

Laparoscopic Fundoplication: Nissen versus Toupet

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Background:

Aerophagia is a rare but well-known comorbidity in patients with gastroesophageal reflux disease. Particularly after laparoscopic Nissen fundoplication, it has proven to result in worse symptomatic outcome and a lower postoperative quality of life in comparison to patients without preoperative gas-related symptoms. AIMS: Aim of the study was to compare the postoperative outcome in gastroesophageal reflux disease patients with aerophagia as comorbidity after either laparoscopic 360 degrees 'floppy' Nissen fundoplication or 270 degrees Toupet fundoplication with main focus on the frequency and subjective impairment of gas-related symptoms.

Results:

Before surgery, there were no significant differences between both surgical groups. Three months after surgery, significant differences ($p < 0.05-0.01$) were found: patients who underwent a laparoscopic 270 degrees Toupet fundoplication suffered from less impairing gas bloat, flatulence and postprandial fullness when compared with patients with a 360 degrees 'floppy' Nissen fundoplication. The majority of these patients were able to belch postoperatively but felt no impairment due to this symptom. In contrast, patients of the Nissen group felt a significant impairment due to the inability to belch.

Conclusion:

Gas-related symptoms are very common in gastroesophageal reflux disease patients with aerophagia as comorbidity. Patients who undergo a laparoscopic Toupet fundoplication show less impairment in relation to gas-related problems compared with patients treated with a Nissen fundoplication for a follow-up period of at least 3 months. In the Toupet group, the ability to belch postoperatively seems to be a positive aspect from the patients' view which also improves the percentage of gas-related problems. However, long-term results are necessary. Conclusion: - It was concluded that there is a special risk for dysphagia in patients who presented preoperatively with motility disorders. Hence, these patients were treated with a partial wrap. We observed that dysphagia also developed after a Toupet procedure and that Nissen fundoplications in our series had a higher rate of recurrent reflux disease than the Toupet procedure. So we decided to evaluate this tailored concept by comparing the two operations depending on esophageal motility, in a prospective, randomized trial with long-term postoperative follow up. Operative results as well as four month follow-up data have been reported previously. The Nissen procedure was considered the most successful in terms of reflux control [11, 29, 30], and was therefore more often performed than partial fundoplication. However, this theory has been challenged lately, shifting the attention to postoperative failures due to mechanical problems (dysphagia), rather than worries about the recurrence of disease. Patients with preoperative evidence of esophageal motility disorders appeared to suffer from postoperative dysphagia more frequently, so that the choice between total or partial fundoplication was made according to the absence or presence of impaired esophageal peristalsis at the preoperative manometric

