Original Article

Surgery for dysphagia: a patient centered perspective

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Background: Our prospective cohort study assesses patient-reported outcomes following an open approach (cricopharyngeal myotomy with pouch inversion) or endoscopic stapling (ES) of pharyngeal pouches.

Methods: Patients with pharyngeal pouches who were treated with either ES or an open cricopharyngeal myotomy (OM) were recruited over a 4-year period. Patients completed a modified SWAL-QOL questionnaire pre-operatively and 6 weeks post-operatively and a post-operative Glasgow Benefit Inventory (GBI) questionnaire.

Results: Fifty-five patients were included, 11 in the endoscopic group and 44 in the open group. The average change in modified SWAL-QOL was 31.6 in the ES group and 36.1 in the OM group. The GBI score was 33.6 and 38.3 in the endoscopic and open groups respectively.

Conclusions: This study suggests that open surgery leads to greater or equal patient satisfaction in the modified SWAL-QOL score and the GBI score when compared to endoscopic surgery. Both methods confer significant improvement in a validated quality-of-life measure.

Keywords: Deglutition disorders; Zenker diverticulum; endoscopy; quality of life; prospective studies

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Introduction

Pharyngeal pouch, also known as Zenker's diverticulum, is an uncommon cause of dysphagia with an estimated incidence of 1:100,000 (1,2). The condition was first described by Ludlow in 1769 and then again in 1877 with a case series of 34 patients by Zenker and his colleague Von Ziemssen (3). Pharyngeal Pouches are an outpouching of mucosa and submucosa through an area of weakness in the posterior pharyngeal wall between the cricopharyngeus muscle and the oblique fibers of the inferior pharyngeal constrictor muscle. There is no clear consensus on the exact pathophysiology underlying this disorder although several hypotheses have been generated (1-8). Historically treatment of a pharyngeal pouch has been via a transcervical cricopharyngeal myotomy and resection or pexy of the diverticulum (3). An endoscopic approach is now the more frequently employed technique, either with the use of an endostapler or with a variety of other endoscopic tools including laser, diathermy or simple sharp division of the common wall of the diverticulum. The open approach is typically reserved for recurrent pouches or those patients who are unsuitable for an endoscopic approach. The rational behind the increased use of the endoscopic approach is shorter operative time, less extensive surgery and shorter hospital stays with similar rates of complications overall (2,4,7,9-12). Much of the research has aimed to delineate operative techniques in terms of feasibility, operative time, length of hospital admission, post-operative complications and rates of recurrence. However, there is a

lack of original research seeking to assess patient centered outcomes following each approach (4). Our study assesses patient centered outcomes following surgical intervention for pharyngeal pouch using a modified dysphagia questionnaire to collect disease specific quality of life information prior to and following surgery. In addition, we used a validated surgical benefit assessment questionnaire, the Glasgow Benefit Inventory (GBI), to collect generic information about benefit of each intervention (13,14). We present the following article in accordance with the STROBE reporting checklist (available at http://dx.doi.org/10.21037/ajo-19-52).

Methods

The study took place across both public and private practice in Christchurch, New Zealand between May 2010 and June 2014. The trial was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and the Harmonized Tripartite Guideline for Good Clinical Practice from the International Conference on Harmonization. Ethical approval was sought and gained from the New Zealand Health and Disability Ethics Committee (ref: URA/10/EXP/021). Patients were given a letter detailing the study prior to agreeing to participate. Inclusion criteria were patients presenting with dysphagia due to a pharyngeal pouch and/or cricopharyngeal spasm and deemed to benefit from surgical treatment. Exclusion criteria was being deemed medically unfit for surgery and incomplete quality of life data. Decision making about procedure choice was made by the operating surgeon. It should be noted that an open procedure is the preferred approach by our institution. However, patients who were felt to have a higher anesthetic risk due to medical comorbidities were offered endoscopic treatment. Endoscopic stapling (ES) was undertaken using a Weerda distending diverticuloscope and an endoGIA^{TM} stapler. The open procedure was undertaken through a transcervical approach with division of distended cricopharyngeus muscle fibers over a bougie with subsequent inversion of the pouch and oversewing rather than excision of the pouch.

Pre-operatively patients completed a modified SWAL-QOL questionnaire. This same questionnaire was then completed 6 weeks post-operatively along with the GBI questionnaire. The SWAL-QOL questionnaire was modified to remove questions unrelated to pharyngeal pouches/cricopharyngeal spasm—those related to food selection and communication in particular. As a result, it could not be used to generate a Likert scale as with the traditional SWAL-QOL, but generates disease specific data. General demographic information was collected separately and therefore removed from the questionnaire. A separate analysis of patients with neurological causes for dysphagia was undertaken. Modified SWAL-QOL values that are higher suggest greater benefit. Positive GBI values suggest benefit. Patients who didn't complete the follow up questionnaire or left the questionnaire partially blank were excluded. P values were calculated using students *t*-test. Statistical significance was deemed to be a P value <0.05.

