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Long-term clinico-radiological assessment of endoscopic stapling of pharyngeal pouch: a series of cases

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Abstract

The endoscopic division of the pharyngeal pouch wall with a mechanical stapling device has become increasingly popular. When compared to open excision, the reduced operative time, early resumption of oral intake, and short in-patient stay with no early recurrence of symptoms, are the proposed advantages. Small pouches or thick walled pouches are not suitable for stapling. From December 1996 to December 1999, 32 patients were admitted to the Aberdeen Royal Infirmary for endoscopic stapling of a pharyngeal pouch. Five patients were unsuitable for stapling. In addition, three patients were treated for pouch recurrence after an external approach. Two patients required repeat stapling at a later date. Our results are encouraging in terms of short operation time and hospital admission, improvement of symptoms and minimal complication rate. Fifteen patients were assessed 24 months after the procedure with satisfaction surveys and contrast swallow X-rays. Subjective improvement was sustained throughout this period, despite radiological evidence of persistence of the pharyngeal pouch.

Key words: Pharynx; Diverticulum; Endoscopy; Gastrointestinal; Surgical Procedures, Endoscopic

Introduction

A phargyngeal pouch is believed to arise as a result of cricopharyngeus muscle dysfunction. A functional increase in the muscle tone and the resulting increase in the intraluminal pressure in the pharynx forces the mucosal lining through Killian's dehiscence in the posterolateral wall of the hypopharynx. The clinical presentation may vary in severity. It is more often seen in elderly patients who develop progressive dysphagia, regurgitation of food, coughing and throat discomfort. Some cases may present as worsening of a chronic pulmonary condition due to overspill into the trachea.[1]

The treatment for the symptomatic pharyngeal pouch is surgical. It is aimed at dividing the cricopharyngeal muscle and obliterating the pharyngeal wall defect by resection, inversion or division of the pouch wall.[1–3]

The surgical options can be divided into two main groups: open external approach, and endoscopic division of the wall between the oesophageal lumen and the pouch. The former includes a cricopharyngeal muscle myotomy with pouch excision, via a lateral neck incision. Minor technique variations include diverticulopexy and inversion of the pouch preserving the pharyngeal mucosa.

The external excision is aimed to re-establish swallowing without long-term recurrence. This is accomplished by removal of the redundant mucosa of the pouch and direct division of the cricopharyngeus muscle fibres. However, post-operative recovery usually requires a drain for the external wound to avoid haematoma formation and nasogastric tube feeding to allow the suture line to heal, preventing leak, infection or fistula formation. Reported complication rate is 29 to 38 per cent.[3] External approach techniques sparing the integrity of the mucosa, i.e. inversion and diverticulopexy, do not require nasogastric tube feeding and reduce the risk of skin wound infection and cutaneous fistula formation. The cricopharyngeal muscle myotomy is believed to prevent pouch recurrence.

In recent years endoscopic stapling has succeeded external pouch excision. This endoscopic technique is carried out through a double-bladed pharyngoscope (Weerda), with division of the shared wall between the pouch and upper oesophagus achieving the cricopharyngeal myotomy. Electrocautery, laser and stapling devices can be used to cut the shared wall.[2,3] With this procedure the general anaesthetic event is shorter, hospitalization is decreased and the risk of infection and mediastinitis is reduced.[1,2,4] Complications may include surgical emphysema, dental trauma and recurrent laryngeal nerve

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FIG. 1

PHARYNGEAL POUCH STAPLING POST-OPERATIVE SURVEY QUESTIONNAIRE

The following are questions related to an operation carried out for pharyngeal pouch with the use of a stapling device. This operation was carried out some time ago and the answers should reflect your present feelings regarding your experience. Feel free to add any pertinent observation or comment in the space provided.

