Key words: Pharyngeal pouch – Surgery – Endoscopic – Stapling – Diverticulotomy

A pharyngeal pouch is a herniation of the pharyngeal mucous membrane through an area of relative weakness in the posterior wall of the inferior constrictor muscular sling. The only treatment available is surgery, which is uncommon and associated with a significant mortality rate of 1–2%. The majority of patients undergoing pharyngeal pouch surgery are elderly and represent a high risk, as elderly medicine physicians often consider them to be too frail for surgery. The mortality rates observed are a reflection of this frailty.¹ The relatively new technique of endoscopic stapled diverticulotomy is reportedly quick, less invasive, bloodless, and safe with a reduced anaesthetic

time, return-to-normal swallowing in 24 h, and a reduced hospital stay in comparison with more traditional surgical treatments.^{2,3} We reviewed our unit's experience of pharyngeal pouch surgery over the past 10 years including diverticulotomy by endoscopic stapling.

Patients and Method

The study involved a retrospective review of all our department's cases of pharyngeal pouch surgery from August 1989 to August 1999 (10 years). From the patients' case-notes, a number of details were obtained including

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age, gender, procedure undertaken, symptoms, pre-operative medical fitness state, time to commencement of diet, complications, length of in-patient stay, and results.

Results

In our study, 56 patients underwent pharyngeal pouch surgery for significant symptoms of disordered swallowing. The age range was 32–89 years with a mean age of 72 years and a male to female ratio of 39:17.

The presenting symptoms are listed in Table 1. Dysphagia, as expected, was the most common symptom, though 2 patients denied dysphagia and regurgitation was their primary complaint. Regurgitation was the second most common symptom. Weight loss was present in over half the patients. Other symptoms included recurrent chest infections, lump in throat sensation, choking episodes, hoarseness and lump in the neck. The duration of symptoms ranged from 1 month to 20 years with a mean duration of 3.6 years. Many of the patients, therefore, had symptoms for a while and only sought medical attention when there was a deterioration in their symptoms. Except for 6 patients with pooling of saliva on flexible laryngoscopy, the physical examination contributed little information. All the patients underwent a barium swallow which readily demonstrated the pharyngeal pouch.

Of the patients, 29 had no significant medical problems; 23 had significant medical conditions such as heart failure and chronic bronchitis, 9 were noted to be clinically malnourished with 2 undergoing nasogastric feeding prior to surgery.

The 56 patients underwent a number of different surgical treatments (Table 2). These were endoscopic stapling (20), external excision (23), Dohlman's procedure by diathermy (9), cricopharyngeal myotomy only (3), inversion of pouch (3), and suspension of pouch (1). Two cases were for recurrent pouches with the original surgery having occurred before the studied period.

Endoscopic stapling diverticulotomy was performed using an Endopath ETS endoscopic linear stapling gun (Ethicon End-Surgery Inc.).

The number of consultants practising each of the different procedures is shown in Table 2. There was a degree of

Table 1 Presenting symptoms of the 56 patients with a pharyngeal pouch

Dysphagia	54
Regurgitation	43
Weight loss	32
Chest infections	12
Throat lump	10
Aspiration/choking	7
Hoarseness	2
Lump in neck	1

departmental subspecialisation for endoscopic stapling with only 4 consultants undertaking this technique, compared to 7 undertaking open surgical methods.

Three of the 20 cases of endoscopic stapling had to be abandoned and were converted intra-operatively to external excision. Two were due to perforations formed at the time of stapling and one was due to inadequate access in a patient who had severe cervical spondylosis with limited neck movement and a narrow pharynx. Of the 23 external excisions, 19 had pharyngeal closure with sutures and 4 underwent excision and closure by a stapling device. The latter group had no complications. Of the 23 patients, 12 had concurrent external cricopharyngeal myotomies. All 9 of the Dohlman's procedures were performed by electrocautery. The 3 operations of cricopharyngeal myotomy alone were performed in patients with pouches too small to excise.

The mean time, in days, to commencement of soft and normal diet are shown in Table 2. Patients with post-operative complications were not included in these figures. Patients who underwent endoscopic stapling had an earlier commencement of soft and normal diet.

The results of surgery were categorised as cured with normal swallowing (c), some non-significant swallowing problems (s), symptomatic as well as radiological recurrence or persistence of pouch (r), and death (d) as shown in Table 3. The mean in-patient length of stay is also featured in Table 3. Of the two patients with recurrences following stapling, one underwent a repeat stapling with cure and the other had a pouch suspension with cure. The remaining 2 patients with recurrences declined further treatment for the time being as their symptoms were relatively mild.