assessment [31, 32]. The results of several nonrandomized trials did not confirm this concept [16, 33, 34]. None of these three randomized trials of laparoscopic fundoplication techniques stratified according to preoperative esophageal motility, so valid information about the tailoring concept is not available [35, 36]. The present study exceeds all other randomized investigations in terms of numbers of study population. The tailored approach is not supported by our postoperative outcome data. In the present study reoperative manometric assessment of esophageal motility does not correlate with the postoperative outcome and should not be regarded as indication for the choice of operative technique. Similar results after retrospectively analyzing their manometric data [17, 25]. Furthermore, the Nissen fundoplication leads to worse outcome with regards to reflux recurrence when compared to the Toupet procedure, even though this trend was not statistically significant. This is a somewhat novel finding since the Nissen procedure is supposed to be superior in terms of effective reflux control. Still these results can probably be explained by lower mechanical failure rate due to more-effective fixation of the fundic wrap and closure of the crurae after the Toupet procedure. Patients with motility disorders had significantly more sphincter incompetence on manometric studies preoperatively (92 vs. 80%) than those with normal motility. Both Nissen and Toupet fundoplication significantly increased the postoperative LES intra-abdominal length but a significantly increased LES pressure was only seen after Nissen fundoplication, and not Toupet, after two years. This is contradictory to a slightly higher reflux recurrence in the Nissen group. Hence, there are discrepancies of manometric results in comparison with pH-metry findings. It can be speculated that patients with a disrupted hiatal anatomy (which was the most common finding at reoperation in the Nissen group) might have normal LES pressures due to an intact fundic wrap but still suffer from reflux recurrence due to crural disruption. In the case of early postoperative dysphagia we prescribe prokinetics. If this medication is not successful we control our fundoplication endoscopically. Even if we do not find a stenosis we tend to dilate the fundoplication because we have good experience concerning symptom control. We were impressed by the fact that 57 out of our 200 patients suffered from dysphagia preoperatively. Fundoplication, whether Nissen or Toupet, improved this symptom. Postoperatively only 27 patients suffered from dysphagia. Regarding one of the main questions that led to this study, comparison of the complication rate of the two operative techniques, the Nissen fundoplication was significantly more often followed by dysphagia than the Toupet procedure. In an animal model, overcorrection of the LES pressure was found after the Nissen fundoplication. This correlates with our clinical findings [40]. Patients with preoperative motility disorders had greater prevalence and severity of respiratory symptoms and heartburn and were more often refractory to medical treatment. Although motility disorders affected clinical symptoms of the disease, they did not affect the outcome after either Nissen or Toupet fundoplication in that relief of heartburn, reflux control on 24-hour pH-monitoring and healing of esophagitis was similar in patients with normal motility and motility disorders. A fundamental question that has rarely been addressed is the extent to which the gas bloat symptoms and belching typically seen after laparoscopic fundoplication are already present before operation in patients with chronic GERD [17]. No randomized clinical trial has evaluated the ability to belch and gas bloat problems after Nissen and Toupet fundoplication. In our study preoperatively 50% of the patients complained about gas bloat. This slightly increased after two years to 53%. In some patients fundoplication procedures impair the ability to belch and thereby to relieve bloating [41]. The inability to belch occurred in about 25% of patients in the Nissen group and in 13% in the Toupet group. A tendency to fewer gas bloat symptoms after Toupet fundoplication with a short- and long-term follow up has also been reported in the literature [42, 43]. Concerning reflux control 85% of our patients were satisfied with the operative result after two years. This excellent result of clinical outcome did not correlate to the worse findings in the

pH-metry and endoscopy follow-up. Fifty-two patients showed pathologic pH-metry studies, 35 exhibited pathologic endoscopy. According to our study criteria (reflux recurrence is defined as pathologic finding in pH-metry and/or endoscopy). Fifty-seven patients had a recurrence of GERD. From today's point of view this definition of recurrent reflux is not correct. As the indication for therapy in GERD depends mainly on clinical symptoms, success should also be measured the same way. Regarding this concern we would like to point out that 83% of the patients with recurrence of GERD (according to our definition) were satisfied with the operative result after two years.

The re-operation rate is three times higher in this group compared to 2,000 patients we have operated on apart from this study. There are two potential reasons for this surprising fact: firstly, in our endoscopic controls we found patients without symptoms but inflammation of the esophagus. Such a patient would not have presented himself outside the study, but we tended to re-operate to achieve good results. Secondly, there was a group of patients with mild symptoms of reflux and/or dysphagia, in which we found objective criteria for unsuccessful surgical therapy. Also in this group we recommended reoperation. Eighty-five percent of our patients reported good or excellent results after two years regardless of the chosen procedure. Surprisingly patients in our Nissen group had an equally high satisfaction rate, although we found worse objective results in our study. Other studies from the literature reported equally good results for reflux surgery. In conclusion the Toupet fundoplication seems to be the better operative procedure for patients suffering from GERD. In our hands the Toupet fundoplication became the procedure of choice for surgical treatment of GERD due to its ease of application, excellent patient satisfaction, well documented curative outcome, low dysphagia rate, and low levels of side-effects.

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