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Review Article

Literature review: revisional anti-reflux surgery

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ABSTRACT

Revision anti-reflux surgery is challenging. With higher rates of complications and lower rates of symptoms control, patient selection is critical. With Roux-en-Y gastrectomy and re-fundoplication being the most commonly performed procedures, there is no clear guidance on operative selection base on patient characteristics. A literature review was performed of the PubMed database with search terms 'reflux', 'gastrectomy', and 'fundoplication'. Of the 164 results, 17 studies were deem suitable for inclusion. In the limited studies available, Roux-en-Y gastrectomy was shown to have higher rates of symptoms control but was also associated with higher rates of complications compared to re-fundoplication. Primary studies assessing the safety and efficacy of gastrectomy as a salvage surgery option are limited. Within the available evidence, select patient groups may benefit from Roux-en-Y gastrectomy over re-fundoplication.

Keywords: Gastrectomy, Fundoplication, Reflux

INTRODUCTION

Gastro-oesophageal disease (GORD) is a common diagnosis with an international prevalence of 14%-20%.[1,2] First line therapy of proton pump inhibitors (PPI) is effective in approximately 70% of cases, particularly in cases of erosive GORD.[3] In cases of inadequate medical treatment, patients may progress to surgical management. While there are various surgical options, Nissen fundoplication is considered the 'gold standard'.[4] It is very effective surgical option, with a success rate of 80%-90% at 20 years follow up.[5] Of the patients undergoing anti-reflux surgery, 10-15% have recurrent symptoms with 3-7% developing severe post-operative symptoms despite initial surgical management.[2] This is the cohort that require revisional surgery.[2]

Modified anatomy, adhesions and Vagus nerve disruption all contribute to the complexity of revisional surgery.[2] Revision surgery is therefore associated with poorer symptomatic outcomes and increased morbidity.[2] Options for revisional anti-reflux surgery include re-fundoplication, and various forms of partial gastrectomy.[2] Complete gastrectomy is also an option, which is uncommonly performed given safer and efficacious options are available.[2] Both re-fundoplication and partial gastrectomy have high rates of post-operative satisfaction and symptom improvement.[6,7]

Aim

This paper will focus on reviewing the literature on the safety and efficacy of Roux-en-Y gastrectomy in patients who have severe reflux despite previous fundoplications. Gastrectomy is a salvage option after multiple re-fundoplications. There are no guidelines on when gastrectomy is indicated over a re-fundoplication and the evidence comparing the two options is greatly limited.

LITURATURE REVIEW

The PubMed database was reviewed with search terms 'reflux', 'gastrectomy', and 'fundoplication' which yielded 164 results. Studies were excluded if the indication for surgery was not reflux and if the procedure reviewed was not a Roux-en-Y gastrectomy. This left 17

articles that referenced Roux-en-Y gastrectomy after failed fundoplication. Most were case studies and small prospective cohort studies. The Cochrane database was reviewed with same search terms with no results found.

RESULTS

Re-fundoplication is the most common approach after failed primary fundoplication. It is utilised in up to 90% of cases.[8] As would be expected, risk of intra-operative and post-operative complications increases with increased number of previous anti-reflux operations.[8] Symptom improvement or resolution occurs in 50-80% of patients undergoing their first re-fundoplication.[8-10] The efficacy of re-fundoplication drops with subsequent operations and can be as low as 40-60% on second re-fundoplication.[11,12] A re-fundoplication with a Roux-en-Y gastrectomy is possible, but is a long, complex procedure with difficult anatomy and has a morbidity rate as high as 67%.[8,13] The first re-fundoplication has a reasonable success rate and may be an appropriate option in the right population group.[8] Subsequent re-fundoplication should be carefully considered and assessed against alternative surgical options given the drop in success and increase in morbidity.

Roux-en-Y gastrectomy and re-fundoplication are considered appropriate surgical options after failed primary fundoplication and most studies compared these surgical options. In prospective cohort studies which directly compared the two options results showed better symptomatic outcomes in gastrectomy patients when comparing similar patient profiles. Symptom improvement or resolution occurred in 89-95% of patients undergoing Roux-en-Y gastrectomy. This is compared to the 50-80% of patients with symptom improvement or resolution after the first re-fundoplication.[8-10] In all studies, Roux-en-Y gastrectomy consistently outperformed re-fundoplication in symptom improvement. The sample size of these studies were relatively small, but results were statistically significant.[8-10] This suggests that Roux-en-Y gastrectomy may be a better option for symptom control after primary fundoplication failure, rather than a re-fundoplication. However, these potential benefits need to be weighed against the potential intra-operative and post-operative complications, and the sequelae of gastrectomy.

