Role of laparoscopic antireflux surgery in the management of chronic GERD symptoms

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Since the first description of laparoscopic antireflux surgery in 1991 (1), there has been a rapid increase in its use and popularity (2,3). The reasons for the rapid adoption of these procedures primarily have been their early success in controlling reflux symptoms coupled with significant lowering of hospital stay, postoperative morbidity and pain, and rapid recovery following surgery (4). The wide use of proton pump inhibitors to control chronic gastroesophageal symptoms has also contributed to the increasing use of laparoscopic fundoplication (4-6). The near complete relief of symptoms offered by proton pump inhibitors and the high recurrence rate of symptoms once patients stop these medications have resulted in a large population of patients on maintenance therapy.

Many younger patients on long term proton pump inhibitors are seeking alternatives and are being referred for laparoscopic fundoplication (4). The choice of surgery over long term medication has become more common in the era of laparoscopic surgery because patients are more accepting of an operation without a large incision and long recovery period, even if the surgery still carries some risks. The proportion of patients who choose surgery even though their symptoms are well controlled on maintenance therapy is reported by some of the larger centres to be close to one-third of those undergoing laparoscopic fundoplication (4). Despite its early success, there are still some significant issues with respect to laparoscopic antireflux surgery that should be addressed further. One issue is who should perform the surgery. Increasing evidence suggests that the surgeon’s skill and experience have a direct impact on the morbidity and success of the procedure (7,8). Laparo-

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scop ic antireflux surgery requires a high degree of two-
headed laparoscopic skill and has a longer learning curve
than simpler laparoscopic procedures such as laparoscopic
cholecystectomy or appendectomy (9). Many experts
believe that any surgeon performing laparoscopic antireflux
surgery not only should be trained and familiar with all as-
pects of management of such patients, but also needs to do
a minimum of 12 procedures a year to maintain the neces-
sary level of skill.

Selection and preparation of patients also contribute
significantly to the success of surgery. The presence of sig-
nificant esophagitis in the era of proton pump therapy is
erare; thus, objective evaluation of acid reflux by 24 h pH
testing and an assessment of esophageal motor function by
esophageal manometry are necessary parts of the preopera-
tive workup of a potential surgical candidate (3). Furthermore,
ongoing follow-up of patients after surgery is essential because it allows each surgeon to evaluate his or
her results against the expected published norms (7).

Another criticism against laparoscopic antireflux surgery
is the lack of long term follow-up data. Although some four-
and five-year follow-up data are being pre-
sented or published (10), there will still be a number of
years before convincing long term data on large numbers of
patients are available. However, that laparoscopic antire-
flux surgery only differs from its open counterpart in its
method of access to the hiatus and not in the technical de-
tails should suggest that the long term outcome of these
procedures should not be significantly different from their
open counterpart with well established long term records.

CHOICE OF DIFFERENT TECHNIQUES

A number of different antireflux procedures are available
and are in use. The most common procedures used are
laparoscopic Nissen fundoplication (1) and laparoscopic
Toupet fundoplication (11). A number of other tech-
niques such as laparoscopic Hill repair (12) or Watson re-
pair (13) are offered by some centres but are not in wide
use.

Laparoscopic Nissen fundoplication is the technique of
choice for most patients. The long term follow-up of pa-

tients after open Nissen fundoplication has shown that,
when performed by a skilled surgeon, it has a 10-year suc-
cess rate of 85% to 90% (14,15). Coupled with the evi-
dence that the procedure is well tolerated even in patients
with esophageal motor abnormality (7,16) and that it is as-
associated with a low rate of unwanted postoperative symp-
toms, the success rate has made laparoscopic Nissen
fundoplication the primary choice for antireflux surgery
by most surgeons. It remains the most popular antireflux
 technique in the era of laparoscopic surgery. Performing
the procedure laparoscopically provides for a better visu-
alization of the operative field and can reduce not only the
operating time, but also the risk of intraoperative compli-
cations (7). There are a number of small technical details
with respect to performing laparoscopic Nissen fundopli-
cation, such as whether to divide short gastric vessels rou-
tinely, which is still debated and arouses interest among
surgeons but probably has no real impact on the long term
outcome of the operation (17). What does, however, ap-
pear to have an impact is the length and looseness of the
wrap. There is increasing evidence that very short (less
then 2 cm) or very loose (50 to 60 French) wraps may be
associated with a higher recurrence rate (7). To minimize
the possibility of recurrence and prevent unnecessary
postoperative complications of dysphagia and gas-bloat
syndrome, it has been demonstrated that gauging the tight-
ness of the wrap based on the status of esophageal motor
function assessed by preoperative manometry provides ex-
cellent results (4).

Laparoscopic Toupet fundoplication, in which a partial
wrapping of the fundus around the distal esophagus is con-
structed, is regarded by some surgeons as the technique of
choice in patients with abnormal esophageal motility (18).
Evidence in the literature shows that the Toupet proce-
dure is associated with lower postoperative dysphagia and
gas-bloat rates than is Nissen fundoplication, at least in the
early postoperative phase (18). Studies also show that the
increase in the high pressure zone at the lower esophageal
sphincter region is significantly less after Toupet fundopi-
lcation than after Nissen fundoplication (19) and has been
suggested as the reason for the higher recurrence rate com-
pared with Laparoscopic Nissen fundoplication. Even the
most ardent proponents of Toupet fundoplication suggest
that the procedure should be preserved for patients with
severe esophageal dysmotility or with mild reflux disease
unable to take medication (20).