Name: Age:

Diet
Following your operation: Please circle the appropriate letter
1. When do you remember starting soft diet on?
   a. Day 1
   b. Day 2
   c. Day 3
   d. Day 4 or more
   e. Not sure
2. When did you start normal diet?
   a. Less than 3 days
   b. 4 to 7 days
   c. 8 to 14 days
   d. More than 2 weeks
   e. Not sure

Quality of swallowing
1. Comparing your swallowing before and after your operation, your swallow now is:
   a. Completely normal
   b. Better but not normal
   c. Unchanged
   d. Worse
2. Do your experience any of the following when you swallow?
   a. Pain or difficulty with swallowing
   b. Coughing or choking
   c. Feeling of something in throat
   d. Foodstuff back into mouth after swallowing
   e. Noises with or after swallowing

Health
1. You consider your general health has changed with your operation
   a. For better
   b. No change
   c. For worse
   d. Not sure
2. Have you visited your general practitioner since you had the operation?
   a. yes
   b. no
   c. not sure

How do you feel regarding your operation
   a. Pleased
   b. Sorry having had it
   c. Not sure

I will be able to attend the Aberdeen Royal Infirmary for a Barium Swallow X-ray. a. Yes b. No

injury.[5,6] Optimal treatment should minimize the operative risk, avoid complications and shorten the time of hospital stay, while keeping costs down.

Recently published literature on the subject highlights the short-term advantages of endoscopic stapling of pharyngeal pouch. The follow-up period is consistently short and below 12 months in most reports. Long-term assessment of this treatment modality has still to be published.[1,6] Post-operative contrast swallow X-ray appearances do not show reliable findings and interpretation may be difficult.[7,8]

Methods

A retrospective review of case notes of patients admitted for endoscopic stapling division of pharyngeal pouch wall yielded 32 patients from December 1996 to December 1999. Information collected included: patient demographics, pre-operative symptoms, operation time, time to resume oral feeding, post-operative complications and overall length of admission. As patients reached 24 months after their operation (n = 15) they were invited for assessment with a survey questionnaire and barium swallow X-ray.

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FIG. 2

PHARYNGEAL POUCH STAPLING POST-OPERATIVE SURVEY QUESTIONNAIRE

Patient id details

Dear Doctor

We are currently carrying out an audit on the long term post operative results of endoscopic stapling of pharyngeal pouch. This operation was carried out to the above mentioned patient, who according to our records is under your care. We would appreciate dearly if you could answer the following questions regarding post operative outcome, this should not take more than five minutes having the patients notes at hand.

1. Has your patient sought medical advice following the discharge after endoscopic stapling of pharyngeal pouch? (Have you seen the patient following the oepration for any reason?)
   a. No If no, there is no need to answer any further question.
   b. Yes

2. During the consultation, has your patient complained of any of the following symptoms? (one or more)
   a. Dysphagia/odinophagia
   b. Coughing/choking
   c. Feeling of something in throat
   d. Regurgitation/gurgling after swallowing
   e. Weight loss
   f. Worsening of respiratory tract symptoms, in patients with chronic respiratory disease

3. Was the patient admitted to hospital since the discharge following the operation?
   a. yes
   b. no
   c. not applicable

4. Your personal impression is that the patients general health following the stapling has:
   a. Improved
   b. Unchanged
   c. Worsened
   d. Not sure

5. You consider your patient should feel:
   a. Pleased with the operation
   b. Sorry having had it
   c. Not sure

Thank you for your valuable co-operation.

The subjective outcome was measured by means of a survey questionnaire previously used by Van Eden *et al.*[1] This was sent and collected by post (Figure 1). Information was also collected from the patient's general practitioner in a similar way (Figure 2).

The objective evaluation consisted of a barium swallow X-ray at 24 months. Films were compared to pre-operative investigations. Information collected included evidence of pouch persistence, ease of flow of contrast into the oesophagus, height of the dividing wall when present and depth of the residual pool of contrast. To minimize magnification distortion, relative measures were used, i.e. height of the adjacent vertebral body.

Outcome measures at long-term assessment were patient satisfaction, post-operative symptoms and comparison of pre- and post-operative X-ray investigations.

Results

Twelve females and 20 males, average age 72 ± 8.2 years (range 56 to 86), were brought to theatre for endoscopic stapling of pharyngeal pouch wall, (n = 32). Symptoms in order of frequency were dysphagia 71 per cent (23/32), regurgitation of undigested food 53 per cent (17/32), and feeling of something sticking in throat 40 per cent (13/32). Other symptoms included chronic cough, choking episodes, food sticking, gurgling noises and weight loss (less than 30 per cent each).

