

World Journal of *Gastroenterology*

World J Gastroenterol 2019 December 28; 25(48): 6876-6958



**EDITORIAL**

- 6876** Wrap choice during fundoplication
Bramhall SR, Mourad MM

OPINION REVIEW

- 6880** Gastric electrical stimulation: An emerging therapy for children with intractable gastroparesis
Setya A, Nair P, Cheng SX

ORIGINAL ARTICLE**Basic Study**

- 6890** Comprehensive multi-omics analysis identified core molecular processes in esophageal cancer and revealed GNGT2 as a potential prognostic marker
Liu GM, Ji X, Lu TC, Duan LW, Jia WY, Liu Y, Sun ML, Luo YG

Case Control Study

- 6902** Diagnostic and prognostic value of lncRNA cancer susceptibility candidate 9 in hepatocellular carcinoma
Zeng YL, Guo ZY, Su HZ, Zhong FD, Jiang KQ, Yuan GD

Retrospective Study

- 6916** Operative complications and economic outcomes of cholecystectomy for acute cholecystitis
Rice CP, Vaishnavi KB, Chao C, Jupiter D, Schaeffer AB, Jenson WR, Griffin LW, Mileski WJ

Observational Study

- 6928** Hepatitis C virus eradication with directly acting antivirals improves health-related quality of life and psychological symptoms
Nardelli S, Riggio O, Rosati D, Gioia S, Farcomeni A, Ridola L

Prospective Study

- 6939** Significance of postoperative follow-up of patients with metastatic colorectal cancer using circulating tumor DNA
Benešová L, Hálková T, Ptáček R, Semyakina A, Menclová K, Pudil J, Ryska M, Levý M, Šimša J, Pazdírek F, Hoch J, Blaha M, Minárik M

CASE REPORT

- 6949** Pulmonary tumor thrombotic microangiopathy of hepatocellular carcinoma: A case report and review of literature
Morita S, Kamimura K, Abe H, Watanabe-Mori Y, Oda C, Kobayashi T, Arao Y, Tani Y, Ohashi R, Ajioka Y, Terai S

ABOUT COVER

Editorial board member of *World Journal of Gastroenterology*, Fabio Grizzi, PhD, Assistant Professor, Department of Immunology and Inflammation, Humanitas Clinical and Research Hospital, Rozzano 20089, Italy

AIMS AND SCOPE

The primary aim of *World Journal of Gastroenterology* (WJG, *World J Gastroenterol*) is to provide scholars and readers from various fields of gastroenterology and hepatology with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJG mainly publishes articles reporting research results and findings obtained in the field of gastroenterology and hepatology and covering a wide range of topics including gastroenterology, hepatology, gastrointestinal endoscopy, gastrointestinal surgery, gastrointestinal oncology, and pediatric gastroenterology.

INDEXING/ABSTRACTING

The WJG is now indexed in Current Contents®/Clinical Medicine, Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports®, Index Medicus, MEDLINE, PubMed, PubMed Central, and Scopus. The 2019 edition of Journal Citation Report® cites the 2018 impact factor for WJG as 3.411 (5-year impact factor: 3.579), ranking WJG as 35th among 84 journals in gastroenterology and hepatology (quartile in category Q2). CiteScore (2018): 3.43.

RESPONSIBLE EDITORS FOR THIS ISSUE

Responsible Electronic Editor: Yan-Liang Zhang

Proofing Production Department Director: Xiang Li

NAME OF JOURNAL

World Journal of Gastroenterology

ISSN

ISSN 1007-9327 (print) ISSN 2219-2840 (online)

LAUNCH DATE

October 1, 1995

FREQUENCY

Weekly

EDITORS-IN-CHIEF

Subrata Ghosh, Andrzej S Tarnawski

EDITORIAL BOARD MEMBERS

<http://www.wjgnet.com/1007-9327/editorialboard.htm>

EDITORIAL OFFICE

Ze-Mao Gong, Director

PUBLICATION DATE

December 28, 2019

COPYRIGHT

© 2019 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Wrap choice during fundoplication

Simon R Bramhall, Moustafa M Mourad

ORCID number: Simon R Bramhall (0000-0003-3313-047X); Moustafa M Mourad (0000-0001-5557-2725).