In considering surgical options, patient selection, symptomology and potential cause of recurrent symptoms or surgical failure is relevant. There are various reasons for recurrent symptoms and categorisation of symptomology may suggest type of surgical failure. There are multiple causes for fundoplication failure including slipped wrap, tight wrap, low wrap, paraoesophageal hernia and vagas nerve damage.[14] One study assessing primary surgical failures in the context of re-fundoplication found herniation and misplaces wrap to be the most common pattern of failure.[15] On correcting failure in re-fundoplication, study showed 73-89% reduction/resolution of symptoms.[15] In another study assessing fundoplication patients with There were no studies which assessed efficacy of Roux-en-Y gastrectomy by surgical failure type or by pre-operative symptomology. Further study into this area would potentially be of benefit in identifying sub-groups who may have better outcomes in re-operation based on identified cause of failure in primary operation and/or pattern of symptomology. For example, treatment of heartburn to control reflux compared to dysphagia secondary to hiatal mechanical issues versus motility disease. Surgical approach should consider potential structural and physiological causes base on symptomology and appropriate pre-op investigations.

As patient selection is vital in considering surgical options, sub-groups and outcomes are important considerations. Some studies have suggested potential benefits for Roux-en-Y gastrectomy in patients with Barrett's oesophagus secondary to reflux.[8,16] They showed regression of Barrett's oesophagus in up to 60% of patients, with an increased potential benefit in patients with long segment Barrett's oesophagus.[8,16] In patients with Barrett's with oesophagitis, rate of post-operative ulcers/strictures remained in 100% of patients with re-fundoplication compared with elimination in 95% of patients after Roux-en-Y gastrectomy.[8] In those with short segment Barrett's, results comparable to Nissen Fundoplication and therefore risks associated with Roux-en-Y gastrectomy may outweigh the benefits when a potentially less complicated surgical option is available.[16]

Another identified subgroup is those with oesophagitis. Limited studies have also suggested a potential benefit in utilising Roux-en-Y gastrectomy over other surgical approaches in patients with persistent oesophagitis after primary fundoplication surgery failure.[8,17] In one study, all patients presented with erosive oesophagitis prior to primary fundoplication, with 83% having persistent oesophagitis post-surgery.[8] This dropped to 24% after a re-fundoplication procedure.[8] This is directly compared to patients who underwent Roux-en-Y gastrectomy instead, where oesophagitis persisted in only 8% of patient post operatively.[8] Based on the limited literature, patients with long segment Barrett's oesophagus or persistent oesophagitis would therefore be potential sub-groups for whom a Roux-en-Y gastrectomy may be preferable.

Several studies focused on Roux-en-Y gastrectomy as a potential first line surgical option for reflux in morbidly obese patients.[8,18] Studies suggest that Roux-en-Y gastrectomy would be more efficacious in treating reflux in morbidly obese patients compared to fundoplication.[19,20] This is a particularly valuable suggestion given obese patients are at higher risk of more complicated forms of reflux with metaplasia, Barrett's oesophagus, and oesophagitis.[21] Roux-en-Y gastrectomy also has the added benefit of potential long-term weight loss and may be designed as a combined anti-reflux and weigh loss surgery.[13] Weight loss would contribute to

reflux reduction, along with other cardiovascular benefits.[19] While the literature is greatly limited, morbidly obese patients are more likely to fit the subgroups for whom a Roux-en-Y gastrectomy may have better outcomes.

Roux-en-Y gastrectomy is widely accepted to be a more complex procedure with a higher potential serious morbidity compared to Fundoplication.[8]In the largest available cohort study comparing the two surgical options, 30% of patients who underwent a laparoscopic Roux-en-Y gastrectomy experienced a complication, with 11% requiring a re-operation.[8] This is compared to laparoscopic re-fundoplication where 17% of patients experienced intra-operative complications with 13% experiencing post-operative complications.[15] Risk of complications increased with conversation to open fundoplication and with increased number of previous failed fundoplications.[15] In one literature review, the most common early complication identified in Roux-en-Y gastrectomy was gastric perforation affecting 5% of patients, with gastrojejunal anastomosis stenosis most common late complication affecting 7% of patients.[13] In re-fundoplication common complications overall were wound infection at 16% and Pneumonia at 7%.[15] Given the potentially higher rates of complications, patient selection is critical. The potential benefits should be weighed against the risks and sub-group analysis is necessary to this assessment.

There are limited studies investigating Roux-en-Y gastrectomy as a salvage surgical option after failed primary anti-reflux surgeries, despite it being widely accepted. Overall, results were consistently positive in terms of symptomatic improvement, even when compared against re-fundoplication. Studies investigating outcomes had small sample sizes and had limited ability to perform sub-group analyses and complication breakdown.

CONCLUSION

The outcomes were largely similar and non-conclusive due to inadequate primary studies. Further investigation into sub-groups would be of benefit, as it would provide greater information on population groups that would most benefit from Roux-en-Y gastrectomy over alternative surgical options. Further research around the safety and efficacy of Roux-en-Y gastrectomy after failed fundoplication is needed.

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