WCJD 世界华人消化杂志®

在线投稿: http://www.baishideng.com/wcjd/ch/index.aspx
帮助平台: http://www.wjgnet.com/esps/helpdesk.aspx
DOI: 10.11569/wcjd.v24.i20.3087

世界华人消化杂志 2016年7月18日; 24(20): 3087-3097
ISSN 1009-3079 (print) ISSN 2219-2859 (online)

述评 EDITORIAL

食管裂孔疝的腹腔镜治疗

王文凭, 倪彭智, 陈龙奇

王文凭, 倪彭智, 陈龙奇, 四川大学华西医院胸外科 四川省成都市 610041

陈龙奇, 教授, 博士生导师, 主要从事食管疾病的基础与临床方向的研究.

作者贡献分布: 王文凭完成论文初稿写作; 倪彭智完成部分文献查阅与数据的统计分析; 陈龙奇完成课题的整体设计与论文修改.

通讯作者: 陈龙奇, 教授, 博士生导师, 610041, 四川省成都市国学巷37号, 四川大学华西医院胸外科. drchenlq@scu.edu.cn

收稿日期: 2016-04-05
修回日期: 2016-04-25
接受日期: 2016-05-03
在线出版日期: 2016-07-18

Laparoscopic surgical treatment of esophageal hiatal hernia

Wen-Ping Wang, Peng-Zhi Ni, Long-Qi Chen

Wen-Ping Wang, Peng-Zhi Ni, Long-Qi Chen, Department of Thoracic Surgery, West China Hospital Affiliated to Sichuan University, Chengdu 610041, Sichuan Province, China

Correspondence to: Long-Qi Chen, Professor, Department of Thoracic Surgery, West China Hospital Affiliated to Sichuan University, 37 Guoxue Alley, Chengdu 610041, Sichuan Province, China. drchenlq@scu.edu.cn

Received: 2016-04-05
Revised: 2016-04-25
Accepted: 2016-05-03
Published online: 2016-07-18

Abstract

Types II, III and IV esophageal hiatal hernia (EHH) which presents obvious symptoms or leads to potentially fatal complications requires surgical treatment. Laparoscopy has been used to repair EHH in the last two decades globally and proved to be minimally invasive compared to conventional open surgery. This review summarizes current status and prospectives of laparoscopic application in EHH treatment. The published articles on minimally invasive laparoscopic surgical treatment of EHH in PubMed, Cochrane Library and EMBASE databases were retrieved and analyzed. From 1992 to 2015, 86 English articles involving a total of 4771 patients receiving laparoscopic treatment for EHH were retrieved. Perioperative information including safety and feasibility of procedure, postoperative complications, and short/long-term outcome after laparoscopic repair was retrospectively analyzed. Laparoscopic surgical treatment of EHH is a safe, feasible and minimally invasive procedure with fast recovery after repair, low postoperative morbidity and recurrence.

Key Words: Esophageal hiatal hernia; Minimally invasive surgery; Laparoscope

Wang WP, Ni PZ, Chen LQ. Laparoscopic surgical treatment of esophageal hiatal hernia. Shijie Huaren Xiaohua Zazhi 2016; 24(20): 3087-3097 URL: http://www.wjgnet.com/1009-3079/full/v24/i20/3087.htm DOI: http://dx.doi.org/10.11569/wcjd.v24.i20.3087

摘要

食管裂孔疝根据分型, 其II、III、IV型因为明显的临床症状和可能的致命并发症, 通常需要及时的外科手术治疗. 在过去的二十

背景资料
外科修补是食管裂孔疝的主要治疗手段, 随着微创外科技术的进步, 其在食管裂孔疝的治疗中也逐渐广泛应用, 微创手术的安全性、有效性如何? 本文梳理了相关大量文献, 进行了综合分析.

同行评议者
常丽丽, 主任医师, 石家庄市第一医院消化内科; 谢义民, 副主任医师, 重庆三峡中心医院二外儿科

研发前沿
合成补片用于部分情况下需用于食管裂孔疝的修补, 理想的补片材料具有高强度、高组织相容性、对周围组织器官损伤小等优点, 目前还不能达到理想条件的人工补片材料, 还需进一步的实验室研究.

年间, 腹腔镜逐步应用于食管裂孔疝的手术治疗, 并显示出作为微创外科的优势, 代替了相当部分传统的开放式手术, 目前已在全球多家医疗单位开展. 本文拟对当前腹腔镜用于治疗食管裂孔疝的现状及未来展望予以综述. 通过PubMed、Cochrane Library、EMBASE等数据库检索关于食管裂孔疝微创手术治疗的文献报道. 通过检索, 删除参考价值不大的文献, 自1992-2015年, 共有86篇英文文献介绍食管裂孔疝的腹腔镜治疗, 共计纳入4771例患者. 本文总结了腹腔镜在食管裂孔疝修补中的特点, 包括: 安全性、技术可行性、术后康复、并发症以及术后短长期治疗效果等指标. 经过二十余年的发展, 相比较开放式手术, 腹腔镜修补食管裂孔疝是一项安全、技术可行、微创、术后恢复快、低并发症的外科技术, 并具有较低的术后复发率, 应用前景广阔.

关键词: 食管裂孔疝; 微创外科; 腹腔镜

核心提示: 本文可为读者提供食管裂孔疝微创外科治疗方面较为全面的信息, 指导手术治疗, 指导手术指针及手术方式的选择, 规避相关围术期风险, 并对发展前景提出了思考及见解.

王文凭, 倪彭智, 陈龙奇. 食管裂孔疝的腹腔镜治疗. 世界华人消化杂志 2016; 24(20): 3087-3097 URL: http://www.wjgnet.com/1009-3079/full/v24/i20/3087.htm DOI: http://dx.doi.org/10.11569/wcjd.v24.i20.3087

0 引言

1853年, Bowditch报道了第一例食管裂孔疝(esophageal hiatal hernia, HH)[1], 根据食管胃交界部的位置和疝内容物分为四型: Ⅰ型, 滑动性食管裂孔疝; Ⅱ型, 食管旁疝; Ⅲ型, 混合型食管裂孔疝; Ⅳ型, 复杂型, 疝内容物尚包括除胃之外的其他腹腔器官(如结肠、脾脏、网膜等)[2]. Ⅱ、Ⅲ、Ⅳ型裂孔疝常因为其明显的临床症状, 并可导致威胁患者生命的并发症, 通常需要积极的外科手术治疗. 1919年, Soresi通过缝合膈肌食管裂孔, 完成了世界上第一例食管裂孔疝修补手术[1]. 在这之后, 外科手术开始成为食管裂孔疝的主要治疗手段, 并逐渐演化为几个标准手术步骤: (1)胃及疝内容物的还纳入腹; (2)疝囊的完整切除; (3)食管裂孔的缝合修补; (4)胃固定或折叠术[3-5]. 世界上第1例腹腔镜下食管裂孔疝手术于1992年英国Dundee大学Cuschieri等[6]首先报道. 到目前为止, 腹腔镜食管裂孔疝修补应用愈来愈广泛, 甚至拓展到新生儿和小儿患者的裂孔疝修补[7], 以及食管裂孔疝急诊手术的修补等[8]. 同时, 不断还有新的微创方式被应用于食管裂孔疝的手术治疗, 如机器人辅助微创手术系统(达芬奇系统)[9,10]. 但作为一门新兴的外科技术, 仍存在各方面的挑战, 表1总结了过去20余年间, 报道例数大于50例的腹腔镜食管裂孔疝修补术[11-28].

