Is surgery the treatment of choice for long term control of gastro-esophageal reflux disease ?

PRO : M. J. Legrand, N. Jacquet

Introduction

During the last years, major changes occurred in the management of gastro-esophageal reflux disease (GERD). Although significant development focused in the understanding of the physiopathology of this disease and improvements in the methods of its investigation, the most important changes have occurred in both medical treatment, with the successful use of the proton pump inhibitors (PPI) in the healing and maintenance of erosive esophagitis, as well as in surgery, with the introduction of laparoscopic antireflux surgery.

Controversy still exists as to which subgroups of GERD patients are best treated surgically. The relative success of treatment with medical and surgical intervention, in terms of both symptom control and objective resolution of esophageal injury must be weighed against the relative costs of each therapeutic strategy in both the short and long term, given that GERD is a lifelong disorder.

Methods

An objective analysis of the published data was carried out on a Medline sqearch of the National Library of Medecine. First of all, research was oriented to Consensus Conferences and Guidelines concerning the management of GERD in adult patients. After this, the literature concerning the results of treatments of reflux esophagitis, the results of antireflux surgery, and the cost effectiveness of the different treatment modalities was reviewed. This review was made for the last 5 to 10 years.

Selection criteria of literature data were based on articles of clinical interest, presence of a summary, accessibility of the published document, considerations ot the quality of the journal, and the value of the methods used by the authors. Priority was accorded to large randomized controlled studies.

Results

Review of Concsnsus Conferences and Guidelines on the management of GERD. Eleven articles of 64 found were selected after critical appraisal. Guidelines can be summarized as follows :

Recommendations for the treatment of GERD included a general approach to therapy (including lifestyle changes), use of acid suppression, use of promotility drugs, maintenance treatment, and indications for antireflux surgery (1). Treatment strategy in uncomplicated GERD should be different than for complicated presentations with erosive or ulcerative esophagitis. There was no consensus as to to investigate uncomplicated GERD, ie, whether to perform endoscopy immediately or after initial therapy fails, in a care for costeffectiveness. The majority decision was for short term "step up" therapy and investigation if symptoms do not improve or recur (2). This conventional step up therapy was the least costly and reasonably effective approach to treat the majority of patients with mild to moderate symptoms of GERD. Maintenance therapy should be carried out with the initial therapy that was effective. H_2 receptor antagonists (H2RA) and prokinetic agents may be sufficient for maintenance therapy in milder GERD (3). However, for severe esophagitis, PPI should be used in priority. In those patients with endoscopic evidence of esophageal mucosal damage, PPI were highly effective and safe in acute healing of erosive esophagitis and were significantly better than H2RA. In contrast to the 28% to 60% healing rates for patients treated with H2RA, 74% to 96% of patients were completely healed with PPI. Once patients with this degree of esophagitis had their mucosal lesions healed, they almost inevitably had recurrence of esophagitis (80% at one year) unless some form of maintenance therapy was continued. Unfortunately, H2RA appeared to be no better than placebo, and PPI were the only class of drugs able to minimize relapse significantly (4). PPI therapy for patients with complicated, persistent and symptomatic GERD appeared to be less costly than H2RA in conventional doses (5). The long term effects of PPI use (over 10 years) are unknown. The optimal dosing strategy and dosing interval for PPI remaine to be defined.

Effective surgery was available as an option in these consensus conferences. Considerable controversy existed whether it was superior to long-term medical therapy (1). There were only two controlled trials of medical versus surgical therapy of GERD, both showing that surgery was more effective. But in either of the two trials, comparaison was made between surgery and PPI use. Certainly patients with esophagitis whose symptoms have not resolved during maintenance treatment with a PPI should be considered for surgery. Moreover, antireflux surgery should be advised in

Address for correspondence : M. J. Legrand, M.D., Department of Digestive Surgery, University Hospital Center, Sart Tilman, 4000 Liège, Belgium.

young patients as an alternative to aggressive medical therapies, or in patients who were not satisfied with medical therapy. On the other hand, prolonged medical therapy should be the preferred approach in older patients, in whom surgical risks ise higher. The role of surgery in the treatment of patients with symptomatic GERD without esophagitis is unclear. Some patients appear to benefit from anti-reflux surgery, including young patients whose disease can be maintained only with aggressive and expensive long term acid suppression (6).

