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ORIGINAL ARTICLE

Development of an Australasian laparoscopic sleeve gastrectomy curriculum: a content validation study

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Abstract

Background: Sleeve gastrectomy is the most performed bariatric procedure in Australia/New Zealand. To date there is no consensus on how the procedure is taught to either trainee surgeons or in the upskilling of general surgeons. To standardize training of the procedure, a laparoscopic sleeve gastrectomy curriculum is required. The aim of this study was to develop content validation for a newly developed laparoscopic sleeve gastrectomy curriculum within the bi-national context of Australia and New Zealand. **Methods:** A survey was conducted via an online platform (Qualtrics). Practising bariatric surgeons who were members of the Australian and New Zealand Metabolic and Obesity Surgery Society (ANZMOSS) were invited to participate. Respondents were required to review the international sleeve gastrectomy curriculum core components. The original 30 items were derived from the clinical practice guidelines, surgical textbooks, and an expert panel in conjunction with the local specialty society. A framework to form Australasian standards was created by linear ranking on a 5-point Likert scale. Components that achieved more than 80% of surgeon consensus of $\geqslant 4$ or higher were included in the final curriculum. **Results:** An invitation was sent to all surgeon members of ANZMOSS, and 41 complete responses were received. The components listed were divided into five domains: anatomic knowledge, patient selection, intra-operative technical considerations, peri-operative considerations and non-technical items. Items ranked $\geqslant 4$ were used to form a proposed curriculum. Components of the survey informed a formalized task list with 26 individual steps; four did not reach consensus agreement (psychological evaluation, nursing evaluation, technical issues of gastric stapling and buttressing of staple lines). All anatomic knowledge items were agreed upon ($>93\%$). For patient selection, all proposed indications, contraindications and pre-operative medical evaluation were agreed upon ($>95\%$), however the inclusion of nursing and psychological evaluation was not supported ($<61\%$). All technical considerations were agreed upon except buttressing considerations, topical agents and omentopexy ($<78\%$). All peri-operative considerations and non-technical items were included. **Conclusions:** Utilizing a web-based mixed-methods survey, a comprehensive curriculum for teaching laparoscopic sleeve gastrectomy is proposed. The content of the educational matrix is validated for the Australasian context. Further studies will be required for adaptation of the curriculum before it is used for formalized assessment purposes.

Keywords: *surgery; education; curriculum development; simulation*

Introduction

There has been a significant and ongoing increase in the volume of bariatric procedures being performed over the past decade. Of these procedures, laparoscopic sleeve gastrectomy (LSG) is the most performed internationally. It is also known that execution of the procedure varies widely between bariatric surgeons.[1] The procedure of LSG is often taught using the apprentice model of education, which is characterized by ad hoc observation without structured outcomes or assessment. A curriculum to standardize LSG teaching has been created in an effort to improve on the current situation. This LSG curriculum has yet to be validated for trainees. The importance of a structured framework cannot be underestimated, because LSG has overtaken gastric bypass to become the most commonly performed bariatric procedure worldwide.[2]

The utilization of curricula validated by practising surgeons as a teaching modality has expanded rapidly. For example,

procedure-specific curricula have been developed in gynaecology,[3] orthopaedics[4] and hepatobiliary surgery.[5] Drivers of structured and standardized curriculum-based training include working hour restrictions, limited trainee exposure,[6] as well as medico-legal concerns in a background of increased patient safety awareness.[7] In addition, high-fidelity simulation alone cannot replicate the real-world complexity of a live patient. Accordingly, the more structured, step-wise approach via curriculum-driven objectives lends itself to safer surgical outcomes.[8] The evolution of surgical education pedagogy towards the development of curricula comes during a time of exponential increase in the number of novel techniques and procedures. There has been a simultaneous decrease in tolerance for learning errors in clinical practice by both patients and medical regulatory bodies. Thus, the increases in techniques and modalities have exposed deficits within traditional apprentice learning models predicated on the see one, do one, teach one approach, particularly because some procedures may not be seen during the training years. Some procedures, such as laparoscopic hernia repair, have been associated with significant learning curves, initiating prolonged proctorships and mentoring by experienced supervisors to help prevent unnecessary complications and shorten the duration of surgery.[9] The aim of this study was to develop content validation for a newly developed LSG curriculum, within the binational context of Australia and New Zealand.