Results

Fifty-six patients were recruited to the study. Fifty-five patients were included in the final analysis, 11 in the ES group and 44 who underwent open myotomy (OM). One patient was excluded from the endoscopic group as they didn't return a complete questionnaire. There was an age range of 46 to 91 with no significant difference in the average age or the gender make up of each group. All patients were New Zealand European aside from 1 other European ethnicity (*Table 1*).

In the OM group 11 patients underwent cricopharyngeal myotomy and inversion of the pouch, the remainder underwent myotomy alone.

There was a significantly shorter length of stay in the ES group, 1.3 days compared with 3.4 in the OM group. There was no statistically significant difference in the rate of complications or rates of revision procedures. There was however more clinically significant complications in the OM group. Only minor complications occurred in the ES group. In the OM group 1 patient had an inadvertent esophageal perforation recognized at the time of operation which was over-sewn with no further sequelae. One patient had a post-operative myocardial infarction which was managed medically with dual anti-platelet treatment. One patient had a post-operative respiratory arrest requiring transfer to the intensive care unit. No patients developed a salivary fistula post-operatively.

Modified SWAL-QOL

Patients in the ES group reported an average modified SWAL-QOL score of 91.7 preoperatively and an average modified SWAL-QOL score of 123.4 postoperatively. Patients in the OM group reported a preoperative score of 83.9 and a postoperative score of 120. There was no statistically significant difference in the average change in

Table 1 Demographics

Variables	Endoscopic procedure	OM	P value
Age (average)	78	73	NS
Sex			
Male	54.5%	59.1%	NS
Female	45.5%	40.9%	NS
Length of stay (average)	1.3	3.4	<0.05
Complications	27.3%	15.9%	NS
Revision procedure	0	4.5%	NS

OM, open cricopharyngeal myotomy.

Table 2 Modified SWAL-QOL

Variables	Endoscopic	Open	P value
First SWAL-QOL average	91.7	83.9	
Second SWAL-QOL average	123.4	120.0	
Change	31.6	36.1	NS

Table 3 Glasgow benefit inventory (GBI)

Variables	Endoscopic	Open	P value
GBI	33.6	38.3	NS
General	50.8	49.6	NS
Social	12.1	19.3	NS
Physical	–7.6	10.6	<0.05

SWAL-QOL scores between groups (*Table 2*).

Glasgow benefit inventory

GBI values were reported as 33.6 in ES group and 38.3 in the OM group. There was no statistically significant difference in overall GBI score nor in the general or social subscales (*Table 3*). Patients in the OM group demonstrated a significant higher physical score on GBI, 10.6 compared with –7.6 in the ES group (P value <0.05).

Patients with neurological causes for dysphagia (e.g., cranial nerve palsy, skull base radiotherapy)

There were seven patients with neurological causes for their dysphagia, all within the OM group. They had an average initial SWAL-QOL of 70.8 and follow up score of 107, a change of 36.2. GBI scores for this group were; 40.9 overall, 50 for general domain, 23.8 for social domain and 21.4 for physical domain.

Discussion

Our single institution prospective study supports the current consensus in the literature that both open approaches to myotomy and ES have comparable rates of effectively treating dysphagia due to a pharyngeal pouch (4,10,11,15,16). An endoscopic approach to managing pharyngeal pouches has become the preferred approach in many institutions. The benefits include shorter operative time, shorter hospital stays and comparable rates of surgical complications (2,7,9). The literature recognizes the need for

open surgery in patients with small pouches or patients with technical difficulty which may preclude access to a pouch endoscopically (4,7,11,15,17,18).

The paucity of literature focusing on patient centered outcomes led to our study. We chose to use a modified version of the SWAL-QOL questionnaire rather than create our own short form questionnaire as other trials assessing patient centered outcomes have done subsequent to our study starting (4,19). In addition, we used the GBI a validated questionnaire designed to assess the subjective benefit to a patient (13). This approach aimed to generate data specific to pharyngeal pouch surgery with our modified SWAL-QOL as well as comparable data in the form of GBI scores.

Comparing overall GBI scores for other otolaryngological interventions to the scores gained from the OM and ES groups highlight the general benefit of the intervention. Comparable interventions such as tonsillectomy gained GBI scores of 27 in the overall score in a pooled analysis of 2 papers undertaken as part of a review by Hendry and colleagues (13). Cochlear implant surgery—often used as a benchmark for quality of life improvement scored total GBI of 38.4 in 3 pooled studies with a total group of 113 patients in the same paper (13). Compared to our average GBI scores of 33.6 in the endoscopic group and 38.3 in the open group suggesting these procedures offer comparable significant quality of life improvement to other otolaryngological interventions. Given the similar values attained in both our intervention groups we can report that surgical correction of dysphagia due to pharyngeal pouch offers significant improvement in quality of life.