In 1998 the Society of American Gastrointestinal Endoscopic Surgeons published guidelines for surgical treatment of GERD (7). Indications for surgery should be considered in those individuals with documented GERD who 1) have failed medical management or 2) opt for surgery despite successfull medical management (due to lifestyle considerations including age, length of the treatment, compliance, or expense of medications) or 3) have complications of GERD (e.g. Barrett's esophagus, stricture, grade III or IV esophagitis) or 4) have "atypical" symptoms and reflux documented on 24-h pH monitoring. Consideration of technical details and results of anti-reflux surgery were also expressed. The primary goal of anti-reflux surgery is to reestablish the antireflux barrier without creation of undue side effects. The choice of technique is typically based upon anatomic considerations as well as the surgeon's preference and expertise. The Nissen fundoplication has emerged as the most widely accepted procedure for patients with normal esophageal motility. For patients with compromised esophageal motility, one of the various partial fundoplications was recommended to decrease the possibility of postoperative dysphagia. Although the choice of procedure and methods of access (open or laparoscopic) should be determined by the surgeon's experience, there was a strength of evidence in favor of laparoscopic anti-reflux procedures (8,9). The benefits of a laparoscopic approach were analogous to those realized with laparoscopic cholecystectomy and included shorter and more comfortable recovery with an earlier return to normal activities. Several reports based primarily on prospective controlled studies documented the feasability, safety, and favorable results of the laparoscopic approach. The indications for laparoscopic treatment of GERD were the same as those outlined for open procedures. Safe and effective laparoscopic treatment of GERD requires advanced laparoscopic skills and appropriate training in anti-reflux surgery.

Review of cost effectiveness of treatment modalities. Fourteen references of the 77 citations were selected. Since GERD is a common problem affecting patients during daily life, at work, at rest, and in other situations, it has a major impat on quality of life. The impact of GERD on society is considerable in terms of medical resources used. GERD is the most frequent acid-related disorder (2,9% overall prevalence). Annual per person attribuable costs were evaluated egal to $ 471 among members of a large health maintenance organization in Northern California. In this organization, total annual expenditures for acid-related disorders were $ 59,4 million, with 40,6%, 36,8% and 22,6% respectively for GERD, peptic ulcer disease and gastritis or dyspepsia (10). Cost is therefore an important factor to consider when evaluating treatment options for these patients. In reflux disease, it is important to consider that medical treatment needed to be potent but still did not cure the condition. Cost-benefit analysis focused on the more severe cases of esophagitis. It was suggested that the most expensive drug, omeprazole, was more cost effective when compared to other medical therapies (11). There were few studies comparing the lifetime costs of surgical versus medical treatment. All studies were retrospective. The study of Coley *et al.* showed that surgery seemed to be more cost-effective than pharmacologic treatment in men younger than 48 and women younger than 55 years (12). A more recent Dutch study showed that comparison of maintenance omeprazole, 20-40 mg daily, and Nissen operation favoured open Nissen procedure after 4 years and laparoscopic operation after 15 months. This difference was mainly due to a reduction in hospital stay (13). Another study compared omeprazole for healing and maintenance purposes with laparoscopic Nissen fundoplication. Both strategies were similarly effective. At 10 years, laparoscopic Nissen fundoplication and omeprazole costs were similar (14). A Finnish rewiew showed Nissen fundoplication to be less costly than continuous, lifelong medication with PPI, or 300 mg ranitidine daily, irrespective of the patient's gender or age (15). Thus from an economic point of view, if one knew in advance that a patient required medical therapy for 10 years, a Nissen fundoplication was the more cost-effective treatment for this patient.

Review of the results of treatment of reflux esophagitis and results of antireflux surgery. 41 references of 928 citations, and 42 of 735 respectively were selected for the discussion.