Table 2 Surgical treatments of the 56 patients with a pharyngeal pouch

	Operations (n)	Operating consultants (n)	Soft diet days (range)	Normal diet days (range)
Endoscopic stapling	20	4	1.7 (1–6)	2.8 (1–7)
External excision	23	7	5 (3–13)	6.4 (4–14)
Dohlman's procedure	9	2	2 (1–3)	3.4 (2–4)
Cricopharyngeal myotomy	3	2	4 (1–6)	5.3 (2–8)
Inversion	3	1	2 (1–3)	3 (2–4)
Suspension	1	2	3 (3)	4 (4)

Table 3 Results of pharyngeal pouch surgery

	In-patient stay-days	Results			
	(range)	C	S	R	D
Endoscopic stapling	3 (1–6)	11	4	2	–
External excision	8.5 (4–16)	21	1	1	–
Dohlman's procedure	5.8 (3–8)	6	1	1	1
Cricopharyngeal myotomy	6.7 (3–10)	3	–	–	–
Inversion	5 (4–6)	2	1	–	–
Suspension	7.5 (7–8)	2	–	–	–

C, cured; S, some problems with swallowing; R, recurrences; D, deaths.

Table 4 Complications of pharyngeal pouch surgery

	Patients (n)	Complications
Endoscopic stapling	3	3 perforations
External excision	3	Fistula/left vocal cord palsy Haematoma + wound infection Upper respiratory tract infection
Dohlman's procedure	2	Death, day 3 postoperatively Fistula
Cricopharyngeal myotomy	2	Left vocal cord palsy Chest infection/left vocal cord palsy
Inversion	1	Postoperative pyrexia
Suspension	1	Haematoma + wound infection

Postoperative complications are listed in Table 4. There were 3 iatrogenic perforations noted at the time of stapling. Two of these, as previously mentioned, underwent an external excision whilst the third was managed successfully by conservative means with nasogastric feeding. Both fistulas were successfully managed conservatively. All the vocal cord palsies from recurrent laryngeal nerve injury became asymptomatic with conservative management. The haematoma after pouch suspension required drainage, whereas the one following external excision was managed conservatively. The only mortality in the studied group was an elderly patient with ischaemic heart disease and pulmonary tuberculosis who succumbed 3 days post-operatively to heart failure. As the patient was frequently aspirating from his pouch, it was felt appropriate to proceed with endoscopic surgery.

Discussion

The surgical options for the treatment of a pharyngeal pouch may be broadly categorised into two groups: endoscopic procedures and external approach procedures.

Endoscopic procedures usually involve division of the common septum between the oesophagus and the pouch, the diverticulotomy, to create a single lumen. A simultaneous cricopharyngeal myotomy occurs with the diverticulotomy. Endoscopic procedures include simple dilatation, Dohlman's procedure, that is a diverticulotomy by electrocautery or more recently with a laser, and diverticulotomy by endoscopic stapling.

External operations include excision with suture repair or excision by an autosuture stapling device. Also, more conservative external procedures are available that avoid 'opening' the pharynx. These include pouch suspension, pouch inversion and cricopharyngeal myotomy alone.

Prior to the endoscopic stapling technique, most series show the two treatments, external approach and endoscopic procedures, to be equally successful,^{4–7} while a few have reported poorer results from the endoscopic diverticulotomy group.^{8,9}

Endoscopic stapling has largely replaced the Dohlman's procedure as the endoscopic procedure of choice as the risk of mediastinitis, fistula, haemorrhage from the wound edges and thermal injury to the recurrent laryngeal nerve are reduced or absent. The technique has been reported to be fast, effective, safe, with most patients resuming oral intake within 6 h after surgery and being discharged from hospital within 24 h.¹⁰ Other series report similar results.^{3,11} In a patient questionnaire, Van Eeden *et al.*¹² found more patients reported normal swallowing and were more pleased with the endoscopic stapling procedure than with other techniques including excision of pouch. The endoscopic stapling diverticulotomy technique offers the patient many advantages over an external excision, including absence of external scar, shorter anaesthetic, avoidance of a nasogastric tube, early resumption of oral intake, minimal postoperative pain, and earlier discharge from hospital.² In our review, the 20 cases of endoscopic stapling occurred in the last 3 years of the study period with only 8 alternative procedures during this time. Therefore, endoscopic stapling has emerged as the primary procedure for pharyngeal pouch surgery in our unit. The advantages of an earlier commencement of diet and earlier hospital discharge have been realised. This is clearly of particular benefit to the elderly, frail patient. However, procedure difficulties can arise, for example in patients who have a very thick bar between the pouch and oesophagus and dentate patients with a relatively small mandible.¹² Elderly patients tend to suffer with cervical spondylosis and gaining an adequate access may not be possible predisposing to iatrogenic perforations. Also, craniofacial abnormalities such as retrognathia may make an open procedure necessary.¹³ Furthermore, perforations may occur after stapling as in 3 of our cases. In the series of 51 staplings by Baldwin and Toma,³ one patient developed postoperative surgical