1 食管裂孔疝腹腔镜修补术并发症和死亡分析

腹腔镜食管裂孔疝修补目前被普遍认为是安全和可行的外科技术, 患者整体创伤小, 术后恢复快, 并发症发生率低[29]. 报道的并发症发生率在0%-28%[13,28]. 而并发症主要包括术中并发症, 如食管穿孔、胃穿孔、气胸、胸膜破损、出血和高二氧化碳血症, 以及术后并发症, 如肺炎、胸腔积液、心律失常、手术部位感染等. 其他因素, 如年龄, 术前ASA分级, 和手术类型, 也会影响术后并发症的发生[12]. 同时, 需要手术的食管裂孔疝患者往往是老年人, 许多人在60岁以上, 并存在多种术前合并症的情况, 虽然相比于年轻患者, 术后并发症发生率明显偏高, 但腹腔镜仍是老年患者的首选手术方式[14,17,30,31]. 报道[16,18,20,21,23,25,28]的术后死亡率介于0%-2.40%之间. 表2进一步总结了文献报道术中或术后的死亡原因[11-14,16,24,26,27,32-35]. 这些死亡原因中, 如食管瘘、胃瘘和延迟性脾出血, 一定程度上与术中医源性损伤相关, 并是可以预防的. 大部分手术技术相关的并发症出现于文献报道病例中的前1/3部分, 可见腹腔镜修补裂孔疝对于外科医生而言, 存在一个较长的学习曲线[26].

如前所述, 腹腔镜裂孔疝修补一般包括胃及疝内容物的还纳入腹, 疝囊的完整切除, 扩张裂孔的缝合修补, 胃固定或折叠术等手术内容, 这与开腹手术差异不大, 但手术时间一般要长于开腹[36]. 已报道的腹腔镜手术时间为88-220 min不等[18,21], 值得一提的是, 外科医生的操作经验能明显影响手术时间、中转开腹率和术后住院时间[37]. Agwunobi等[33]和Rosenberg等[38]分别报道了简化的腹腔镜裂孔疝修补方案和快速通路手术方案, 仅将胃还纳入腹, 并于腹壁行胃固定术, 省去了疝囊切除

表 1 腹腔镜食管裂孔疝修补术的大样本报道

作者	n	患者平均年龄(岁)	平均手术时间(min)	中转开腹比例(%)	术后平均住院时间(d)	并发症发生率(%)	死亡率(%)
Luketich等[11]2010	662	70(19-92)	-	1.51	3.0	13.00	1.70
Larusson等[12]2009	354	64(23-90)	-	5.65	-	15.30	0.80
Pierre等[13]2002	200	67	-	1.50	3.0	28.00	0.50
Gangopadhyay等[14]2006	171	65 ± 15	173 ± 49	0.00	-	-	0.58
Andujar等[15]2004	166	68	160	1.20	3.9	8.40	-
Mattar等[16]2002	125	64(18-92)	218(55-426)	2.40	3.9	11.20	2.40
Diaz等[17]2003	116	65 ± 13	-	-	-	4.31	1.72
Luketich等[18]2000	100	68	220(120-690)	3.00	2.0	25.00	0.00
Gebhart等[19]2013	92	64	-	0.00	2.0	5.50	0.00
Poncet等[20]2010	89	65.8(14-87)	-	4.49	5.0	10.11	0.00
Dallemagne等[21]2011	85	66(37-85)	88(40-150)	0.00	3.0	9.00	0.00
Zehetner等[22]2010	73	69(60-76)	160(132-188)	9.59	3.0	11.00	0.00
Perdikis等[23]1997	65	63.6(26-90)	120	3.08	2.0	3.08	0.00
Wiechmann等[24]2001	60	53	202 ± 81	10.00	-	-	1.67
Huntington等[25]1997	58	67.3(24-90)	115	1.72	2.8	7.00	0.00
Gantert等[26]1998	55	67(35-102)	219	9.09	2.4	9.00	1.82
Leeder等[27]2003	53	71(45-92)	129(65-210)	7.55	2.0	11.32	1.89
Champion等[28]2003	52	57(32-77)	101(40-150)	-	-	0.00	0.00

表 2 食管裂孔疝腹腔镜修补术死亡原因总结

死亡原因	报道文献	死亡(n)
食管瘘	[13,16,24,32]	5
胃瘘	[16,27,33]	3
心肌梗塞	[14,34]	2
肺栓塞	[26]	1
ARDS	[35]	1
延迟性脾出血	[35]	1
未提及	[11,12]	14

ARDS: 急性呼吸窘迫综合征.

和裂孔缝合, 该方案旨在减少手术与麻醉时间以降低并发症发生率, 特别是针对老年患者, 通过此番简化, 手术时间可分别缩至25-45 min和75 min, 但术后裂孔疝复发率却明显增高, 故其推广价值还需商榷. 腹腔镜裂孔疝修补的术后住院时间为2-5 d[18,20,23,27], 这显著低于开腹手术[22,36], 另外, 年龄、ASA分级、并发症等因素也可影响术后住院时间[12]. 相比开放手术, 腹腔镜术后的患者快速恢复是其巨大优势, 除住院时间缩短外, 还包括如早日可恢复经口进食, 早日可回归正常社会活动等, 多数患者在术后1-3 wk即可完全恢复正常的工作生活状态[23,39-41]. 另一方面, 患者在手术期间的疼痛体验相比开放式手术明显减少, 腹部的微创切口一般都能达到的良好、美观的愈合效果.

2 中转开腹分析

有报道[42]对于复杂食管裂孔疝, 可采用胸腔镜进行疝囊的切除和食管的松解, 疝修补和胃底折叠则由腹腔镜完成, 也是一种较好的解决思路. 在腹腔镜裂孔疝修补术的报道中, 有报道[14,21,24]最高10%的患者因为各种原因无法继续实施腹腔镜手术, 需要中转开腹, 相关中转开腹原因及发生情况如表3[11-13,15,16,18,20,22-27,30,33,36,40,43-58]. 对我们检索到的所有文献进行整合计算, 整体的中转开腹率为2.70%(129/4771), 最常见的原因包括疝囊严重黏连、腹腔黏连、出血、食管损伤和胃损伤等.

3 腹腔镜手术效果评估

3.1 患者症状改善的评估 对需手术治疗的食管裂孔疝患者, 常规的术前评估包括完整的症状记录、体格检查、上消化道造影和上消化道内镜检查. 食管功能测定和食管pH监测一般未作为常规. 常见的食管裂孔疝症状包括胃食管反流症状(烧心、非典型胸痛), 梗阻症状(吞咽困难、呕吐、胀气感、就餐时易饱), 上消化道出血症状(呕血、隐匿性出血、缺铁性贫

创新盘点
本文在大量文献报道的基础上, 对食管裂孔疝微创治疗的各项指标进行提炼、分析、总结, 涵盖信息量大, 时间跨度长, 内容全面.

同行评价
本文涉及知识面广, 与食管裂孔疝外科治疗发展方向同步, 有创新性和可读性.