Author contributions: Bramhall SR and Mourad MM contributed to concept of manuscript, manuscript review, accuracy check; Bramhall SR wrote the manuscript.

Conflict-of-interest statement: Neither Dr. Bramhall or Dr. Mourad has nothing to disclose.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Invited manuscript

Received: October 21, 2019

Peer-review started: October 21, 2019

First decision: November 26, 2019

Revised: December 3, 2019

Accepted: December 22, 2019

Article in press: December 22, 2019

Published online: December 28, 2019

P-Reviewer: Armellini E, Martini F, Mayol J, Savarino V, Schietroma M

S-Editor: Gong ZM

L-Editor: A

Simon R Bramhall, Department of Surgery, The County Hospital, Hereford HR1 2ER, United Kingdom

Moustafa M Mourad, Department of Surgery, Worcester Royal Infirmary, Worcester WR5 1DD, United Kingdom

Corresponding author: Simon R Bramhall, MD, FRCS (Gen Surg), Attending Doctor, Surgeon, Department of Surgery, The County Hospital, Union Walk, Hereford HR1 2ER, United Kingdom. simon.bramhall@wvt.nhs.uk

Abstract

Gastro-oesophageal reflux disease is an increasing health burden. The mainstay of treatment has conventionally been medical therapy but since the introduction of laparoscopic surgery laparoscopic anti-reflux surgery has been increasingly used for intractable symptoms or in patients unwilling to take long term medication. The Nissen 360 degree wrap has traditionally been considered the gold standard operation but can be associated with significant complications. These complications include "gas bloat" and dysphagia and can occur relatively frequently. Various modifications have been described to the original operation and some of these have been described. In addition alternative wraps have been described which seem to have a reduced incidence of complications associated with their use. This editorial discusses the various types of wrap that can be performed and the minimum requirements of the surgical technique. The evidence from a recent meta-analysis of the randomised data has suggested that an anterior wrap is associated with a lower rate of complications and gives just as good control of reflux symptoms. The advantages and disadvantages of an anterior wrap are discussed. The lack of long term follow up data concerns some practitioners and at the moment the choice of wrap carried out still rests with the individual surgeon.

Key words: Fundoplication; Wrap; Laparoscopic; Reflux disease; Choice

©The Author(s) 2019. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: The type of wrap chosen during a laparoscopic fundoplication will be decided by the surgeon but the evidence suggests that an anterior wrap is associated with less complications than a full posterior wrap and gives just as good control of reflux.

Citation: Bramhall SR, Mourad MM. Wrap choice during fundoplication. *World J Gastroenterol* 2019; 25(48): 6876-6879

E-Editor: Ma YJ

URL: <https://www.wjgnet.com/1007-9327/full/v25/i48/6876.htm>DOI: <https://dx.doi.org/10.3748/wjg.v25.i48.6876>

INTRODUCTION

Gastro-oesophageal reflux disease (GORD) is a common disorder and the prevalence is increasing. GORD represents a considerable healthcare burden and has significant effects on patients quality of life.

Since the first laparoscopic Nissen fundoplication (LNF) was described in 1991^[1] there have been many studies of antireflux surgery reported and laparoscopic fundoplication is now an established treatment of GORD^[2]. Anti-reflux surgery has evolved over the years with increasing practitioner experience and advances in laparoscopic techniques. These advances have led to a safer and more satisfactory outcome for many patients, with a reduction in requirements for open surgery, shorter length of stay and more cost effective healthcare.

SURGICAL OPTIONS

LNF is considered the gold standard surgical procedure and is the most widely used fundoplication variant for the treatment of gastro-oesophageal reflux disease but it is complicated by a number of unwanted functional disorders such as dysphagia and gas bloat syndrome. These symptoms have been reported to occur at very high rates in the initial post-operative period, although troublesome dysphagia persists in up to 10% of patients at a year^[3-5] and only between 1% and 10% of patients require reoperation with up to 25% requiring balloon dilation at endoscopy^[4,6].