At endoscopy five patients had no stapling carried out and two cases were found to have a very small pouch; in another patient it was not possible to divide a small, thick pouch wall with the staple gun. In a further two patients the diverticuloscope could not be inserted into the pouch adequately, because of prominent teeth, or cervical spine stiffness precluding advancement of the rigid scope. These were labelled failed attempts and were excluded from further analysis (n = 27).

Five of the 27 patients had endoscopic stapling for a recurrent pouch; three had been previously treated via an external approach, and in two patients previous stapling procedures had been carried out, twice in one case and three times in the other. This yielded a total of 30 stapling procedures in 27 patients.

The primary outcomes were as follows:

(1) Length of operation time, measured as the total time under general anaesthetic, 20 ± 6.8 min (range 10 to 35 minutes)

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TABLE I
LONG-TERM ASSESSMENT RESULTS

Patient	Age	Swallow quality	Health change	Operation acceptance	Symptoms	Pouch appearance at Ba swallow
1	67	Normal	No	Pleased	No	No change
2	75	Better	No	Pleased	Cough, gurgling, regurgitation	No change
3	63	Normal	Better	Very pleased	Dysphagia at times	Smaller
4	74	Normal	Better	Pleased	Minor regurgitation	No change
5	71	Normal	Better	Very Pleased	No	Smaller
6	74	Normal	Better	Pleased	No	Smaller
7	74	Normal	Better	Pleased	Occasional regurgitation	No change
8	89	Normal	Better	Pleased	No	No change
9	79	Normal	Better	Pleased	No	No change
10	72	Better	Better	Pleased	Gurgling	Smaller
11	80	Unchanged	No	Sorry	Globus, occasional dysphagia, cough	No change
12	79	Better	No	Not sure	Cough	No change
13	75	Unchanged	No	Not sure	Dysphagia, gurgling, regurgitation	No change
14	86	Normal	Not sure	Pleased	No	Unable to attend
15	68	Normal	Not sure	Pleased	Cough not related to swallow	No change

(2) Length of time to resume oral feeding, measured as time from surgical event to trial with clear fluids orally: 17 hours, (range three hours to seven days)
(3) Length of hospital admission: 3.17 ± 1.8 days, (range two to 11 days)
(4) Complications: one episode of post-operative surgical emphysema, which settled with conservative treatment.

Long-term, fifteen patients had follow-up assessments at 24 months by satisfaction survey, and fourteen had contrast swallow X-ray (one patient was too frail to have this done).

All fifteen patients responded to the postal survey. Twelve were filled in personally, three by a relative or carer. Twelve patients were pleased with their operation result at two years, two were not sure and only one felt unhappy about having it done. Ten patients rated their swallowing normal, three as improved and two felt no change. Seven patients were symptom-free, in the remaining eight the common symptoms were regurgitation (4/8), followed by gurgling, cough and dysphagia (3/8). In almost all cases (13 out of 15) the general practitioner's survey responses agreed with the patient's evaluation.

All post-operative X-rays showed evidence of persistence of a pharyngeal pouch, as well as easy flow of the contrast into the oesophagus. From the cases in which pre- and post-operative studies were available for comparison (n = 12) eight were unchanged in appearance and four showed smaller dimensions of pouch. The latter were judged by the height of the dividing wall and/or the residual pool of contrast. There was no evidence of aspiration of dye into the airway in any of the cases.

Discussion

Cases of symptomatic pharyngeal pouch are treated surgically.[1–3,9] Pharyngeal pouches are commonly found in the elderly, sometimes associated with other gastrointestinal dysmotility problems. Symptoms include dysphagia, regurgitation, cough and potential aspiration into the tracheo-bronchial tree. Recognized surgical treatment involves a lateral cervicotomy, pouch removal and a cricopharyngeal myotomy to alleviate symptoms and avoid recurrence of pouch formation. Associated medical conditions may preclude a prolonged anaesthetic for an elaborate surgical procedure. The endoscopic division of the pharyngeal pouch wall with a mechanical stapling device has become increasingly popular in the last few years. The advantages in recently published series include relief of pre-operative symptoms in all patients, shorter operation time and hospital admission, and minimal patient discomfort.[9,10] Disadvantages include the possibility of post-operative surgical emphysema due to inadvertent perforation of the pouch wall with surgical instruments or unsatisfactory division or stapling with the device.[5] In small pouches, or those where a thick shared wall precludes the insertion of the stapling gun, this surgical option is not recommended.[11,12]