表 3 食管裂孔疝腹腔镜修补术中转开腹原因

中转开腹原因	报道文献	例数(*n*)
疝囊严重黏连	[11,13,15,16,18,20,23,24,26,33,36,43–47]	35
腹腔黏连	[27,48]	9
出血	[11,26,36,49,50]	8
食管损伤	[16,22,24,51,52]	7
胃损伤	[11,23,26,38]	5
食管裂孔暴露不佳	[20,30,40,43]	4
体位受限	[22,36]	3
短食管	[52,53]	2
高碳酸血症	[26]	1
气胸伴气道压升高	[36]	1
腔镜下无法缝合裂孔	[36]	1
未提及	[12,22,25,54–58]	53
总计		129

血), 肺部并发症(餐后气紧、夜间误吸、反流所致的哮喘), 疼痛症状(上腹痛、胸痛、吞咽痛), 食欲不振, 恶心感, 体质量减轻, 以及便秘等[18,39,40,52,59-62], 这些症状有些可持续数十年. 另外, 绝大多数患者是几个症状同时具备, 也有极少部分患者可以无任何症状表现[63]. 需要注意的是, 食管裂孔疝的患者, 都存在潜在的致命性并发症风险, 如急性胃嵌顿、胃扭转、心肺受压、消化道穿孔等, 这些都是急诊手术的绝对指针[64].

症状描述通常受患者的主观感受左右, 难以建立统一的客观性. 早期的文献中, 作者一般仅根据患者描述的症状减轻程度及对手术效果的满意程度, 进行术前术后的比较和评估. 现在, 越来越多的症状问卷量表应用在围术期的评估中, 代替了过去简单的患者描述, 以求建立较为“客观”的症状评估系统. Andujar等[15]最早报道了应用可视化模拟评分(Visual Analogue Scores, VAS)评价腹腔镜治疗食管裂孔疝的效果, 评分等级划分为0-10, 患者在烧心、反流、吞咽困难、胸痛诸多指标上, 术后较之术前可有平均4.7的显著改善. 胃食管反流疾病相关生活质量评分(Gastroesophageal Reflux Disease Health-Related Quality of Life, GERD-HRQOL)应用最广, 而据此评分, 86.7%-91.3%的手术患者对腹腔镜手术效果评价为好或出色[11,22,36,45,51]. 同时, 其他的症状评分系统的结果也显示了腹腔镜食管裂孔疝术后症状显著改善, 如Eypasch指数[65], 胃肠症状评定量表(GSRS)[51], 反流和消化不良生活质量评分(QOLRAD)[30,66,67], 胃肠生活质量指数评分[21]等.

3.2 客观检查指标对手术效果的评估 除了主观症状描述外, 客观的检查指标能够提供更准确的数据. 上消化道造影、上消化道内镜、食管pH检测、食管测压检查, 这4项是临床中用于诊断食管裂孔疝, 以及评估其严重程度和术后改善的有力工具. 术前内镜常用来观察反流症状, 通过测量食管胃交界部与膈肌压迹的距离, 辅助证明裂孔疝的诊断[68], 内镜下的表现主要有食管炎, Barrett's食管和反流内容物等[20,58]. 腹腔镜修补术后胃镜检查的资料报道相对较少, 这可能与其未作为术后常规有关, Zaninotto等[63]在术后36 mo复查胃镜, 显示6.67%的患者存在食管炎, 对比术前51%的比例有大幅改善. 也有部分外科医生应用胃镜术中监测有无食管或胃穿孔发生, 以策安全[15].

食管测压和pH监测在食管裂孔疝腹腔镜修补患者中的资料报道较为稀少, 因其不作为常规检查, 术后的效果评估亦更少(表4). 食管裂孔疝主要的食管功能检查表现包括: 食管下括约肌压力降低和远端食管蠕动不良, 而食管pH监测可发现胃食管反流, 部分患者DeMeester评分可有升高. 已有的报道显示, 腹腔镜修补裂孔疝后, 受损的食管功能可有显著恢复. 需要注意的是, 由于裂孔疝使食管胃在解剖结构上处于错乱的状态, 此时测得的功能数据难免有失准确, 这可能会误导治疗[27,41,49], 也有部分学者认为, 食管功能检查和pH监测只在患者有明显的胃食管反流症状时予以应用,

表 4　食管裂孔疝腹腔镜修补术前术后食管测压及pH监测

作者信息	n	食管功能检测		24 h pH监测	
		术前	术后	术前	术后
Casabella等[43]1996	15	7.7%远端食管压力<30 mmHg	–	81.8%DeMeester评分升高, 平均51.2	–
Perdikis等[23]1997	65	55.8% LES压力降低	–	64.5%食管pH异常	–
Willekes等[39]1997	30	63.6%平均LES压力<10 mmHg	–	–	–
Gantert等[26]1998	55	63.6% LES压力降低; 51.5%远端食管蠕动减弱	–	66.7%平均DeMeester评分升高, 达101	–
Athanasakis等[61]2001	10	LES平均压力 = 15 mmHg	LES平均压力 = 20 mmHg	平均DeMeester评分 = 70(range3–165)	平均DeMeester评分 = 10(range 3–16)
Zaninotto等[63]2007	19	10.5%食管蠕动减弱	–	33.3%pH异常	–
Poncet等[20]2010	89	40.7%食管蠕动减弱	2.9%食管蠕动减弱	10.0%平均DeMeester评分 = 315	100%DeMeester评分均正常

LES: 食管下括约肌.

不必列为常规检查[52,69].

3.3 腹腔镜修补术后食管裂孔疝远期效果 上消化道造影在食管裂孔疝的诊断中具有举足轻重的作用, 还用于食管裂孔疝的分型, 明确疝入胸腔的胃体积比例. 另一方面, 术后的复查也主要依赖于造影检查, 并可确定有无裂孔疝复发、胃底折叠部移位或滑动疝形成这些征象. 以术后造影确定的复发率在文献报道中差异较大, 也形成一个看似矛盾的现象, 即使患者的症状改善很显著, 并无症状上的反复, 但影像学却判定为“复发”, 主观症状与客观证据分离. Hashemi等[70]曾报道了腹腔镜修补食管裂孔疝, 术后平均17 mo的造影检查可发现高达42%的复发率, 相比之下, 开放式手术后35 mo的复发率仅为15%, 这样的结果让人们不禁担心腹腔镜治疗食管裂孔疝的长期效果, 即便在上述很多手术及术后短期指标上腹腔镜都占尽优势, 但若长远效果不佳, 复发率高, 则无实质上的意义. 进一步的分析和讨论, 引出了“症状学复发”和“影像学复发”两个概念, 前者指术后患者出现裂孔疝的症状和对手术效果的不满意, 并需要进一步的药物治疗或再次手术, 一些研究显示, “症状学复发”与“影像学复发”之间并无明确的联系, “影像学复发”过高的判断了腹腔镜术后裂孔疝复发情况. 一些术后“影像学复发”的患者, 可没有裂孔疝复发症状, 且并不需要任何干预. 有学者提出, 患者术后裂孔疝大小只要不超过5 cm, 则不会对生活质量和手术满意度产生影响[21]. 同时, 腹腔镜术后因为裂孔疝复发, 需要再次手术的患者所占比例很小, 与开放式手术差别不大. 表5总结了食管裂孔疝腹腔镜修补术后远期(>2年)效果[11,15,20,21,45,56,69,71-73].

一些报道总结了腹腔镜术后复发的危险因素, 包括年轻、肥胖[11,20,72]、术前裂孔缺损大[74]、肺部疾病致长期咳嗽[45]、有腹部手术史[20]、短食管等[40]. Puri等[75]还报道了手术医生的经验不足、疝囊未切除干净、术后早期呕吐, 和超重等都是导致术后复发风险增加的危险因素. 这些危险因素都需要引起外科医生的注意, 并尽可能予以避免. DeMeester[76]提出疝复发的核心问题是“张力”, 并根据经验提出了防止术后复发的几点核心措施, 包括: 疝囊切除、纵隔食管游离、膈肌脚修补和胃底折叠.