Methods

A 30-question mixed-methods survey was developed to assess content validity. Survey items were derived from the American Society for Metabolic & Bariatric Surgery (ASMBS) national care pathway for sleeve gastrectomy,[10] the European Association for Endoscopic Surgery guidelines on bariatric surgery,[11] and the ASMBS Textbook of Bariatric Surgery,[12] with additions from an Australasian panel of expert bariatric surgeons. Questions were developed by the authors in conjunction with leadership of the sub-specialty obesity surgery society. The survey targeted three main areas: cognitive items, technical items, and non-technical items. Through this approach, upper gastrointestinal anatomy and physiology, peri-operative management, technical considerations and human factors were covered by the process.

All consultant bariatric surgeons in current practice who are full members of the Australian/New Zealand Metabolic and Obesity Surgery Society (ANZMOSS) were invited to participate in the online survey via email. Data collection ceased 60 days after the original electronic invitation.

Using a five-point Likert scale, surgeons were asked to rate the importance of each of 30 items of the curriculum from strongly disagree to strongly agree. In addition, they were asked whether the item should be included in the final curriculum for trainees. Expert consensus was defined as 80% or more of respondents rating an item as agree or strongly agree. Items in the survey that ranked $\geqslant 4$ were used to form a proposed curriculum. The survey was distributed by ANZMOSS secretariat from Melbourne, Australia. The primary author completed data collection and management. The survey was administered via an online web-based platform (Qualtrics, Provo, Utah, USA).

Data analysis was performed using Microsoft Excel (version 16.40) and SPSS version 24 (IBM). Descriptive statistics were performed for each survey question. Each subcategory was analysed individually using SPSS.

Results

Of the 213 consultant surgeons invited to participate in the survey, 41 (19.2%) responses were received (see Supplementary Table 1). Responses were received from surgeons based in six Australian states as well as from New Zealand.

Twenty-five of 30 items reached positive consensus entailing 80% agreement by being rated as 4 (agree) or 5 (strongly agree) by the participants. Table 1 lists components of the proposed Australasian curriculum, categorized by cognitive items, technical items and non-technical items. Several items, including nursing evaluation and psychological evaluation, were not included in the final curriculum due to lack of agreement among the surgeons surveyed.

Anatomic knowledge

The three most common areas of the requisite anatomic knowledge were surveyed: the vascular supply of the stomach, differential stomach thickness and definitions of upper gastrointestinal anatomic areas. All three were rated as important by 93% or more of the participants surveyed.

Patient selection

Most components of standard patient selection criteria were rated as important by participants. Indications and contraindications of a sleeve gastrectomy were rated as important by at least 95% of participants. Pre-operative medical evaluation showed less concordance, with 88% of surgeons surveyed attaching significance to it. Of the multi-disciplinary team input, only dietetics was included in the final curriculum (95%); nursing and psychological evaluation and ongoing care were not included (61%).

Table 1. Australasian laparoscopic sleeve gastrectomy curriculum

Cognitive items	
Upper gastrointestinal anatomy	Awareness of differential stomach thickness Stomach vascular supply Definitions and role of GOJ, incisura, pylorus, diaphragmatic hiatus
Patient selection	Indications for sleeve gastrectomy Contraindications to sleeve gastrectomy Specific contraindications and knowledge of pathophysiology: severe symptomatic GORD, Barrett's oesophagus, oesophageal dysmotility
Pre-operative medical evaluation	
Dietetic consultation	
Peri-operative considerations	Awareness of the utility of pre-operative VLED
Postoperative	Care and follow-up Complications: anticipation and avoidance
Technical items	
Intra-operative considerations	Patient positioning Assessment of liver, hiatus and peritoneal adhesions Adequacy of intra-abdominal access and port placement Adequate exposure: liver, stomach, hiatus, GOJ, greater curvature Gastric mobilization: extent entry into lesser sac, adequate antral and fundal mobilization Use of energy devices in omental resection (principles of tension-free resection, thermal spread) Intra-operative assessment of staple line integrity Hiatus assessment and closure Assessment of liver size/texture Distances from angle of His, GOJ, pyloris Gastric stapling: consideration of the extent of antral resection; adequacy of fundal resection, avoidance of incisura; technical issues (precompression, progressive firing techniques)
Non-technical items	Importance of teamwork in theatre Best practice scenarios: leadership Crisis scenario management: intra-operative events

GOJ, gastro-oesophageal junction; GORD, gastro-oesophageal reflux disease; VLED, very low energy diet.

Intra-operative technical considerations

There was generally a high degree of agreement between participants on assessment of intra-operative technical considerations. Patient positioning was included (80%) as were most aspects of intra-operative assessment of regional viscera, access and port placement and adequate exposure (more than 93%). All aspects of gastric mobilization (98%) and gastric stapling were included (entailing antral resection, adequacy of fundal resection and technical issues of precompression and progressive firing). Standard techniques of omental resection, use of energy sources (88%), as well as subjective assessment of staple line integrity (85%) and the hiatus (93%), were included. However, optional adjunctive therapies proved more controversial such that buttressing (78%), topical agents (61%) and omentopexy (73%) were not included in the final curriculum.