In an attempt to reduce the incidence of these complications post fundoplication a number of modifications and variants have been suggested. Some authors have reported routine division of the short gastric vessels but randomized controlled data has suggested no difference in dysphagia either in the short or long term but has suggested a slight increase in post-operative epigastric bloating^[7,8]. The consensus of opinion is therefore that the short gastric vessels only need to be divided if it is required to achieve a tension free fundoplication. Leaving the crura untouched and minimal dissection techniques have also been proposed as a means of reducing post-operative dysphagia but these have never been tested in a randomized manner^[9]. Although the evidence is not strong, most would however advocate hiatal closure if the defect is moderate or large^[10]. A single randomized study has reported on the use of a 56 French bougie placed in the oesophagus during construction of the fundoplication. This study did report a reduced incidence of dysphagia at a short follow up period, it also reported a small (1.2%) incidence of oesophageal injury secondary to the bougie and on this basis a bougie is not widely used^[11].

A number of alternative wraps have been described to try to address the functional problems associated with a full 360-degree Nissen fundoplication. The wrap types can be split into posterior wraps where the stomach is wrapped behind the oesophagus. These include both the Nissen fundoplication and the 270-degree posterior Toupet wrap. Alternatively, anterior wraps where the stomach is passed anterior to the oesophagus such as the 180-200 degree Watson or Dor wraps. Anything less than a 180° wrap has been dismissed as inadequate^[12].

Partial wraps were initially reported as advantageous in patients with reduced oesophageal motility and therefore potentially at higher risk of post-operative dysphagia but recent evidence has suggested that this is not necessarily correct^[13,14].

The choice of wrap has traditionally been based on anatomic considerations and surgeon preference. The lack of standardization can make comparison of techniques difficult but most surgeons would accept that the following should occur: (1) Crural repair with non-absorbable sutures; (2) Vagal preservation; (3) A mobilization of at least 3cm of intra-abdominal oesophagus; (4) A tension free wrap with or without division of the short gastric vessels; and (5) A 1.5 to 2 cm wrap incorporating the anterior wall of the oesophagus with at least one suture.

COMPARISON BETWEEN FULL AND PARTIAL WRAPS

There have been a number of randomized controlled trials that have compared the

outcomes of both full and partial posterior^[15,16] and posterior with anterior fundoplication^[17-19]. The evidence suggests that there is little difference in post-operative dysphagia when comparing full and partial posterior fundoplication^[20] and while the evidence from the randomized trials comparing posterior with anterior fundoplication was mixed. A recent meta-analysis has reported that both anterior and posterior fundoplication are equally effective at controlling reflux symptoms the 180° anterior fundoplication is associated with a lower incidence of post-operative dysphagia^[21]. As a consequence an anterior fundoplication is associated with fewer re-operations (carried out for dysphagia).

In addition to these data, there are technical factors to consider when comparing anterior and posterior fundoplication. There is little doubt that the 180° anterior fundoplication is simpler to perform but the requirement to anchor the fundoplication to the right crus means that re-operation for recurrent symptoms requires more dissection to release the attachments.

The evidence therefore would suggest that the fundoplication associated with the lowest rates of unwanted post-operative symptoms is an anterior 180° fundoplication. This fundoplication will provide an acceptable level of symptom control and patient satisfaction but in the event of the patient requiring further surgery, this type of fundoplication might increase the complexity of that redo surgery. This however, needs to be balanced against the reduce requirement for intervention for post-operative dysphagia.

CONCLUSION

There is a paucity of long-term follow up data in this field and this has led to practitioners who favour the full posterior fundoplication to question some of the data presented. Ultimately, the decision regarding the type of fundoplication performed will rest with the surgeon and be based on their experience, their preference and the individual patient.