LONG TERM COMPLICATIONS

OF ANTIREFLUX SURGERY

The most feared complication of antireflux surgery is
dysphagia. The incidence of postoperative dysphagia in the
immediate period after surgery remains high, but for most
patients the symptoms completely subside by six to eight
weeks after surgery (21). The incidence of long term
dysphagia after laparoscopic fundoplication (Nissen and
Toupet), however, is low (less than 3%). Three recent
studies have found that the symptom of dysphagia im-
proved after laparoscopic antireflux surgery in the major-
ity of patients (7,17,21). These results are similar to those
reported with the open fundoplication (22). A number of
factors, including an improvement in esophageal motor
function, have been suggested as possible reasons (22,23)
but have not been investigated adequately. Patients with
normal esophageal motility, or mild or moderate esophag-

eal dysmotility are recommended to have laparoscopic Nis-

sen fundoplication, while patients with severe esophageal
motor dysfunction are considered for a very loose Nissen
or a Toupet fundoplication. Those in the latter group, who
may already experience dysphagia, however, risk the possi-
bility of facing significant dysphagia for solids after sur-

gery (21). Thus, the decision to operate on these patients
should be made jointly by the surgeon, the patient and the
referring gastroenterologist. In most instances, surgery in
these patients is a last resort for complications of chronic gastroesophageal reflux disease (GERD) (most often respiratory complication) that have not responded to high doses of proton pump inhibitors.

Another significant complication of laparoscopic antireflux surgery is gas-bloat syndrome, which is reported in 1% to 3% of cases (4,7). Although many patients experience some difficulty with belching and may experience bloating after a large or rapidly ingested meal, very few develop the severe symptoms associated with gas-bloat syndrome. These patients may be treated with proton pump inhibitors or dilation of the wrap, but some may require complete reversal of the wrap if the symptoms persist. The exact etiology of gas-bloat syndrome is poorly understood. Suggestions that it may be due to a tight or a long wrap have not been supported in the literature. Recent studies have suggested that this may be due to abnormal central processing of vagal signals, but this requires further evaluation (24).

One of the most common causes of reoperation after laparoscopic antireflux surgery is development of paraesophageal herniation of the stomach through the hiatus (25). This complication is encountered after open antireflux surgery (26) but is more commonly reported after laparoscopic surgery, in part due to closer follow-up in the latter group. However, lack of adhesion formation is believed to contribute also to the development of paraesophageal hernias (27).

Several recent studies have shown that, although there is some temporary impairment of diaphragmatic function after laparoscopic fundoplication, it is substantially less than the impairment normally encountered after open antireflux surgery (28,29). This has meant that many patients with significant respiratory compromise who previously were refused open surgery can now undergo laparoscopic antireflux surgery without significant risk of morbidity or mortality.

Overall, the rate of complications after laparoscopic fundoplication in an appropriately selected patient and when performed by an experienced surgeon remains low. This has certainly been a significant factor in the rapid adoption of this technique by surgeons and its popularity among referring physicians and patients.

FOLLOW-UP DATA AVAILABLE

The best follow-up data published extend for the first two to five years after antireflux surgery (4,10,20). These data suggest that laparoscopic fundoplication increases the high pressure zone at the lower esophageal sphincter and remains an effective antireflux barrier in approximately 95% of patients over this period. However, long term (10 to 20 years) data are needed to establish completely the long term efficacy of this treatment modality.

Laparoscopic fundoplication has also been shown to be effective treatment in patients with respiratory complications of GERD, particularly chronic cough (30) and pulmonary fibrosis secondary to repeat aspiration pneumonia (31), who often do not respond adequately to medical therapy.

The hospital cost of laparoscopic fundoplication in Canada is about $2500 to $3000 (32). Even with the addition of time lost from work after surgery, it is likely that this modality is more cost effective in patients who require proton pump therapy for longer than three years.

SUMMARY

The recent adoption of laparoscopic techniques has significantly reduced the hospital stay and postoperative recovery after antireflux surgery. Early results suggest that this surgery remains effective in the majority (90% or more) of patients followed for up to five years. Laparoscopic Nissen fundoplication is the technique of choice for most surgeons. Appropriate selection of patients with full preoperative workup, including 24 h pH testing, esophageal manometry and endoscopy, is recommended. The complication rate after this surgery is low and is in part related to the skill and experience of the surgeon.

Laparoscopic antireflux surgery has the potential to offer a significant clinical alternative to a large number of reflux patients on maintenance therapy with proton pump inhibitors. It should be considered in all patients who require long term therapy and who do not have significant surgical risk factors.

The last Canadian Consensus conference on GERD recommended a prospective randomized trial to assess the cost effectiveness of laparoscopic fundoplication in the treatment of chronic GERD symptoms in patients on maintenance medical therapy.

REFERENCES