4 补片材料的使用及争议

在上世纪90年代早期, 腹腔镜修补较大的裂孔缺损开始偶尔应用合成补片[29,77], 但并未对其长远效果进行评估. 随着对腹腔镜术后复发率的关注, 人工补片材料的使用也逐渐增多, 力图通过补片对修补效果予以增强, 防止术后复发. 一项针对胃肠内镜外科医生学会(Society of Gastrointestinal and Endoscopic Surgeons,

表 5　食管裂孔疝腹腔镜修补术后远期(>2年)效果

作者信息	*n*	平均随访时间 (mo)	影像学复发率 (%)	症状学复发率 (%)	因复发再次手术率 (%)
Khaitan等[56]2002	31	25	40.00	9.68	0
Jobe等[71]2002	52	39	32.00	19.00	–
Andujar[15]等2004	166	24	28.30	6.02	8.62
Aly等[72]2005	100	48	30.00	20.00	4.00
White等[73]2008	52	120	32.26	–	3.85
Nason等[45]2008	185	60	15.00	–	3.78
Poncet等[20]2010	89	57	15.70	–	8.99
Luketich等[11]2010	662	30	15.70	–	3.17
Furnée等[69]2010	70	45	30.00	11.67	–
Dallemagne等[21]2011	85	155	66.00	–	1.18

表 6　食管裂孔疝腹腔镜修补术补片应用对照研究

作者信息	*n* (补片：单纯修补)	补片类型	手术时间 (min)	术后并发症发生率(%)	术后裂孔疝复发率(%)
Frantzides等[68]1999	17：18	聚四氟乙烯补片	192±18：150±12	11.7：5.5	0：16.7
Frantzides等[81]2002[1]	36：36	聚四氟乙烯补片	156±30：126±18	5.5：2.7[2]	0：36.3
Keidar等[52]2003	10：23	6例Gore-Tex, 4例Prolene	–	–	10：18
Müller-Stich等[82]2006	17：39	Prolene或Vicryl	140±37：125±50	13：15[2]	0：19
Ringley等[83]2006	22：22	人无细胞真皮基质补片	121：108	0：0	0：9
Oelschlager等[84]2006	51：57	猪小肠黏膜下层补片	201±69：185±66	24 ：18[2]	9：24

[1]该研究为随机对照试验; [2]所有并发症均与补片无关.

SAGES)成员的调查问卷结果显示, 多数外科医生倾向于在面对裂孔缺损较大时使用补片, 包括生物材料, 聚四氟乙烯, 聚丙烯等材料, 但具体哪一种材料的补片具有显著优势尚不清楚[78]. 相比单纯裂孔缝合, 应用补片增强可降低术后的裂孔疝复发率[79], 但也有报道应用补片腹腔镜术后, 复发率仍可高达50%[80]. 表6总结了腹腔镜下应用补片修补和单纯缝合裂孔的对照研究[52,68,81-84]. 应用补片会增加手术时间[81], 并在一定程度上增加医疗费用[68].

需要注意的是, 随着补片材料在食管裂孔疝腹腔镜修补术中的应用, 也开始出现一些补片相关性并发症报道, 有些甚至还是严重并发症, 包括: 补片嵌入食管腔, 导致食管被迫切除[85-87], 补片导致食管狭窄或致密纤维化, 引起吞咽困难等[87], 甚至有补片嵌入腹主动脉导致致命性大出血的报道[88]. 这些并发症都与补片材料的不可降解性有关, 因此有一些补片开始采用新的可降解材料, 如生物可吸收补片等. 采用生物可吸收补片可降低术后的吞咽困难症状或补片侵蚀发生率[19,89], 但这些材料的可降解性却又容易导致修补增强效果不佳, 甚至疝复发等[78]. 这些并发症, 以及其他一些补片材料的缺点, 也是反对补片使用者的理由.

当前普遍的共识是面对较大的裂孔缺损或单纯缝合较为脆弱时, 可考虑使用补片增强, 以避免修补失败[28,68,90,91]. 理想的补片材料应具备如下特点: 腹腔镜下易于处理、与膈肌表面附着良好、组织相容性好、对相邻器官无损伤[92]. 除了人工材料外, 也有报道[48,55]应用患者自身组织来增强修补的探索, 如利用肝圆韧带就不失为一个安全有效的方法.

5 腹腔镜食管裂孔修补疝与开放手术

经检索文献, 目前尚无前瞻性随机对照实验对比腹腔镜修补裂孔疝与传统开放手术, 仅3篇[22,36,57]

表 7 腹腔镜对比开放手术治疗食管裂孔疝

作者信息	*n* (微创:开放)	手术时间 (min)	术后住院时间 (d)	术后并发症发生率(%)	住院死亡率	术后疝复发率(%)
Karmali等[36]2008	46：47	186 ± 30：150 ± 42 (P = 0.005)	5：10 (P<0.001)	22：53 (P = 0.002)	–	均为9
Díez Tabernilla等[57]2009	43：57	–	3.4：9.1 (P<0.05)	9.5：10.6	–	–
Zehetner等[22]2011	73：73	160：177 (P = 0.036)	3：9 (P<0.001)	8：26	–	12.3：24.7 (P = 0.09)

回顾性分析的原始性报道对两者进行了对比(表7). 以上回顾对比结果, 都较为一致的认同相比开放手术, 腹腔镜食管裂孔疝修补术后住院时间短、并发症发生率低.

6 结论

当前腹腔镜修补术也逐渐形成了常规程序: 五孔进路、胃及疝内容物的还纳入腹、疝囊的完整切除、扩张裂孔的缝合修补, 外加胃固定或胃底折叠术. 目前虽还无大样本的临床随机对照实验对微创手术与传统开放手术进行比较, 但已有的报道均证明了其具备了可靠的安全性和技术可行性. 相较于开放式手术, 腹腔镜食管裂孔疝修补术后住院时间短、并发症发生率低. 纵观食管裂孔疝腹腔镜修补术20余年的发展, 其为外科医生提供了一个治疗食管裂孔疝的新途径, 是外科技术未来的必然发展趋势.