The physical domain of the GBI is the only area where a significant difference was detected between open and endoscopic surgery. Patients in the open group reported a greater improvement to their physical health generally following the procedure and conversely the endoscopic group reporting a reduction in their general health following the procedure. A possible explanation for this is the patient groups themselves. Whilst there was no significant difference between groups in demographics it is highly likely that those in the endoscopic group underwent that procedure because of their lack of suitability for an open procedure due to higher anesthetic risk or other underlying health conditions. Hence the likelihood of scoring highly in the physical domain may be impacted on by their comorbidities. Conversely this may highlight the benefit of definitive treatment of the pouch and hence better long-term resolution of symptoms. Our institutional practice is to offer an open procedure preferentially. It was not in the scope of our study to assess outcomes at an interval longer than the first follow up appointment, literature reports the maximal difference in failure rates in the short term (7).

The modified SWAL-QOL data suggests that both surgical approaches offer comparable benefit in improving dysphagia. Limited inference can be drawn from this other than to add weight to the benefit derived from both surgical techniques in improving patients' dysphagia. This is supported by recent work undertaken by Alwan *et al.* with findings of improved quality of life regardless of surgical intervention (20).

Patients who had a major neurological condition felt to be contributing to their dysphagia reported comparable modified SWAL-QOL and GBI scores, suggesting that OM offers a comparable improvement in these patients to that in patients without significant neurological comorbidities. The absolute modified SWAL-QOL values were lower but given the sample size no inference can be drawn from this.

A weakness of this study is the lack of comparability with other work on patient centered outcomes following surgery for pharyngeal pouches. This is an issue seen throughout literature on pharyngeal pouch interventions given a lack of unified approach. The GBI has not been used in any other literature comparing various approaches to pouch surgery that the authors are aware of. The modification of the SWAL-QOL questionnaire limits comparability due to the lack of scalability as discussed above. In other papers a variety of questionnaires are used. In Seth *et al.*'s 2014 paper patients completed a validated questionnaire based on the gastrointestinal quality of life questionnaire and were asked to score their perceived dysphagia at 3 stages pre-operatively, 1 month post-operatively and at the time of the phone call collecting the information (4). Another study assessing laser diverticulotomy uses the MD Anderson dysphagia inventory questionnaire to assess disease specific outcomes and the short form 36 to assess general health quality of life (6). Other studies have used combinations of questionnaires to accomplish a similar aim to our own study's (19). The lack of a uniform approach to assessing quality of life limits our ability to compare different methods of surgical treatment for pharyngeal pouch surgery. It should be noted that the majority of these papers were published after our study protocol had been agreed on. Small numbers within the ES group is another relative limitation of our study, while this highlights the surgeon preference in our institution, it limits comparison with

larger cohorts of endoscopic patients. In addition, there was a limited range of ethnicities in the study population, limiting any outcomes comparison between ethnic groups and regarding Māori patients in particular.

Conclusions

This study reports the positive benefit from surgical intervention for pharyngeal pouch related dysphagia. In addition, as far as the authors are aware, this is the first study to demonstrate the positive impact on quality of life from Pouch surgery using the GBI in the assessment of pharyngeal pouch related dysphagia. Both ES and OM have comparable validated quality of life outcomes, with GBI scores comparable to other otolaryngological interventions such as cochlear implant surgery and tonsillectomy. This further highlights the significant overall benefit to patients.

When comparing the two techniques, ES had a shorter period of hospital stay, while there was a greater benefit in the physical domain of the GBI in the OM group, suggesting better physical health following the open procedure.

Further research is required to identify which procedure confers greater benefit to patients, this could be aided by the use of a standardized approach to quality of life assessment.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at http://dx.doi.org/10.21037/ajo-19-52

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/ajo-19-52). The authors have no conflict of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The trial was conducted in accordance with the Declaration of Helsinki (as revised in 2013) and the Harmonized Tripartite Guideline for Good Clinical Practice from the International Conference on Harmonization. Ethical approval was sought and approved from the Upper South Island Health and Disability Ethics committee (ref: URA/10/EXP/021). All participants in the study gave informed consent.

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Supplementary

Summary

- Pharyngeal Pouches are an uncommon cause of dysphagia with two main surgical approaches; OM and transoral ES.
- Historically an OM has been the treatment of choice but increasingly transoral ES has become preferred due to shorter operative time and hospital stay with comparable rates of complications.
- No randomized control trials have been published to support the use of endoscopic treatment over open surgery.
- There is a lack of research assessing patient centered, quality of life outcomes for the different surgical interventions.
- Reported rates of both failure and recurrence are higher with an endoscopic approach compared with transcervical approach in the literature.
- This paper reports an improvement in quality of life in a validated general scoring system—the GBI in both the aforementioned surgical approaches. Additionally, a dysphagia specific scoring system—the modified SWAL-QOL—shows significant improvement in quality of life. The use of the GBI in association with pharyngeal pouch surgery is a novel approach to quality of life assessment in head and neck surgery.