IMPROVING OUTCOMES FOLLOWING SURGERY FOR GASTRO-OESOPHAGEAL REFLUX DISEASE - LAPAROSCOPIC ANTIREFLUX SURGERY

Thesis submitted in November, 1997 for the degree of Doctor of Medicine in the University of Adelaide by


The work described in this thesis was performed within the Department of Surgery at the University of Adelaide, and the Royal Adelaide Centre for Endoscopic Surgery at the Royal Adelaide Hospital
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The advent of laparoscopic surgical techniques has refocused the medical community's interest in surgery for gastro-oesophageal reflux disease. This has led to a significant increase in the operative caseload in centers interested in surgery for this problem, thereby providing a renewed opportunity for the evaluation of variations to standard surgical techniques which might improve the outcome for patients undergoing antireflux surgery.

Recent published reports highlight promising short term outcomes following laparoscopic antireflux operations, with equivalent control of reflux symptoms demonstrated at short term follow-up, and reduced overall perioperative morbidity. However, long term outcomes following the laparoscopic approach remain unreported, and some unique complications have arisen following laparoscopic antireflux procedures. To reduce the risk of post-operative dysphagia, some surgeons advise either the routine or selective application of a partial fundoplication technique. Although the results of uncontrolled case series suggest that this approach is advantageous, the results of 4 previous prospective randomised trials of Nissen fundoplication versus posterior partial fundoplication, performed by open surgical techniques, did not demonstrate any reduction in the incidence of dysphagia following surgery. The anterior partial fundoplication technique has not been evaluated in a prospective randomised trial.

Initial experience at the Royal Adelaide Hospital identified an increased risk of several complications following laparoscopic Nissen fundoplication. These include; pneumothorax, para-oesophageal hiatus herniation, and hiatal stenosis. As a result of this, a laparoscopic technique was developed during which diathermy was used sparingly or not at all during hiatal dissection, the oesophageal hiatus was routinely repaired posteriorly, and a short loose 360° fundoplication was calibrated around a large intræoesophageal bougie. A learning curve, comprising each individual's first 20 procedures,
and the institutions first 50 procedures, was also identified. Outcomes improved once each surgeons' experience was beyond this phase.

To improve the outcome of surgery for reflux disease it was hypothesised that the modification of standard open antireflux surgery techniques to a laparoscopic approach, the routine division of the short gastric vessels to mobilise the fundus fully during Nissen fundoplication, and the performance of a partial (anterior) fundoplication would be advantageous. Laboratory research using both a bench top model and a laparoscopic approach in a live porcine model, compared the efficacy of the Nissen procedure, with both anterior and posterior partial fundoplication techniques. The results of these studies confirmed that both partial fundoplication techniques restored an adequate antireflux barrier.

A prospective randomised trial of laparoscopic versus open Nissen fundoplication confirmed that the application of laparoscopic techniques reduces the overall morbidity of surgery for reflux disease, and significantly shortens the post-operative hospital stay, and the overall length of convalescence following surgery. However, the duration of the operating time for antireflux surgery was lengthened. A second randomised trial of division versus no division of the short gastric vessels during laparoscopic Nissen fundoplication, demonstrated no reduction in the incidence of dysphagia or any other adverse outcome following division of the short gastric vessels. Vessel division, however resulted in longer overall operating times, and significant postoperative bleeding in one patient. A third randomised trial compared laparoscopic Nissen fundoplication with anterior partial fundoplication. Whilst initial follow-up 1 and 3 months following surgery revealed no advantages for the partial fundoplication technique, significant advantages for the partial fundoplication technique were identified 6 months following surgery.

Specifically, the incidence and severity of dysphagia for solid food was reduced by the partial fundoplication technique, as was the incidence of other adverse outcomes including inability to belch and increased passage of flatus. Overall patient satisfaction was better following the anterior partial fundoplication technique.
The studies described in this thesis support the routine application of laparoscopic techniques to antireflux surgery, but not the routine division of the short gastric vessels during Nissen fundoplication. The use of an anterior partial fundoplication was advantageous, although follow-up remains short term. Longer term follow-up will be needed before it can be recommended that patients requiring surgery for gastro-oesophageal reflux disease should routinely undergo an anterior partial fundoplication in preference to the Nissen technique. Nevertheless, with time this approach may prove to be the most appropriate surgical operation for gastro-oesophageal reflux disease.