7 参考文献

1 Stylopoulos N, Rattner DW. The history of hiatal hernia surgery: from Bowditch to laparoscopy. *Ann Surg* 2005; 241: 185-193 [PMID: 15622007]
2 Mitiek MO, Andrade RS. Giant hiatal hernia. *Ann Thorac Surg* 2010; 89: S2168-S2173 [PMID: 20494004 DOI: 10.1016/j.athoracsur.2010.03.022]
3 Oddsdottir M, Franco AL, Laycock WS, Waring JP, Hunter JG. Laparoscopic repair of paraesophageal hernia. New access, old technique. *Surg Endosc* 1995; 9: 164-168 [PMID: 7597586 DOI: 10.1007/BF00191959]
4 Patti MG, Fisichella PM. Laparoscopic paraesophageal hernia repair. How I do it. *J Gastrointest Surg* 2009; 13: 1728-1732 [PMID: 19018602 DOI: 10.1007/s11605-008-0745-y]
5 Wijnhoven BP, Watson DI. Laparoscopic repair of a giant hiatus hernia--how I do it. *J Gastrointest Surg* 2008; 12: 1459-1464 [PMID: 18213501 DOI: 10.1007/s11605-008-0473-3]
6 Cuschieri A, Shimi S, Nathanson LK. Laparoscopic reduction, crural repair, and fundoplication of large hiatal hernia. *Am J Surg* 1992; 163: 425-430 [PMID: 1532701 DOI: 10.1016/0002-9610(92)90046-T]
7 Bradley T, Stephenson J, Drugas G, Avansino JR. Laparoscopic management of neonatal paraesophageal hernia with intrathoracic gastric volvulus. *J Pediatr Surg* 2010; 45: E21-E23 [PMID: 20713199 DOI: 10.1016/j.jpedsurg.2010.05.033]
8 Bawahab M, Mitchell P, Church N, Debru E. Management of acute paraesophageal hernia. *Surg Endosc* 2009; 23: 255-259 [PMID: 18855051 DOI: 10.1007/s00464-008-0190-8]
9 Draaisma WA, Gooszen HG, Consten EC, Broeders IA. Mid-term results of robot-assisted laparoscopic repair of large hiatal hernia: a symptomatic and radiological prospective cohort study. *Surg Technol Int* 2008; 17: 165-170 [PMID: 18802897]
10 Seetharamaiah R, Romero RJ, Kosanovic R, Gallas M, Verdeja JC, Rabaza J, Gonzalez AM. Robotic repair of giant paraesophageal hernias. *JSLS* 2013; 17: 570-577 [PMID: 24398199 DOI: 10.4293/108680813x13654754534594]
11 Luketich JD, Nason KS, Christie NA, Pennathur A, Jobe BA, Landreneau RJ, Schuchert MJ. Outcomes after a decade of laparoscopic giant paraesophageal hernia repair. *J Thorac Cardiovasc Surg* 2010; 139: 395-404, 404.e1 [PMID: 20004917 DOI: 10.1016/j.jtcvs.2009.10.005]
12 Larusson HJ, Zingg U, Hahnloser D, Delport K, Seifert B, Oertli D. Predictive factors for morbidity and mortality in patients undergoing laparoscopic paraesophageal hernia repair: age, ASA score and operation type influence morbidity. *World J Surg* 2009; 33: 980-985 [PMID: 19277773 DOI: 10.1007/s00268-009-9958-9]
13 Pierre AF, Luketich JD, Fernando HC, Christie NA, Buenaventura PO, Litle VR, Schauer PR. Results of laparoscopic repair of giant paraesophageal hernias: 200 consecutive patients. *Ann Thorac Surg* 2002; 74: 1909-1915; discussion 1915-1916 [PMID: 12643372]
14 Gangopadhyay N, Perrone JM, Soper NJ, Matthews BD, Eagon JC, Klingensmith ME, Frisella MM, Brunt LM. Outcomes of laparoscopic paraesophageal hernia repair in elderly and high-risk patients. *Surgery* 2006; 140: 491-498; discussion 498-499 [PMID: 17011895 DOI: 10.1016/j.surg.2006.07.001]
15 Andujar JJ, Papasavas PK, Birdas T, Robke J, Raftopoulos Y, Gagné DJ, Caushaj PF, Landreneau RJ, Keenan RJ. Laparoscopic repair of large paraesophageal hernia is associated with a low incidence of recurrence and reoperation. *Surg Endosc* 2004; 18: 444-447 [PMID: 14752653 DOI: 10.1007/s00464-003-8823-4]

16 Mattar SG, Bowers SP, Galloway KD, Hunter JG, Smith CD. Long-term outcome of laparoscopic repair of paraesophageal hernia. *Surg Endosc* 2002; 16: 745-749 [PMID: 11997814 DOI: 10.1007/s00464-001-8194-7]
17 Diaz S, Brunt LM, Klingensmith ME, Frisella PM, Soper NJ. Laparoscopic paraesophageal hernia repair, a challenging operation: medium-term outcome of 116 patients. *J Gastrointest Surg* 2003; 7: 59-66; discussion 66-67 [PMID: 12559186 DOI: 10.1016/S1091-255X(02)00151-8]
18 Luketich JD, Raja S, Fernando HC, Campbell W, Christie NA, Buenaventura PO, Weigel TL, Keenan RJ, Schauer PR. Laparoscopic repair of giant paraesophageal hernia: 100 consecutive cases. *Ann Surg* 2000; 232: 608-618 [PMID: 10998659 DOI: 10.1097/00000658-200010000-00016]
19 Gebhart A, Vu S, Armstrong C, Smith BR, Nguyen NT. Initial outcomes of laparoscopic paraesophageal hiatal hernia repair with mesh. *Am Surg* 2013; 79: 1017-1021 [PMID: 24160791]
20 Poncet G, Robert M, Roman S, Boulez JC. Laparoscopic repair of large hiatal hernia without prosthetic reinforcement: late results and relevance of anterior gastropexy. *J Gastrointest Surg* 2010; 14: 1910-1916 [PMID: 20824385 DOI: 10.1007/s11605-010-1308-6]
21 Dallemagne B, Kohnen L, Perretta S, Weerts J, Markiewicz S, Jehaes C. Laparoscopic repair of paraesophageal hernia. Long-term follow-up reveals good clinical outcome despite high radiological recurrence rate. *Ann Surg* 2011; 253: 291-296 [PMID: 21217518 DOI: 10.1097/SLA.0b013e3181ff44c0]
22 Zehetner J, Lipham JC, Ayazi S, Oezcelik A, Abate E, Chen W, Demeester SR, Sohn HJ, Banki F, Hagen JA, Dickey M, Demeester TR. A simplified technique for intrathoracic stomach repair: laparoscopic fundoplication with Vicryl mesh and BioGlue crural reinforcement. *Surg Endosc* 2010; 24: 675-679 [PMID: 19690911 DOI: 10.1007/s00464-009-0662-5]
23 Perdikis G, Hinder RA, Filipi CJ, Walenz T, McBride PJ, Smith SL, Katada N, Klingler PJ. Laparoscopic paraesophageal hernia repair. *Arch Surg* 1997; 132: 586-589; discussion 590-591 [PMID: 9197849]
24 Wiechmann RJ, Ferguson MK, Naunheim KS, McKesey P, Hazelrigg SJ, Santucci TS, Macherey RS, Landreneau RJ. Laparoscopic management of giant paraesophageal herniation. *Ann Thorac Surg* 2001; 71: 1080-1086; discussion 1086-1087 [PMID: 11308140 DOI: 10.1016/S0003-4975(00)01229-7]
25 Huntington TR. Short-term outcome of laparoscopic paraesophageal hernia repair. A case series of 58 consecutive patients. *Surg Endosc* 1997; 11: 894-898 [PMID: 9294267 DOI: 10.1007/s004649900481]
26 Gantert WA, Patti MG, Arcerito M, Feo C, Stewart L, DePinto M, Bhoyrul S, Rangel S, Tyrrell D, Fujino Y, Mulvihill SJ, Way LW. Laparoscopic repair of paraesophageal hiatal hernias. *J Am Coll Surg* 1998; 186: 428-432; discussion 432-433 [PMID: 9544957]
27 Leeder PC, Smith G, Dehn TC. Laparoscopic management of large paraesophageal hiatal hernia. *Surg Endosc* 2003; 17: 1372-1375 [PMID: 12820060 DOI: 10.1007/s00464-002-9192-0]
28 Champion JK, Rock D. Laparoscopic mesh cruroplasty for large paraesophageal hernias. *Surg Endosc* 2003; 17: 551-553 [PMID: 12582773 DOI: 10.1007/s00464-002-8817-7]
29 Kuster GG, Gilroy S. Laparoscopic technique for repair of paraesophageal hiatal hernias. *J Laparoendosc Surg* 1993; 3: 331-338 [PMID: 8268502]
30 Hazebroek EJ, Ng A, Yong DH, Berry H, Leibman S, Smith GS. Evaluation of lightweight titanium-coated polypropylene mesh (TiMesh) for laparoscopic repair of large hiatal hernias. *Surg Endosc* 2008; 22: 2428-2432 [PMID: 18626699 DOI: 10.1007/s00464-008-0070-2]
31 Mosnier H, Leport J, Aubert A, Guibert L, Caronia F. Videolaparoscopic treatment of paraesophageal hiatal hernia. *Chirurgie* 1998; 123: 594-599; discussion 598-599 [PMID: 9922600]
32 Targarona EM, Novell J, Vela S, Cerdán G, Bendahan G, Torrubia S, Kobus C, Rebasa P, Balague C, Garriga J, Trias M. Mid term analysis of safety and quality of life after the laparoscopic repair of paraesophageal hiatal hernia. *Surg Endosc* 2004; 18: 1045-1050 [PMID: 15156380 DOI: 10.1007/s00464-003-9227-1]
33 Agwunobi AO, Bancewicz J, Attwood SE. Simple laparoscopic gastropexy as the initial treatment of paraoesophageal hiatal hernia. *Br J Surg* 1998; 85: 604-606 [PMID: 9635803 DOI: 10.1046/j.1365-2168.1998.00639.x]
34 Rathore MA, Andrabi I, Nambi E, McMurray AH. Intermediate-term results of laparoscopic repair of giant paraesophageal hernia: lack of follow-up esophagogram leads to detection bias. *JSLS* 2007; 11: 344-349 [PMID: 17931517]
35 Dahlberg PS, Deschamps C, Miller DL, Allen MS, Nichols FC, Pairolero PC. Laparoscopic repair of large paraesophageal hiatal hernia. *Ann Thorac Surg* 2001; 72: 1125-1129 [PMID: 11603423 DOI: 10.1016/S0003-4975(01)02972-1]
36 Karmali S, McFadden S, Mitchell P, Graham A, Debru E, Gelfand G, Graham J, Martin S, Tiruta C, Grondin S. Primary laparoscopic and open repair of paraesophageal hernias: a comparison of short-term outcomes. *Dis Esophagus* 2008; 21: 63-68 [PMID: 18197941 DOI: 10.1111/j.1442-2050.2007.00740.x]
37 Neo EL, Zingg U, Devitt PG, Jamieson GG, Watson DI. Learning curve for laparoscopic repair of very large hiatal hernia. *Surg Endosc* 2011; 25: 1775-1782 [PMID: 21136114 DOI: 10.1007/s00464-010-1461-8]
38 Rosenberg J, Jacobsen B, Fischer A. Fast-track giant paraoesophageal hernia repair using a simplified laparoscopic technique. *Langenbecks Arch Surg* 2006; 391: 38-42 [PMID: 16391947 DOI: 10.1007/s00423-005-0008-2]
39 Willekes CL, Edoga JK, Frezza EE. Laparoscopic repair of paraesophageal hernia. *Ann Surg* 1997; 225: 31-38 [PMID: 8998118 DOI: 10.1097/00000658-199701000-00004]
40 Wu JS, Dunnegan DL, Soper NJ. Clinical and radiologic assessment of laparoscopic paraesophageal hernia repair. *Surg Endosc* 1999; 13: 497-502 [PMID: 10227951 DOI: 10.1007/s004649901021]
41 Rosen M, Ponsky J. Laparoscopic repair of giant

