

# 完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术治疗门静脉高压症合并脾动脉瘤的临床价值

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曾志武与夏辉对本文有同等贡献

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**【摘要】 目的** 探讨完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术治疗门静脉高压症合并脾动脉瘤的临床价值。**方法** 采用回顾性描述性研究方法。收集2013年1月至2020年5月2家医学中心收治的17例(深圳大学总医院15例,武汉市第一医院2例)门静脉高压症合并脾动脉瘤患者的临床资料;男7例,女10例;年龄为(59±14)岁。所有患者行完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术。观察指标:(1)手术及术后情况。(2)并发症情况。(3)随访情况。采用门诊和电话方式进行随访,了解患者术后3个月动脉瘤体隔绝治疗效果及血液复流情况、门静脉内血栓情况和生存情况。随访时间截至2020年12月。正态分布的计量资料以 $\bar{x} \pm s$ 表示,偏态分布的计量资料以 $M$ (范围)表示。**结果** (1)手术及术后情况。17例患者均顺利完成手术,无围手术期死亡患者。17例患者手术时间为(181±30)min,术中出血量为187(90~420)mL,术后第3天白细胞计数为 $(9 \pm 4) \times 10^9/L$ ,红细胞计数为 $(3.5 \pm 0.9) \times 10^{12}/L$ ,血红蛋白为 $(86 \pm 17)g/L$ ,血清白蛋白为 $(36 \pm 7)g/L$ ,术后拔除腹腔引流管时间为 $(7 \pm 4)d$ ,术后住院时间为 $(11 \pm 4)d$ 。(2)并发症情况。17例患者术后均有腹水,予利尿剂口服治疗后好转。所有患者未见腹腔内大出血、消化道瘘、胸腔积液、感染、脓肿形成、发热、血管栓塞等并发症。(3)随访情况:17例患者均获得随访,随访时间为28.6(7.0~84.0)个月。随访期间,所有患者脾动脉瘤腔隔绝完全,其内未见血液复流;门静脉内未见血栓形成;无死亡患者。**结论** 完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术治疗门静脉高压症合并脾动脉瘤安全、可行。

**【关键词】** 静脉高压症; 脾动脉瘤; 脾动脉瘤隔绝术; 贲门周围血管离断术; 腹腔镜检查

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**Clinical value of totally laparoscopic exclusion of splenic artery aneurysm combined with pericardial devascularization for portal hypertension complicated with splenic aneurysm**

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**【 Abstract 】 Objective** To investigate the clinical value of totally laparoscopic exclusion of splenic artery aneurysm combined with pericardial devascularization for portal hypertension complicated with splenic aneurysm. **Methods** The retrospective and descriptive study was conducted. The clinicopathological data of 17 patients with portal hypertension complicated with splenic aneurysm who were admitted to 2 medical centers (15 cases in Shenzhen University General Hospital and 2 cases in Wuhan First Hospital) from January 2013 to May 2020 were collected. There were 7 males and 10 females, aged (59±14)years. All patients underwent totally laparoscopic exclusion of splenic artery aneurysm combined with pericardial devascularization. Observation indicators : (1) surgical and postoperative conditions; (2) complications; (3) follow-up. Follow-up was conducted by outpatient examination and telephone interview to detect the effect of exclusion of arterial tumor, and blood re-flow, portal vein thrombosis and survival of patients 3 months after operation. The follow-up was up to December 2020. Measurement data with normal distribution were represented as  $\text{Mean} \pm \text{SD}$ , and measurement data with skewed distribution were represented as  $M(\text{range})$ . **Results** (1) Surgical and postoperative conditions. All 17 patients successfully completed the operation, without perioperative death. The operation time, volume of intraoperative blood loss of 17 patients were (181±30)minutes, 187(range, 90–420)mL. The white blood cell count, red blood cell count, hemoglobin, serum albumin were  $(9 \pm 4) \times 10^9/\text{L}$ ,  $(3.5 \pm 0.9) \times 10^{12}/\text{L}$ ,  $(86 \pm 17)\text{g/L}$ ,  $(36 \pm 7)\text{g/L}$  on the postoperative day 3. Time to postoperative abdominal drainage tube removal and duration of postoperative hospital stay were (7±4)days and (11±4)days. (2) Complications. All 17 patients had ascites after surgery, which were improved after oral treatment with diuretics. There was no complication such as intra-abdominal hemorrhage, gastrointestinal fistula, pleural effusion, infection, abscess formation, fever and vascular embolism. (3) Follow-up. All the 17 patients were followed up for 28.6 (range, 7.0–84.0)months. During the follow-up, the splenic aneurysm cavity of all patients was completely isolated, no blood re-flow and no portal vein thrombosis was observed, and no patient died. **Conclusion** Totally laparoscopic exclusion of splenic artery aneurysm combined with pericardial devascularization is safe and feasible in the treatment of portal hypertension complicated with splenic aneurysm.