Personnal experience with laparoscopic nissen fundoplication

From May 1991 to October 1994, we undertook a prospective clinical trial on the feasibility, safety, and efficiency of laparoscopic Nissen fundoplication in the Department of Digestive Surgery of the University of Liege. We evaluated technical feasibility in terms of complications and conversion rate to laparotomy. The functional result analysis was based on symptom assessment after 6 weeks and 1 year, endoscopic evaluation and esophageal manometry. Patient satisfaction and symptom assessments were reevaluated by questionnaire after a mean follow-up of 2 years. 311 consecutive patients with documented GERD were enrolled in the study (16).

There were 179 males and 132 females, with a mean age of 49 years (range 14 to 81). The mean duration

of disease was 6 years (range 1 to 30). All but 10 patients had undergone intensive medical therapy based on antisecretory drugs : 238 patients (76%) were managed longterm with H2RA, and 190 (61%) more recently received PPIs. Ten patients with chronic anemia related to large hiatal hernia had no acid suppression therapy. The preoperative work-up in all patients included physical examination, evaluation of symptoms related to reflux disease, esogastroduodenoscopy, and stationnary esophageal manometry. A barium swallow (n = 136), an ambulatory 24 hour esophageal pH probe analysis (n = 59), and gastric studies (n = 11) were performed selectively.

The procedure included complete hiatal dissection (100% of patients), division of the short gastric vessels (79%), approximation of the crura of the diaphragm (89%), calibration of the wrap (93%), and suture of a 360° fundus wrap to a distance of 2 to 4 cms with separated stitches (92%). Eight percent of the fundoplications were partial, as indicated by the preoperative esophageal motor function study. The mean operative time was 119 minutes.

Nissen fundoplication was achieved under laparoscopy in 97% of cases. Intraoperative complications occurred in 21 patients (6%), and included pneumothorax in 10, bleeding in 8, gastric perforation in 2, and injury of the anterior vagal nerve in 1.

Eighteen patients (5,8%) experienced postoperative complications. Minor complications occured in 4 patients. General medical complications occured in 10 patients with four other patients experienced surgery related complications ; these included transfusion for a wound haematoma in one patient, drainage of a subphrenic abces in one, and early reoperation for dysphagia in two. There were no deaths. Most patients were started on clear liquids on postoperative day 1 (mean 1,3). The mean hospital stay was 4 days (range 2 to 28).

Heartburn was reported in 0.3% of the patients after six weeks and in 5% after one year. Disabling dysphagia, epigastric discomfort, bloating and diarrhea were respectively reported in 5,6%, 13%, 4,3%, 0,3% after six weeks and in 3%, 13%, 8%, 1% after one year. 215 patients accepted a postoperative endoscopic control which showed an esophagitis healing in 95% and an improvement in the remaining 5%. In 44 patients were able to compare postoperative esophageal manometric data with preoperative values. This comparison showed a significant ($p < 0.05$) restauration of the mean lower esophageal sphincter (LES) pressure (19 mmHg $\pm$ 7), of mean total sphincter length (4 cm $\pm$ 1), and of mean abdominal sphincter length (2 cm $\pm$ 1).

301 patients (97%) were available for follow-up study (mean duration 23 months). 284 (94%) patients were satisfied with excellent or good results and no heartburn (classified Visick I or II). Ten patients (3.3%) still complained of side effects of the fundoplication, and were classified Visick III. Seven patients (2.3%) were dissatisfied with the operation because of recurrence of preoperative symptoms of reflux. Five of these were again taking medication. Over the last 6 years, twelve patients (3.8%) from this series underwent reoperation with good results in 70%.

Discussion

Although mortality was low, GERD is associated with considerable morbidity and has a significant impact on the quality of life for a substantial proportion of the adult population in western countries. The natural history of erosive esophagitis and its evolution are not clearly understoood. The study of Ollyo *et al.* showed, in patients receiving medical therapy, that esophagitis was limited to an isolated episode in 46% of patients. But for 31%, esophagitis relapsed to a milder grade and for 23%, it progressed steadily to a more severe form (17). These patients invariably will need permanent therapy. Some factors predictive of relapse during medical therapy could be defined : initial presence of esophagitis requiring aggressive acid suppression for healing, occurrence of residual symptoms after healing, need for prolonged therapy to relieve symptoms or heal the initial episode of esophagitis, long duration of symptoms before initial therapy, and finally low basal LES pressure (18).