paraesophageal hernias: an update for internists. *Cleve Clin J Med* 2003; 70: 511-514 [PMID: 12828222 DOI: 10.3949/ccjm.70.6.511]
42 Molena D, Mungo B, Stem M, Lidor AO. Novel combined VATS/laparoscopic approach for giant and complicated paraesophageal hernia repair: description of technique and early results. *Surg Endosc* 2015; 29: 185-191 [PMID: 24969852 DOI: 10.1007/s00464-014-3662-z]
43 Casabella F, Sinanan M, Horgan S, Pellegrini CA. Systematic use of gastric fundoplication in laparoscopic repair of paraesophageal hernias. *Am J Surg* 1996; 171: 485-489 [PMID: 8651391 DOI: 10.1016/s0002-9610(97)89609-2]
44 Krähenbühl L, Schäfer M, Farhadi J, Renzulli P, Seiler CA, Büchler MW. Laparoscopic treatment of large paraesophageal hernia with totally intrathoracic stomach. *J Am Coll Surg* 1998; 187: 231-237 [PMID: 9740179 DOI: 10.1016/S1072-7515(98)00156-2]
45 Nason KS, Luketich JD, Qureshi I, Keeley S, Trainor S, Awais O, Shende M, Landreneau RJ, Jobe BA, Pennathur A. Laparoscopic repair of giant paraesophageal hernia results in long-term patient satisfaction and a durable repair. *J Gastrointest Surg* 2008; 12: 2066-2075; discussion 2075-2077 [PMID: 18841422 DOI: 10.1007/s11605-008-0712-7]
46 Bettolli M, Rubin SZ, Gutauskas A. Large paraesophageal hernias in children. Early experience with laparoscopic repair. *Eur J Pediatr Surg* 2008; 18: 72-74 [PMID: 18437647 DOI: 10.1055/s-2008-1038395]
47 Obeidat FW, Lang RA, Knauf A, Thomas MN, Hüttl TK, Zügel NP, Jauch KW, Hüttl TP. Laparoscopic anterior hemifundoplication and hiatoplasty for the treatment of upside-down stomach: mid- and long-term results after 40 patients. *Surg Endosc* 2011; 25: 2230-2235 [PMID: 21359905 DOI: 10.1007/s00464-010-1537-5]
48 Varga G, Cseke L, Kalmár K, Horváth Ors P. [New laparoscopic procedure for the treatment of large hiatal hernias: the first 20 cases]. *Magy Seb* 2005; 58: 311-315 [PMID: 16496773]
49 Boushey RP, Moloo H, Burpee S, Schlachta CM, Poulin EC, Haggar F, Trottier DC, Mamazza J. Laparoscopic repair of paraesophageal hernias: a Canadian experience. *Can J Surg* 2008; 51: 355-360 [PMID: 18841230]
50 Ferri LE, Feldman LS, Stanbridge D, Mayrand S, Stein L, Fried GM. Should laparoscopic paraesophageal hernia repair be abandoned in favor of the open approach? *Surg Endosc* 2005; 19: 4-8 [PMID: 15531968 DOI: 10.1007/s00464-004-8903-0]
51 Parameswaran R, Ali A, Velmurugan S, Adjepong SE, Sigurdsson A. Laparoscopic repair of large paraesophageal hiatus hernia: quality of life and durability. *Surg Endosc* 2006; 20: 1221-1224 [PMID: 16865618 DOI: 10.1007/s00464-005-0691-7]
52 Keidar A, Szold A. Laparoscopic repair of paraesophageal hernia with selective use of mesh. *Surg Laparosc Endosc Percutan Tech* 2003; 13: 149-154 [PMID: 12819496 DOI: 10.1097/00129689-200306000-00002]
53 Rosati R, Bona S, Fumagalli U, Chella B, Peracchia A. Laparoscopic treatment of paraesophageal and large mixed hiatal hernias. *Surg Endosc* 1996; 10: 429-431 [PMID: 8661795 DOI: 10.1007/BF00191632]
54 Horgan S, Eubanks TR, Jacobsen G, Omelanczuk P, Pellegrini CA. Repair of paraesophageal hernias. *Am J Surg* 1999; 177: 354-358 [PMID: 10365868 DOI: 10.1016/S0002-9610(99)00061-6]
55 Varga G, Cseke L, Kalmar K, Horvath OP. Laparoscopic repair of large hiatal hernia with teres ligament: midterm follow-up: a new surgical procedure. *Surg Endosc* 2008; 22: 881-884 [PMID: 17973164 DOI: 10.1007/s00464-007-9648-3]
56 Khaitan L, Houston H, Sharp K, Holzman M, Richards W. Laparoscopic paraesophageal hernia repair has an acceptable recurrence rate. *Am Surg* 2002; 68: 546-551; discussion 551-552 [PMID: 12079137]
57 Díez Tabernilla M, Ruiz-Tovar J, Grajal Marino R, Calero García P, Pina Hernández JD, Chames Vaisman A, Morales Castiñeiras V, Sanjuanbenito Dehesa A, Martínez Molina E, Fresneda Moreno V. Paraesophageal hiatal hernia. Open vs. laparoscopic surgery. *Rev Esp Enferm Dig* 2009; 101: 706-711 [PMID: 19899938]
58 Smith GS, Isaacson JR, Draganic BD, Baladas HG, Falk GL. Symptomatic and radiological follow-up after para-esophageal hernia repair. *Dis Esophagus* 2004; 17: 279-284 [PMID: 15569363 DOI: 10.1111/j.1442-2050.2004.00426.x]
59 Kim KC, Park HJ, Yoon DS, Chi HS, Lee WJ, Lee KS, Chon CY, Park IS. A case of paraesophageal hernia repaired by laparoscopic approach. *Yonsei Med J* 1996; 37: 151-157 [PMID: 8711938 DOI: 10.3349/ymj.1996.37.2.151]
60 Hawasli A, Zonca S. Laparoscopic repair of paraesophageal hiatal hernia. *Am Surg* 1998; 64: 703-710 [PMID: 9697897]
61 Athanasakis H, Tzortzinis A, Tsiaoussis J, Vassilakis JS, Xynos E. Laparoscopic repair of paraesophageal hernia. *Endoscopy* 2001; 33: 590-594 [PMID: 11473330 DOI: 10.1055/s-2001-15306]
62 Medina L, Peetz M, Ratzer E, Fenoglio M. Laparoscopic paraesophageal hernia repair. *JSLS* 1998; 2: 269-272 [PMID: 9876752]
63 Zaninotto G, Portale G, Costantini M, Fiamingo P, Rampado S, Guirroli E, Nicoletti L, Ancona E. Objective follow-up after laparoscopic repair of large type III hiatal hernia. Assessment of safety and durability. *World J Surg* 2007; 31: 2177-2183 [PMID: 17726627 DOI: 10.1007/s00268-007-9212-2]
64 Oddsdóttir M. Paraesophageal hernia. *Surg Clin North Am* 2000; 80: 1243-1252 [PMID: 10987033 DOI: 10.1016/S0039-6109(05)70222-X]
65 Horstmann R, Klotz A, Classen C, Palmes D. Feasibility of surgical technique and evaluation of postoperative quality of life after laparoscopic treatment of intrathoracic stomach. *Langenbecks Arch Surg* 2004; 389: 23-31 [PMID: 14625776 DOI: 10.1007/s00423-003-0437-8]
66 Hazebroek EJ, Gananadha S, Koak Y, Berry H, Leibman S, Smith GS. Laparoscopic paraesophageal hernia repair: quality of life outcomes in the elderly. *Dis Esophagus* 2008; 21: 737-741 [PMID: 18459987 DOI: 10.1111/j.1442-2050.2008.00831.x]
67 Hazebroek EJ, Koak Y, Berry H, Leibman S, Smith GS. Critical evaluation of a novel DualMesh