REFERENCES

- 1 **Dallemagne B**, Weerts JM, Jehaes C, Markiewicz S, Lombard R. Laparoscopic Nissen fundoplication: preliminary report. *Surg Laparosc Endosc* 1991; **1**: 138-143 [PMID: 1669393]
- 2 **Pauwels A**, Boecxstaens V, Andrews CN, Attwood SE, Berrisford R, Bisschops R, Boeckxstaens GE, Bor S, Bredenoord AJ, Cicala M, Corsetti M, Fornari F, Gyawali CP, Hatlebakk J, Johnson SB, Lerut T, Lundell L, Mattioli S, Miwa H, Naftoux P, Omari T, Pandolfino J, Penagini R, Rice TW, Roelandt P, Rommel N, Savarino V, Sifrim D, Suzuki H, Tutuian R, Vanuytsel T, Vela MF, Watson DI, Zerbib F, Tack J. How to select patients for antireflux surgery? The ICARUS guidelines (international consensus regarding preoperative examinations and clinical characteristics assessment to select adult patients for antireflux surgery). *Gut* 2019; **68**: 1928-1941 [PMID: 31375601 DOI: 10.1136/gutjnl-2019-318260]
- 3 **Pessaux P**, Arnaud JP, Delattre JF, Meyer C, Baulieux J, Mosnier H. Laparoscopic antireflux surgery: five-year results and beyond in 1340 patients. *Arch Surg* 2005; **140**: 946-951 [PMID: 16230543 DOI: 10.1001/archsurg.140.10.946]
- 4 **Triponez F**, Dumonceau JM, Azagury D, Volonte F, Slim K, Mermillod B, Huber O, Morel P. Reflux, dysphagia, and gas bloat after laparoscopic fundoplication in patients with incidentally discovered hiatal hernia and in a control group. *Surgery* 2005; **137**: 235-242 [PMID: 15674207 DOI: 10.1016/j.surg.2004.07.016]
- 5 **Brehant O**, Pessaux P, Arnaud JP, Delattre JF, Meyer C, Baulieux J, Mosnier H; Association Française de Chirurgie. Long-term outcome of laparoscopic antireflux surgery in the elderly. *J Gastrointest Surg* 2006; **10**: 439-444 [PMID: 16504893 DOI: 10.1016/j.gassur.2005.06.017]
- 6 **Menon VS**, Manson JM, Baxter JN. Laparoscopic fundoplication: learning curve and patient satisfaction. *Ann R Coll Surg Engl* 2003; **85**: 10-13 [PMID: 12585623 DOI: 10.1308/00358840321001345]
- 7 **Yang H**, Watson DI, Lally CJ, Devitt PG, Game PA, Jamieson GG. Randomized trial of division versus nondivision of the short gastric vessels during laparoscopic Nissen fundoplication: 10-year outcomes. *Ann Surg* 2008; **247**: 38-42 [PMID: 18156921 DOI: 10.1097/SLA.0b013e31814a693e]
- 8 **O'Boyle CJ**, Watson DI, Jamieson GG, Myers JC, Game PA, Devitt PG. Division of short gastric vessels at laparoscopic nissen fundoplication: a prospective double-blind randomized trial with 5-year follow-up. *Ann Surg* 2002; **235**: 165-170 [PMID: 11807353 DOI: 10.1097/0000658-200202000-00001]
- 9 **Victorzon M**, Tolonen P. Symptomatic outcome of laparoscopic fundoplication, using a minimal dissection technique. *Scand J Surg* 2003; **92**: 138-143 [PMID: 12841554 DOI: 10.1177/145749690309200205]
- 10 **SAGES**. Guidelines for surgical treatment of gastroesophageal reflux disease (GERD). Available from: <https://www.sages.org/publications/guidelines/guidelines-for-surgical-treatment-of-gastroesophageal-reflux-disease-gerd/>
- 11 **Patterson EJ**, Herron DM, Hansen PD, Ramzi N, Standage BA, Swanström LL. Effect of an esophageal bougie on the incidence of dysphagia following nissen fundoplication: a prospective, blinded, randomized clinical trial. *Arch Surg* 2000; **135**: 1055-61; discussion 1061-2 [PMID: 10982510 DOI: 10.1001/archsurg.135.9.1055]
- 12 **Engström C**, Lönroth H, Mardani J, Lundell L. An anterior or posterior approach to partial fundoplication? Long-term results of a randomized trial. *World J Surg* 2007; **31**: 1221-5; discussion 1226-7 [PMID: 17453284 DOI: 10.1007/s00268-007-9004-8]