**【 Key words 】** Vein hypertension; Splenic artery aneurysm; Splenic artery aneurysm exclusion; Pericardial devascularization; Laparoscopy

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门静脉高压症是普通外科常见疾病,多由肝硬化导致,常合并脾脏增大、脾功能亢进、食管胃底静脉曲张,部分患者合并脾动脉瘤<sup>[1-6]</sup>。门静脉高压症患者食管胃底静脉曲张重度曲张合并出血且内镜治疗效果不佳时,常需要进行外科手术治疗。此时,若其合并脾动脉瘤处置不当,会发生围手术期动脉瘤破裂出血,病情凶险,可危及生命。本研究回顾性分析 2013 年 1 月至 2020 年 5 月 2 家医学中心收治的 17 例(深圳大学总医院 15 例,武汉市第一医院 2 例)门静脉高压症合并脾动脉瘤患者的临床资

料,探讨完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术治疗门静脉高压症合并脾动脉瘤的临床价值。

## 资料与方法

### 一、一般资料

采用回顾性描述性研究方法。收集 17 例门静脉高压症合并脾动脉瘤患者的临床资料;男 7 例,女 10 例;年龄为(59±14)岁。17 例患者中,11 例为食



管胃底静脉重度曲张(GⅢ期),6例为食管胃底静脉中度曲张(GⅡ期);15例为单发性脾动脉瘤,2例为脾动脉多发动脉瘤;5例有自脾动脉瘤体发出的胰背动脉,12例胰背动脉发自脾动脉主干。17例患者门静脉主干内径为 $(12\pm 4)$ mm,彩色多普勒血流显像检查结果示:门静脉为入肝血流,门静脉主干流速为 $(19\pm 7)$ cm/s;动脉瘤长径为 $(7\pm 5)$ cm。17例患者中,13例合并乙型病毒性肝炎。本研究通过深圳大学总医院医学伦理委员会和武汉市第一医院医学伦理委员会审批,批号分别为[2020]科研伦审(09)号和武卫一院[2013]伦审(2)号。患者及家属均签署知情同意书。

## 二、纳入标准和排除标准

**纳入标准:**(1)有肝硬化病史,脾脏增大、脾功能亢进表现,发生消化道出血症状>1次。(2)术前经彩色多普勒超声、CT等影像学检查确诊为肝硬化,门静脉高压症合并脾动脉瘤,胃镜检查有中-重度食管胃底静脉曲张。(3)术前肝功能检查Child-Pugh为A~B级,无明显凝血功能障碍。(4)腹部CT增强血管造影检查明确诊断合并脾动脉瘤。(5)无明显心、肺功能不全,无严重心、脑血管疾病。(6)随访资料完整。

**排除标准:**(1)上消化道大出血急性期。(2)肝功能Child-Pugh为C级,PLT水平 $<50\times 10^9/L$ ,合并凝血功能障碍。(3)合并严重的心、肺功能障碍,肝、肾功能不全,脑血管疾病等麻醉手术禁忌证。(4)中转开放手术。(5)随访资料缺失。

## 三、治疗措施

### (一)术前检查

所有患者术前行常规检查了解患者一般情况,评估肝功能。行胃镜检查了解食管胃底静脉曲张程度。行彩色多普勒超声、增强CT及腹部血管成像检查明确诊断,了解脾脏大小,载瘤脾动脉长径、走行,脾动脉瘤的位置、大小、形状等信息,以及有无动脉瘤体发出的胰背动脉支。多发性脾动脉瘤可行介入血管造影检查<sup>[5]</sup>。

### (二)手术步骤

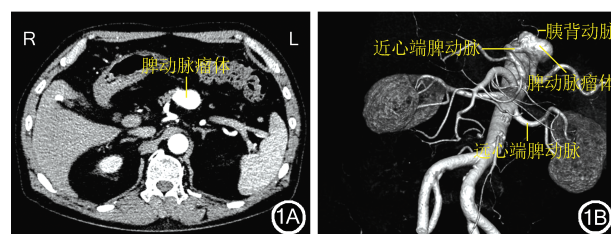
17例患者由同一手术团队完成完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术。