Acid suppression only addresses one factor in a multifactorial disease. It does not take into account the varied nature of the refluxate. Complications of GERD are particulary frequent and severe in patients who have a combination of a defective LES and increased esophageal acid/alkaline exposure. Contamination of the refluxed gastric juice with bile acids predispose the patient to the development of stricture and Barrett's esophagus (19). Recently, detection of duodenal juice reflux into the esophagus was evaluated with a fiberoptic sensor for bilirubin (Bilitec 2000, Synetics, Inc.). The vast majority of duodenal reflux seemed to occur at a pH range of 4 to 7, at which bile acids, the major component of duodenal juice, are capable of damaging the esophageal mucosa. Alteration in the gastric pH environement caused by acid suppression therapy would allow the refluxed bile salts and active duodenal enzymes to potentiate esophageal injury and might encourage metaplasia (20). This finding could explain why 23% of patients with reflux esophagitis developed progressive mucosal damage despite medical therapy. Antireflux surgery should be the only mean available for prevention of esophageal exposure to gastric and duodenal juices in these.

GERD can only be controlled, not cured, by medical therapy (18). Timmer *et al.* assessed esophageal motility and acid clearance in 27 patients treated for reflux esophagitis with omeprazole 40 mg. After healing, neither motor response and esophageal acid exposure changed, thus implying that acid clearance remained unchanged (21). In the same way, maintenance of remission of esophagitis for prolonged periods did not

alter the degree of acid reflux on discontinuation of medication (22). Surgical therapy, on the other hand, was effective because it improved sphincter function.

Continuous use of PPI has proven to be safe in the short term, but long term effects (over 10 years) were unknown. Klinkenberg-Knol *et al.* showed that maintenance therapy with dose increment omeprazole was effective for 5 years. This was, however, accompanied by a persistant increase in serum gastrin levels, micronodular argyrophil cell hyperplasia, and by subatrophic or atrophic gastritis (23). The latter phenomenon has proven to be persistent in patients who were positive for Helicobacter pylori. It has been suggested that patients with GERD who require prolonged acid suppressive therapy should be also treated to eradicate Helicobacter pylori, if they are infected (24). This additional therapy could interfere with treatment compliance and increase total costs. In the majority of clinical trials, omeprazole has been found to be well tolerated. However, potential toxicity, particularly confusion, hepatotoxicity, and leucopenia has been reported (25). Fatal fulminant hepatic failure related to omeprazole has also been described (26).

Failure to standard doses of PPI are commonly reported. In the study of Sontag *et al.* of maintenance therapy with lansoprazole (27), 17 patients out of 64 during the phase III study did not heal and were excluded, whereas 43 out of 99 (43%) during the maintenance phase relapsed. Eleven other patients in the lansoprazole group were withdrawn because of adverse events. In the study of Laursen *et al.* of long term treatment with omeprazole (28), failure was noted in 24 patients out of 204 during the healing phase, while during the maintenance phase, 27 out of 65 in the group 20 mg omeprazole and 41 out of 64 in the 10 mg group omeprazole. Relapsed failure thus affected at least 60% of the patient treated with omeprazole during the entire study. In the study of Bate *et al.* on prevention of recurrence of reflux esophagitis with 2 doses of omeprazole (29), 113 patients out of 313 (36%) were not healed and remained symptomatic after the healing phase. The other 193 healed (grade 0 on endoscopy) and had good responses to omeprazole therapy. The patients entered the maintenance study. In this group, endoscopic criteria to define relapse were changed and were redifined as esophagitis grade 2 or above. This criteria was less severe than during the healing phase, leading to overestimation of the good results. Forty-eight patients out of 128 (37%) receiving omeprazole relapsed.