repair for large hiatal hernias. *Surg Endosc* 2009; 23: 193-196 [PMID: 18320282 DOI: 10.1007/s00464-008-9772-8]
68 Frantzides CT, Richards CG, Carlson MA. Laparoscopic repair of large hiatal hernia with polytetrafluoroethylene. *Surg Endosc* 1999; 13: 906-908 [PMID: 10449850 DOI: 10.1007/s004649901131]
69 Furnée EJ, Draaisma WA, Simmermacher RK, Stapper G, Broeders IA. Long-term symptomatic outcome and radiologic assessment of laparoscopic hiatal hernia repair. *Am J Surg* 2010; 199: 695-701 [PMID: 19892314 DOI: 10.1016/j.amjsurg.2009.03.008]
70 Hashemi M, Peters JH, DeMeester TR, Huprich JE, Quek M, Hagen JA, Crookes PF, Theisen J, DeMeester SR, Sillin LF, Bremner CG. Laparoscopic repair of large type III hiatal hernia: objective followup reveals high recurrence rate. *J Am Coll Surg* 2000; 190: 553-560; discussion 560-561 [PMID: 10801022 DOI: 10.1016/S1072-7515(00)00260-X]
71 Jobe BA, Aye RW, Deveney CW, Domreis JS, Hill LD. Laparoscopic management of giant type III hiatal hernia and short esophagus. Objective follow-up at three years. *J Gastrointest Surg* 2002; 6: 181-188; discussion 188 [PMID: 11992803]
72 Aly A, Munt J, Jamieson GG, Ludemann R, Devitt PG, Watson DI. Laparoscopic repair of large hiatal hernias. *Br J Surg* 2005; 92: 648-653 [PMID: 15800954 DOI: 10.1002/bjs.4916]
73 White BC, Jeansonne LO, Morgenthal CB, Zagorski S, Davis SS, Smith CD, Lin E. Do recurrences after paraesophageal hernia repair matter: Ten-year follow-up after laparoscopic repair. *Surg Endosc* 2008; 22: 1107-1111 [PMID: 18330640 DOI: 10.1007/s00464-007-9649-2]
74 Morino M, Giaccone C, Pellegrino L, Rebecchi F. Laparoscopic management of giant hiatal hernia: factors influencing long-term outcome. *Surg Endosc* 2006; 20: 1011-1016 [PMID: 16763927 DOI: 10.1007/s00464-005-0550-6]
75 Puri V, Kakarlapudi GV, Awad ZT, Filipi CJ. Hiatal hernia recurrence: 2004. *Hernia* 2004; 8: 311-317 [PMID: 15300469 DOI: 10.1007/s10029-004-0255-0]
76 DeMeester SR. Laparoscopic paraesophageal hernia repair: critical steps and adjunct techniques to minimize recurrence. *Surg Laparosc Endosc Percutan Tech* 2013; 23: 429-435 [PMID: 24105280 DOI: 10.1097/SLE.0b013e3182a12716]
77 Behrns KE, Schlinkert RT. Laparoscopic management of paraesophageal hernia: early results. *J Laparoendosc Surg* 1996; 6: 311-317 [PMID: 8897241 DOI: 10.1089/lps.1996.6.311]
78 Frantzides CT, Carlson MA, Loizides S, Papafili A, Luu M, Roberts J, Zeni T, Frantzides A. Hiatal hernia repair with mesh: a survey of SAGES members. *Surg Endosc* 2010; 24: 1017-1024 [PMID: 19997755 DOI: 10.1007/s00464-009-0718-6]
79 Furnée E, Hazebroek E. Mesh in laparoscopic large hiatal hernia repair: a systematic review of the literature. *Surg Endosc* 2013; 27: 3998-4008 [PMID: 23793804 DOI: 10.1007/s00464-013-3036-y]
80 Fumagalli U, Bona S, Caputo M, Elmore U, Battafarano F, Pestalozza A, Rosati R. Are Surgisis biomeshes effective in reducing recurrences after laparoscopic repair of large hiatal hernias? *Surg Laparosc Endosc Percutan Tech* 2008; 18: 433-436 [PMID: 18936659 DOI: 10.1097/SLE.0b013e3181802ca7]
81 Frantzides CT, Madan AK, Carlson MA, Stavropoulos GP. A prospective, randomized trial of laparoscopic polytetrafluoroethylene (PTFE) patch repair vs simple cruroplasty for large hiatal hernia. *Arch Surg* 2002; 137: 649-652 [PMID: 12049534 DOI: 10.1001/archsurg.137.6.649]
82 Müller-Stich BP, Holzinger F, Kapp T, Klaiber C. Laparoscopic hiatal hernia repair: long-term outcome with the focus on the influence of mesh reinforcement. *Surg Endosc* 2006; 20: 380-384 [PMID: 16432659 DOI: 10.1007/s00464-004-2272-6]
83 Ringley CD, Bochkarev V, Ahmed SI, Vitamvas ML, Oleynikov D. Laparoscopic hiatal hernia repair with human acellular dermal matrix patch: our initial experience. *Am J Surg* 2006; 192: 767-772 [PMID: 17161091 DOI: 10.1016/j.amjsurg.2006.08.042]
84 Oelschlager BK, Pellegrini CA, Hunter J, Soper N, Brunt M, Sheppard B, Jobe B, Polissar N, Mitsumori L, Nelson J, Swanstrom L. Biologic prosthesis reduces recurrence after laparoscopic paraesophageal hernia repair: a multicenter, prospective, randomized trial. *Ann Surg* 2006; 244: 481-490 [PMID: 16998356 DOI: 10.1097/01.sla.0000237759.42831.03]
85 Hazebroek EJ, Leibman S, Smith GS. Erosion of a composite PTFE/ePTFE mesh after hiatal hernia repair. *Surg Laparosc Endosc Percutan Tech* 2009; 19: 175-177 [PMID: 19390288 DOI: 10.1097/SLE.0b013e3181a11926]
86 Kepenekci I, Turkcapar AG. Mesh erosion as a complication of laparoscopic fundoplication with prosthetic hiatal closure: report of a case. *Surg Laparosc Endosc Percutan Tech* 2009; 19: e51-e54 [PMID: 19390264 DOI: 10.1097/SLE.0b013e3181979a45]
87 Stadlhuber RJ, Sherif AE, Mittal SK, Fitzgibbons RJ, Michael Brunt L, Hunter JG, Demeester TR, Swanstrom LL, Daniel Smith C, Filipi CJ. Mesh complications after prosthetic reinforcement of hiatal closure: a 28-case series. *Surg Endosc* 2009; 23: 1219-1226 [PMID: 19067074 DOI: 10.1007/s00464-008-0205-5]
88 Zügel N, Lang RA, Kox M, Hüttl TP. Severe complication of laparoscopic mesh hiatoplasty for paraesophageal hernia. *Surg Endosc* 2009; 23: 2563-2567 [PMID: 19440795 DOI: 10.1007/s00464-009-0456-9]
89 Goers TA, Cassera MA, Dunst CM, Swanström LL. Paraesophageal hernia repair with biomesh does not increase postoperative dysphagia. *J Gastrointest Surg* 2011; 15: 1743-1749 [PMID: 21773871 DOI: 10.1007/s11605-011-1596-5]
90 Frantzides CT, Carlson MA. Prosthetic reinforcement of posterior cruroplasty during laparoscopic hiatal herniorrhaphy. *Surg Endosc* 1997; 11: 769-771 [PMID: 9214330 DOI: 10.1007/s004649900447]
91 Meyer C, Buffler A, Rohr S, Lima MC. Laparoscopic treatment of large hiatal hernias using a prosthesis. Report of ten cases. *Ann Chir*