**1. Trocar分布:**采用5孔法,以脾门为中心呈扇形分布<sup>[7]</sup>。

**2. 完全腹腔镜脾动脉瘤隔绝术。**(1)仔细探查腹腔,于胃网膜侧无血管区打开胃结肠韧带,根据脾动脉瘤所在部位的不同,调整打开胃结肠韧带的

长度及部位,通常左侧至脾门,右侧至胃窦大弯侧距离幽门约5~8cm。(2)将胃向上翻开,在胰腺上缘处观察脾动脉搏动,结合术前影像学检查结果(图1A,1B),初步判断脾动脉瘤体的位置及其周围毗邻重要的解剖结构(图2A)。若目视不能完全确定,可以沿胰腺上缘打开背侧腹膜,于搏动明显处找到脾动脉,沿脾动脉走行寻找动脉瘤;也可行术中超声检查,确认扩张的脾动脉瘤后,再就近切开胰腺上缘腹膜确定。(3)解剖分离脾动脉瘤体近心端脾动脉,予以悬吊(图2B);解剖远心端脾动脉,予以悬吊(图2C)。(4)首先应用1-0丝线结扎脾动脉瘤近心端动脉,注意结扎时用力轻柔,不要完全闭合脾动脉管腔,避免损伤脾动脉内膜形成假性动脉瘤;然后根据脾动脉直径选用合适的Hem-o-lok双重夹闭脾动脉瘤体近心端脾动脉(图2D)<sup>[7]</sup>。采用同样方法结扎并夹闭脾动脉瘤体远心端脾动脉(图2E)。(5)对于多发性脾动脉瘤患者,应在近心端第1个脾动脉瘤体近心端侧将脾动脉游离悬吊后结扎隔绝,将位于远心端一侧的瘤体旷置,如果远心端脾动脉瘤体靠近脾门,可与脾脏一并切除。(6)部分患者在术前检查或术中探查发现有增粗的胰背动脉自动脉瘤体发出,手术中需解剖脾动脉瘤体发出的胰背动脉支,予以结扎夹闭(图2F)。此时观察脾脏的血供,可见脾动脉瘤体隔绝后脾脏呈明显动脉缺血状态,包膜张力显著减低(图2G),有时仅见胃短静脉汇入部位区域有部分血供。

若脾动脉瘤位于脾门部位,先行脾动脉中段结扎,然后游离脾脏、脾蒂及脾动脉瘤体,于脾动脉瘤



**图1** 脾动脉瘤体及其毗邻器官的影像学检查结果 1A:增强CT检查结果显示扩张的脾动脉瘤体;1B:腹部动脉血管3D成像检查结果示近心端脾动脉、脾动脉瘤体、远心端脾动脉、胰背动脉

**Figure 1** Imaging examination results of splenic artery aneurysm and its adjacent organs 1A: Enhanced computed tomography showed dilated splenic artery aneurysm; 1B: Three-dimensional imaging of abdominal artery showed proximal splenic artery, splenic aneurysm, distal splenic artery and dorsal pancreatic artery



近心端侧离断脾蒂,行脾脏及脾动脉瘤体整体切除术,如患者部分胰腺尾部伸入脾门,可一并切除。

3. 贲门周围血管离断术。(1)切除脾脏:离断胃脾韧带,逐支结扎离断胃短静脉,将胃底与脾脏分开;离断脾结肠韧带,自胰体尾部下缘及脾门下方分离脾蒂,应用内镜下切割闭合器予以离断,完全离断脾肾韧带及脾膈韧带,移除脾脏。(2)贲门周围曲张血管离断:分别沿胃大、小弯侧及胃食管后方向上游离,逐支结扎离断贲门周围曲张的回流静脉

支(图2H),完全离断食管支及高位食管支曲张静脉,向上直达食管下段8~10 cm,完成贲门周围血管离断术(图2I)。

#### 四、观察指标和评价标准

观察指标:(1)手术及术后情况包括手术完成情况,围手术期死亡情况,手术时间,术中出血量,术后第3天生化指标(WBC计数、RBC、Hb、血清Alb),术后拔除腹腔引流管时间,术后住院时间。(2)并发症情况:腹水、腹腔内大出血、消化道痿、