Most similar randomized control studies comparing PPI to placebo allowed the systematic use of additional anti-acid medication (28-33). During the maintenance phase, these studies looked for healing esophagitis and symptomatic improvement. Patients were considered asymptomatic if moderate or severe heartburn were absent. However, these patients were allowed to take anti-acid tablets if necessary. This could have modified the severity of heartburn.

Some patients were shown to be refractory to PPI therapy, and represented a limitation to medical treatment. Holloway *et al.* (34) showed reduced responsiveness to acid suppression with omeprazole in some patients. In 61 patients with severe reflux esophagitis, 30% failed to heal with omeprazole 20 mg, and 47% of the unhealed patients also failed with a 40 mg dose. These patients had similar levels of acid exposure before treatment, but had greater acid exposure while receiving treatment. This group potentially represents good candidates for surgical management.

Studies comparing surgery to placebo cannot be carried out. Only two randomized trials compared antireflux surgery to medical therapy. The report from Behar *et al.* was the first to objectively compare both treatment in a controlled, prospective, randomized study (35). Seventy-three percent of the surgical and 19% of the medical group had good to excellent responses. However the number of patients was too small, and the medical treatment used was relatively ineffective to allow good comparison. The report from Spechler compared antireflux surgery to conventional medical therapy for complicated GERD in veterans (36). Surgery was significantly more effective than medical therapy in improving symptoms and endoscopic signs of esophagitis for up to two years. This study can be criticised for the absence of PPI in the medical treatment group. Thus a majority of the published results of antireflux surgery are prospective non randomized or retrospective studies.

Surgical therapy was effective because it improved sphincter function, which is the basic anatomical defect in most cases of severe GERD. After fundoplication, there was a significant increase in median resting lower esophageal sphincter (LES) pressure and length. Median residual LES pressure during swallow induced LES relaxation also increased significantly after operation (37). The effects of fundoplication on compromised esophageal body function in patients with GERD are poorly understood. Unlike medical treatment, Nissen fundoplication increased contraction amplitude in the middle and distal thirds of the esophagus on long term follow-up, when compared with preoperative findings. There was no corresponding effect on propagation speed and duration of contractions (38,39).

This aim can be achieved by a variety of surgical procedures of which the most commonly performed are the Nissen fundoplication, the Toupet partial fundoplication, the Hill repair, and the Belsey Mark IV operation. All involve repositioning the LES in the abdomen, and increasing the LES barrier to reflux. These procedures were performed in patients with GERD with an 80 to 90% success rate after 10 year follow-up (40). This success rate was achieved with negligible mortality (1%) and morbidity (less than 20%). Complications of surgery included dysphagia, slippage of the fundoplication into the chest, gastric ulceration, bloating, diarrhea, and early satiety. These were usually not severe and required specific therapy in less than

5% of patients. The Nissen fundoplication was found to give the most consistently good results (41,42).

Surgery was a viable therapeutic option in cases of severe esophagitis, pulmonary symptoms, or complicated disease.

The presence of severe esophagitis on initial presentation was predictive of relapse and the need for long-term medical management. The success of antireflux surgery seemed to be constant, irrespective of the preoperative esophagitis grade (43).

About 75% of asthmatics had acid gastro-esophageal reflux and 40% had reflux esophagitis. Results of trials of medical therapy using H2RA showed results ranging from no benefit to modest improvement of nocturnal symptoms of asthma only. In uncontrolled surgical studies, antireflux surgery resulted in partial or complete remission of asthma symptoms in a large proportion of patients (44). Wetscher *et al.*, in a prospective, non-randomized study, showed that PPI therapy and cisapride failed to control respiratory symptoms in GERD, because this treatment did not inhibit regurgitation. Surgery controlled reflux and improved esophageal peristalsis, which contributed to its superiority (45).