- 13 **Booth MI**, Stratford J, Jones L, Dehn TC. Randomized clinical trial of laparoscopic total (Nissen) versus posterior partial (Toupet) fundoplication for gastro-oesophageal reflux disease based on preoperative oesophageal manometry. *Br J Surg* 2008; **95**: 57-63 [PMID: [18076018](#) DOI: [10.1002/bjs.6047](#)]
- 14 **Strate U**, Emmermann A, Fibbe C, Layer P, Zornig C. Laparoscopic fundoplication: Nissen versus Toupet two-year outcome of a prospective randomized study of 200 patients regarding preoperative esophageal motility. *Surg Endosc* 2008; **22**: 21-30 [PMID: [18027055](#) DOI: [10.1007/s00464-007-9546-8](#)]
- 15 **Mardani J**, Lundell L, Engström C. Total or posterior partial fundoplication in the treatment of GERD: results of a randomized trial after 2 decades of follow-up. *Ann Surg* 2011; **253**: 875-878 [PMID: [21451393](#) DOI: [10.1097/SLA.0b013e3182171c48](#)]
- 16 **Watson A**, Jenkinson LR, Ball CS, Barlow AP, Norris TL. A more physiological alternative to total fundoplication for the surgical correction of resistant gastro-oesophageal reflux. *Br J Surg* 1991; **78**: 1088-1094 [PMID: [1933193](#) DOI: [10.1002/bjs.1800780918](#)]
- 17 **Watson A**, Spychal RT, Brown MG, Peck N, Callander N. Laparoscopic 'physiological' antireflux procedure: preliminary results of a prospective symptomatic and objective study. *Br J Surg* 1995; **82**: 651-656 [PMID: [7613942](#) DOI: [10.1002/bjs.1800820527](#)]
- 18 **Cai W**, Watson DI, Lally CJ, Devitt PG, Game PA, Jamieson GG. Ten-year clinical outcome of a prospective randomized clinical trial of laparoscopic Nissen versus anterior 180(degrees) partial fundoplication. *Br J Surg* 2008; **95**: 1501-1505 [PMID: [18942055](#) DOI: [10.1002/bjs.6318](#)]
- 19 **Raue W**, Ordemann J, Jacobi CA, Menenakos C, Buchholz A, Hartmann J. Nissen versus Dor fundoplication for treatment of gastroesophageal reflux disease: a blinded randomized clinical trial. *Dig Surg* 2011; **28**: 80-86 [PMID: [21293136](#) DOI: [10.1159/000323630](#)]
- 20 **Du X**, Hu Z, Yan C, Zhang C, Wang Z, Wu J. A meta-analysis of long follow-up outcomes of laparoscopic Nissen (total) versus Toupet (270°) fundoplication for gastro-esophageal reflux disease based on randomized controlled trials in adults. *BMC Gastroenterol* 2016; **16**: 88 [PMID: [27484006](#) DOI: [10.1186/s12876-016-0502-8](#)]
- 21 **Du X**, Wu JM, Hu ZW, Wang F, Wang ZG, Zhang C, Yan C, Chen MP. Laparoscopic Nissen (total) versus anterior 180° fundoplication for gastro-esophageal reflux disease: A meta-analysis and systematic review. *Medicine (Baltimore)* 2017; **96**: e8085 [PMID: [28906412](#) DOI: [10.1097/MD.0000000000008085](#)]



Published By Baishideng Publishing Group Inc
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-2238242
E-mail: bpgoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>