2002; 127: 257-261 [PMID: 11980297 DOI: 10.1016/S0003-3944(02)00716-2]
92 Granderath FA, Carlson MA, Champion JK, Szold A, Basso N, Pointner R, Frantzides CT. Prosthetic closure of the esophageal hiatus in large hiatal hernia repair and laparoscopic antireflux surgery. *Surg Endosc* 2006; 20: 367-379 [PMID: 16424984 DOI: 10.1007/s00464-005-0467-0]

编辑: 于明茜 电编: 闫晋利

ISSN 1009-3079 (print) ISSN 2219-2859 (online) DOI: 10.11569

• 消息 •

《世界华人消化杂志》正文要求

本刊讯 本刊正文标题层次为 0引言; 1 材料和方法, 1.1 材料, 1.2 方法; 2 结果; 3 讨论; 4 参考文献. 序号一律左顶格写, 后空1格写标题; 2级标题后空1格接正文. 以下逐条陈述: (1)引言 应包括该研究的目的和该研究与其他相关研究的关系. (2)材料和方法 应尽量简短, 但应让其他有经验的研究者能够重复该实验. 对新的方法应该详细描述, 以前发表过的方法引用参考文献即可, 有关文献中或试剂手册中的方法的改进仅描述改进之处即可. (3)结果 实验结果应合理采用图表和文字表示, 在结果中应避免讨论. (4)讨论 要简明, 应集中对所得的结果做出解释而不是重复叙述, 也不应是大量文献的回顾. 图表的数量要精选. 表应有表序和表题, 并有足够具有自明性的信息, 使读者不查阅正文即可理解该表的内容. 表内每一栏均应有表头, 表内非公知通用缩写应在表注中说明, 表格一律使用三线表(不用竖线), 在正文中该出现的地方应注出. 图应有图序、图题和图注, 以使其容易被读者理解, 所有的图应在正文中该出现的地方注出. 同一个主题内容的彩色图、黑白图、线条图, 统一用一个注解分别叙述. 如: 图1 萎缩性胃炎治疗前后病理变化. A: …; B: …; C: …; D: …; E: …; F: …; G: …. 曲线图可按●、○、■、□、▲、△顺序使用标准的符号. 统计学显著性用: $^{a}P<0.05$, $^{b}P<0.01$($P>0.05$不注). 如同一表中另有一套P值, 则$^{c}P<0.05$, $^{d}P<0.01$; 第3套为$^{e}P<0.05$, $^{f}P<0.01$. P值后注明何种检验及其具体数字, 如$P<0.01$, $t = 4.56$ *vs* 对照组等, 注在表的左下方. 表内采用阿拉伯数字, 共同的计量单位符号应注在表的右上方, 表内个位数、小数点、±、-应上下对齐. “空白”表示无此项或未测, “-”代表阴性未发现, 不能用同左、同上等. 表图勿与正文内容重复. 表图的标目尽量用t/min, c/(mol/L), p/kPa, V/mL, t/℃表达. 黑白图请附黑白照片, 并拷入光盘内; 彩色图请提供冲洗的彩色照片, 请不要提供计算机打印的照片. 彩色图片大小7.5 cm×4.5 cm, 必须使用双面胶条黏贴在正文内, 不能使用浆糊黏贴. (5)志谢 后加冒号, 排在讨论后及参考文献前, 左齐.

Published by **Baishideng Publishing Group Inc**
8226 Regency Drive, Pleasanton,
CA 94588, USA
Fax: +1-925-223-8242
Telephone: +1-925-223-8243
E-mail: bpgoffice@wjgnet.com
http://www.wjgnet.com

ISSN 1009-3079