Currently, there is no evidence that PPI therapy can prevent Barrett's esophagus or decrease the associated cancer risk. No form of medical therapy was superior to antireflux surgery, which is indicated in cases resistant to pharmacological agents (44). Regression of Barrett's esophagus was rare following any type of therapy. Ortiz *et al.* questioned the systematic conservative approach in the initial management of patients with Barrett's esophagus. In a prospective, randomized, controlled study comparing conservative treatment versus antireflux surgery, surgery was significantly more effective in controlling inflammatory lesions and stenosis. A decrease in the length of columnar mucosa was more frequent in the surgical group, and conversely, an upward progression of the columnar lining was more frequent in the conservative treatment group (46). For De Meester *et al.*, an antireflux procedure was indicated, since it was highly effective in controlling reflux symptoms, healing the associated esophagitis, preventing repetitive injury of the Barrett's epithelium, and was more effective than medical therapy in the long term (47). Other therapeutic strategies that are currently under investigation include laser ablation of Barrett's epithelium and photodynamic therapy associated with a reflux-free environnement (48).

Up to 1991, surgical reconstruction of the antireflux mechanism was only possible through a large abdominal or thoracic incision, with the inherent disadvantages of a prolonged hospital stay and recovery time, and associated morbidity. With the advent of laparoscopic techniques and their rapid worldwide adoption, it has become clear that much of the morbidity associated with upper abdominal or thoracic surgery was wound related. In experienced hands, laparoscopic antireflux surgery has been seen to be feasible. Conversion rates to laparotomy for peroperative complications or technical difficulties range from 0% to 12% (49-58). As expected, this approach markedly reduces postoperative discomfort and shortened hospital stay and recovery (40,52,54,55,58,59). In addition, the laparoscopic approach undoubtedly also provides a more satisfying cosmetic result for the patient. There were fewer complications such as incidental splenectomy, wound infection, deep veinous thrombosis, or pulmonary complications. Mortality was negligible (0,2%) and the postoperative morbidity (ranging from 0% to 9,5%) was lower than for the open approach. Short-term results of laparoscopic antireflux procedures appeare to be comparable to those obtained with fundoplications performed via laparotomy. Control of reflux symptoms ranges from 82% to 100%, and the incidence of dysphagia ranges from 3% to 12%. Overall satifaction rates fluctuate from 84% to 97% (16,49,50,52-59). Early and late reoperation rate (ranging 0% to 7%) were identical to experience with the open approach. The follow-up period for laparoscopic fundoplications is short. However, it is expected that long-term results should parallel those of open procedures.

Conclusions

GERD is a significant health concern. Although modern acid suppression therapeis are effective and are the preferred strategy for most patients, they only address one factor in a multifactorial disease. In severe disease, there was a significant failure rate of long-term therapy and progression of the disease was often noted. Medical therapy was expensive and may often be required for the life of the patient. Side effects were exceptional, but long term use of PPI is an unknown issue.

Effective surgical therapy is also available. Antireflux surgery should be the treatment of choice in patients who have persistent symptoms or esophagitis despite an adequate course of intensive acid suppression therapy. It is a viable therapeutic option in cases of severe esophagitis, recurrent symptoms, or complications after continuous PPI therapy, particularly if a defective LES is present on manometry, if the patient is young or unwilling to become dependent on chronic medication. A short and floppy 360° Nissen fundoplication was the procedure of choice for most patients, and achieved reflux control in over 90% of patients for up to 10 years with minimal side effects and a high degree of patient satisfaction. In experienced hands, the laparoscopic approach was safe, effective, and offered the patient all the advantages of a minimally invasive therapy. From an economic point of view, laparoscopic Nissen fundoplication is becoming the preferred treatment strategy in patients with a long life expectancy, because postoperative morbidity is low and GERD symptoms remain controlled for many years.

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CONTRA : J. Janssens

1. The frequency of heartburn is the determining factor for health related well-being in patients with reflux disease

Heartburn is the most prevalent symptom of reflux disease ; therefore it is the most important factor in dictating the impact of the disease on the patient. Recent data indicate that heartburn causes a similar significant impairment of health-related well-being irrespective of whether or not esophagitis is present. These recent studies have assessed health-related well-being by the use of generally accepted indices.