emphysema presumed to be due to a perforation of the pouch fundus. Koay *et al.*¹³ state there is a risk of perforating the pouch by the tip of the stapling gun if it is inserted too far. Deciding how much septum can be safely divided is a matter of judgement and is probably related to experience. If in doubt, it is safer to under-divide rather than over-divide the septum and risk a perforation. Estimating the depth of the pouch aids the subsequent positioning of the stapling gun.^{3,12}

Should problems arise, the surgeon must be prepared to convert the procedure to an external approach under the same general anaesthetic. When consenting, we now routinely inform patients of such a possibility.

In our study, the results of stapling would also appear to be not as good as that for external excision, with 4 patients experiencing some problems with their swallowing and 2 patients undergoing further surgery for recurrences. However, residual or recurrent pouches, can be readily treated with a revision endoscopic stapling procedure without any increased morbidity,¹⁴ as with one of our patients. A learning curve must be appreciated with any new technique and results are expected to improve with experience as in other series.¹⁰

An external excision of pharyngeal pouch is an alternative intervention. However, this operation carries a significant morbidity and mortality.⁴ Risks of vocal cord palsy and fistula formation are up to 20–30%.^{8,15} However, in our series, only one patient (4%) experienced a fistula and vocal cord palsy following an external excision.

Vered *et al.*¹⁶ described the excision of pharyngeal pouch by an autosuture stapling device on 3 patients with uneventful postoperative courses and no complications. The patients resumed a regular diet by the 6th postoperative day. Pagliero *et al.*¹⁷ described 7 cases treated by autosuture with the only complication being a small leak in their first case that settled conservatively. Their patients were gradually introduced to a normal diet over 2 weeks. Westmore¹⁸ performed external excisions of pharyngeal pouches by staple gun in 18 patients with all patients swallowing a normal diet by the 4th postoperative day, and with no complications. With excision and closure by an autosuture stapling device, it is conceivable, as with an endoscopic stapling, to commence diet earlier and achieve an earlier hospital discharge, though the 4 patients in this study who underwent this technique were managed relatively conservatively with nasogastric feeding for 7 days on average, before commencing oral intake.

In our experience, results would appear to be better in the excision group as compared to endoscopic treatments with more cures, less swallowing problems and fewer recurrences.

Another treatment option is conservative open surgery with either pouch inversion or suspension. In our series,

only 3 inversions and 2 suspensions (1 revision) were performed, but with satisfactory results and no significant complications. A number of series have shown pouch suspension to allow earlier commencement of diet with a shorter hospital stay.^{19,20} These advantages as well as fewer complications were found in 9 cases of pouch inversion compared to excision.²¹

A point of note is the small risk of concurrent carcinoma in the pharyngeal pouch. In our study, no cases of carcinoma were found on endoscopic examination of the pouch or on histological analysis when the pouch was excised. In a series of 961 cases, Wychulis *et al.*²² reported an incidence of 0.3%. Occasionally, the carcinoma may be microscopic and, therefore, undetectable on endoscopy prior to definitive treatment. Westmore¹⁸ found 2 cases, in a series of 18, of invasive squamous cell carcinoma in the fundus of a macroscopically normal diverticulum that was excised. MacKay⁶ reported a case of a carcinoma occurring in a pouch following a Dohlman's procedure. Although extremely rare, a person who undergoes endoscopic stapling or conservative external approach surgery may subsequently manifest a carcinoma in their pouch remnant, though no such case has been reported as far as we are aware. Pouch excision surgery may, therefore, be appropriate in relatively young and medically fit patients.

More than 75% of surgeons who operate on pharyngeal pouches perform three or less pouch operations per year.²³ As pharyngeal pouch surgery is relatively rare, it may be appropriate for surgeons to subspecialise to increase expertise, improve results, and minimise complications. The National Confidential Enquiry into Perioperative Deaths in the United Kingdom recommended that there should be one or two surgeons within a department of otolaryngology who are trained and competent in the surgery of pharyngeal pouches, and that these surgeons should be specialist head and neck surgeons where appropriate.¹

Conclusions

Elderly, frail patients at risk from a general anaesthetic may benefit from endoscopic stapling, though occasionally a conversion to external approach may be necessary. Conservative open surgery may be appropriate in such circumstances. External excision of pharyngeal pouches may be more appropriate in the young, medically fit, and when malignancy is a concern.

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