Twenty-seven patients have been treated during a three-year period with endoscopic assisted pharyngeal pouch wall stapling in Aberdeen. Follow-up ranges from nine months to four years. Our current experience supports the findings already published in the recent literature. Endoscopic stapling of the pharyngeal pouch is an effective surgical option for the treatment of this condition. The operation time is short, as are the time to resume oral feeding and the overall hospital stay. The post-operative complication rate is reduced significantly. These advantages make this surgical option attractive especially for patients with other conditions which might increase the risk of a prolonged general anaesthetic and traumatic surgical procedures. Recurrent cases can be treated with a revision procedure without increased risk.[4] We operated upon five recurrent cases, of which three had an external approach via cervicotomy, one of them on multiple occasions. Two patients with early recurrence of symptoms following endoscopic stapling were treated by repeating the procedure. One of these returned with clinical and radiological evidence of recurrence of the pouch soon afterwards and was submitted to

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revision stapling for a second time. At six months' review after the third event this patient remained asymptomatic.

Cases where the pharyngeal pouch wall is thick and short may not be suitable for this treatment option. This can also be the case when the instruments cannot be placed adequately.[6,11] Five cases in our series had a failed attempt to staple the pharyngeal pouch wall, two of them because of difficulty in placing the diverticuloscope. One patient had prominent upper teeth and a relatively short mandible, while the other one had an arthritic, stiffened cervical spine. Despite being able to identify the pouch, the double-bladed Weerda pharyngoscope could not be inserted properly so as to isolate the pouch 'bar' and place the stapling gun adequately. One of these patients underwent an external approach with cricopharyngeal muscle division and pouch inversion, the other declined further surgery. The remaining three cases had a very small pouch or thick short wall, preventing the stapling gun gaining any purchase in the dividing wall. In one case the staple gun divided a short portion of bulky mucosa. In the other cases endoscopy failed to show a pouch big enough to accommodate the stapling device properly.

Careful inspection of the suture line and pharyngeal wall is recommended to avoid inadvertent wall perforation.[5] The one significant complication following 27 successful attempts at endoscopic stapling yielded a low complication rate (in spite of the learning curve). The only early complication found was a case of surgical emphysema, which recovered uneventfully after failure to detect any wall defect endoscopically or with radiographic studies.

During a three-year period, 15 out of 27 cases have reached
24 months after endoscopic stapling. Subjective satisfaction was recorded in all but two of them. Symptoms persisted in half the patients, although they appeared to be well tolerated. In contrast, objective assessment by barium swallow showed a persistent pouch in all cases; in eight out of 12 the pouch appeared unchanged from the pre-operative evaluation (Table I). We consider that post-operative evaluation of persistent or recurrent symptoms following endoscopic stapling of a pharyngeal pouch should not include contrast swallow X-rays.

These findings support our view that following endoscopic stapling of a pharyngeal pouch symptomatic patients should be managed with a repeat rigid endoscopy, in an attempt to use the stapling device to divide any residual pouch wall found. Repeat stapling is safe and may improve or resolve the patient's swallowing-related symptoms. Radiological appearances after a barium swallow have no correlation with clinical symptoms. We found this investigation of no benefit in the post-operative evaluation of pharyngeal pouch stapling.

Conclusions

Endoscopic stapling of a pharyngeal pouch is an effective surgical treatment option for this condition. The short operative time, quick return to eating and reduced hospital admission are the salient advantages. Minimal complication rates can be expected. We propose that this technique should be the treatment of choice for the symptomatic pharyngeal pouch. Long-term results with follow-up beyond two years show discrete recurrence of symptoms. Almost universal patient satisfaction, however, contrasts with radiological evidence of pouch persistence. A repeat endoscopic stapling attempt is suggested for patients with persistent swallowing-related symptoms without the need for contrast swallow X-ray assessment.

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