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2. Erosive esophagitis is absent in more than 50% of individuals who have heartburn two or more times a week for six months

It is very important to recognize that the intensity of the symptoms has no predictive value whether or not esophagitis is present. Many data from randomized clinical trials support this.

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3. In patients with esophagitis who present with frequent episodes of heart control of the symptoms to less than 2 episodes per week is associated with healing of the esophagitis in most patients

Several clinical trials have shown that the symptom response to medical therapy is also a useful indicator of the healing of esophagitis lesions, and this is especially the case if proton pump inhibitors are used as the medical therapy.

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4. In the medical maintenance treatment of reflux disease, the therany should be stepped down to the lowest dose that controls the symptoms, and this is the case for erosive as well as non-

erosive GERD. The step-down can be guided by the symptoms without repeating endoscopy

Minimalization of cost is the dominent logic behind this statement in GERD patients with Los Angeles grade A and B. Considerable data now exist that indicate that during maintenance therapy sustained symptom relief is a sufficiently reliable predictor of maintained healing in these patients. Los Angeles grade C and D esophasitis are considered by most investigators as needing full dose maintenance therapy.

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5. Long term results of anti-reflux surgery are equivalent to those achieved with proton nump inhibitors

There are not that many studies that compare medical treatment with anti-reflux surgery after a follow-up of at least 5 years. On a shorter basis (one year of therapy) numerous studies have proven the efficacy of drug therapy. Moreover, available published comparison of anti-reflux surgery and drug therapy do not compare current state of the art approaches for both modalities.

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6. Long-term results of anti-reflux surgery are highly dependent on the clinical skill of the surgeon

There is a wide variation in efficacy reported in the literature and there is also a significant learning curve for surgeons doing laparoscopic anti-reflux surgery. This means that the results of expert reflux surgery are probably not representative for overall reflux surgery. There is no learning curve and a greater availability of expertise in drug therapy.

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JURY OPINION : M. Melange, A. Elewaut, R. Fiasse, J.J. Houben

1. The presence of reflux symptoms (heartburn, regurgitations) and/or extracorporeal symptoms must be considered for the management of GORD.

2. Heartburn causes significant impairment of health related well being irrespective or whether or not esophagitis is present.

3. In patients with proven esophagitis who present with frequent episodes of heartburn, control of the symptoms is associated with healing of the esophagitis in most patients.

4. In the medical treatment of GORD, therapy should be stepped down to the lowest dose of antisecretory drug that control the symptoms of mild erosive as well as non erosive GORD. The step down must be guided by the symptoms without repeated endoscopy. In patients with GORD related debilitating symptoms, the PPI dose necessary to maintain the patient asymptomatic can be required potentially life long.

5. Indications of anti-reflux surgery are :
- incomplete control on the long-term by medical treatment of demonstrated symptomatic esophagitis ;
- individual options
  - choice of the patient
  - young age
  - compliance
  - socio-professional consideration (the patient must be well informed)
- complications of GORD (repeated bleeding). Anti-reflux surgery may be considered in Barrett's esophagus in the setting of a multidisciplinary surveillance.

On behalf of the jury (D. Bouilliez, R. Brenard, M. Closson, J. Delwaide, P. Defrance, J. Fevery, M. Hautekeete (†), C. Melot, D. Urbain, P. Pelckmans, M. Adler).

- atypical symptoms (asthma, ENT symptoms ...) with pHmetry demonstrated reflux, not controlled by medical treatment.

6. Long-term results of PPI and anti-reflux surgery are equivalent if the dosage of PPI is adjusted according to symptoms.

7. The results of anti-reflux surgery (Nissen and Toupet procedures) are dependent on the technical expertise of the surgeon in esogastric surgery.

8. To date of age, surgery becomes more cost effective after 3 years of pharmacological treatment.

9. Following the data of the literature, postoperative mortality is about 0.2%. Postoperative morbidity ranges from 0 to 9.5% following series including gasbloating syndromes, problems of dysphagia ...

10. The results of anti-reflux surgery are not definitive and recurrence of GORD disease is possible 10 years after Nissen or Toupet procedures.