Peri-operative considerations

All components of routine peri-operative management of the bariatric patient were included. The use of pre-operative a very low energy diet was rated important by 95% of respondents, with universal support for the inclusion of postoperative routine care and complication types and management.

Non-technical items

All three components of teamwork (90%), leadership scenarios (80%) and crisis management (98%) were rated as important and included in the final curriculum.

Discussion

Although several generic training curricula have been proposed for bariatric procedures previously, this is the first study to elucidate content validity for an LSG curriculum for Australian and New Zealand surgeons and trainees. The proposed curriculum provides a useful framework for both mentors, who may benefit from a structured programme for teaching trainees, and for surgeons who are starting in the sub-specialty of bariatric surgery.

There is currently a lack of structured approaches to bariatric sub-specialty training. This has been noted in

particular for surgeons and physicians who complete traditional training programmes without becoming familiar with bariatric care.[13] Most bariatric surgeons report skill acquisition from learning by doing, course participation and observerships.[14] There are proven benefits to bariatric subspecialty education; it has been shown that bariatric-specific specialty training is associated with improved short-term morbidity and mortality rates after LSG.[15] Similarly, when acute general surgical intervention is required for obese patients, bariatric surgeons are more likely to perform the procedure laparoscopically with resultant reductions in hospital length of stay.[16] In addition, when surgical coaching is used for sleeve gastrectomy and gastric bypass procedures, skills scores are improved alongside reduction of technical errors.[17]

There has been a move away from time- or volume-based surrogate markers of competency. The need for structured teaching mirrors the advent of surgical simulation technologies; reduced trainee theatre time increases reliance on simulation to provide procedural experience.[18] ASMBS created a competency-based curriculum in 2017, consisting of cognitive and technical milestones.[19] As opposed to undergraduate teaching, development of postgraduate surgical curricula is just one aspect of surgical education. Modern surgical education must also include teaching mentorship and coaching, deliberate practice and ability to provide formative feedback.[20]

With regard to specific curricular content, the areas of knowledge focusing on cognitive items, including upper gastrointestinal anatomy, patient selection and peri-operative evaluation, were readily agreed. The role of nursing input in bariatric surgical practice was not included by most of the surgeons surveyed. This perhaps reflects a lack of recognition of the role of nursing care within a bariatric programme, in addition to a known lack of education surrounding obesity education for nurses.[21] Similarly, there was a lack of support for mandatory knowledge of psychological factors in bariatric surgical training; this likely reflects what should be required of a trainee rather than its independent importance, given psychopathology has been shown to be a predictor of a reduction in body mass index after weight loss surgery.[22]

Some limitations may be noted from the present study. Although mixed-methods surveys are a useful generic indicator of current practice, they do not account for local variations or skewed surgeon population numbers. With generally higher numbers in capital cities, teaching capacity is usually limited to these areas. The exclusion of nursing and psychology considerations perhaps reflects sub-specialist knowledge; allied health is not core knowledge for a surgeon or bariatric surgical trainee. This is countered by the reality that a broad understanding of the principles underlying their participation in the surgical pathway is highly useful. The relatively low percentage uptake of the survey invitation by surgeons in Australasia may reflect a lack of academic focus within bariatric surgery as a sub-specialty to date; increased standardization of the extensive (and often disparate) methods used by bariatric surgeons should be strongly encouraged to ensure a baseline of defensible standards in safe surgical technique.

Conclusions

The present study outlines a potential template for teaching LSG to non-bariatric surgeons and trainees. Utilizing a mixed-methods web survey, consensus was sought for content validation among a bi-national specialty society of Australian and New Zealand-based bariatric surgeons. The curriculum can be used to inform future teaching modalities as a move away from informal observation towards formalized standards of teaching, and potentially assessment, for novel procedures. A didactic curriculum allows for teaching as well as a potential role in assessment of surgeons newly trained in sleeve gastrectomy, a procedure to which many general surgical trainees have limited exposure during training.

Further research utilizing this defined content would allow for usage in the teaching setting in a simulation facility, as well as transfer to theatre scenarios, before use in high stakes assessments such as certification, re-validation and accreditation.

Supplementary material

Supplementary Table 1 is available at https://doi.org/10.5281/zenodo.5886779.

Conflict of interest

The authors have no conflicts of interest to declare.

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