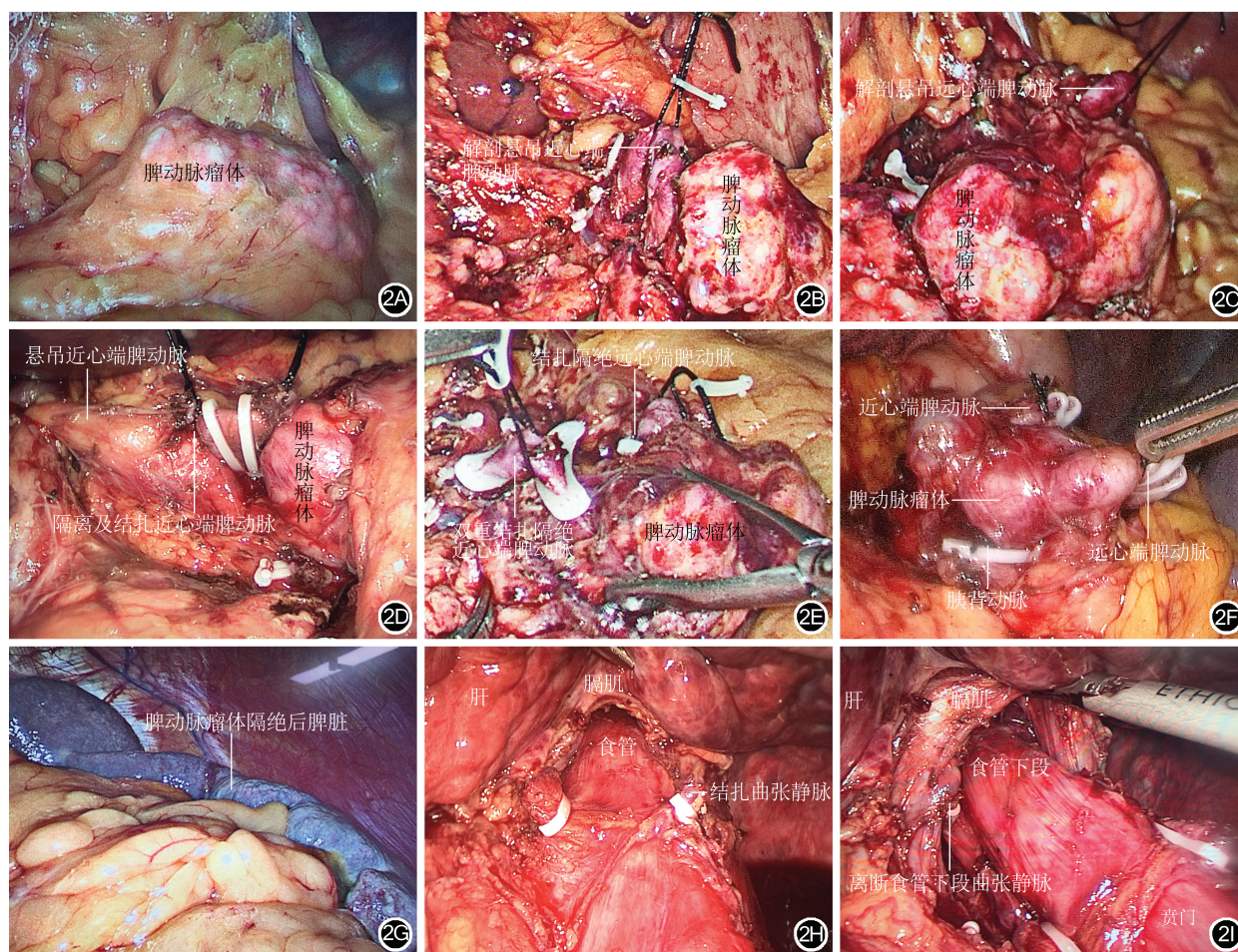


图2 完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术 2A:判断脾动脉瘤体的位置及其周围毗邻重要的解剖结构;2B:解剖分离脾动脉瘤体近心端脾动脉,予以悬吊;2C:解剖远心端脾动脉,予以悬吊;2D:双重夹闭脾动脉瘤体近心端脾动脉;2E:结扎并夹闭脾动脉瘤体远心端脾动脉;2F:解剖脾动脉瘤体发出的胰背动脉支,予以结扎夹闭;2G:脾动脉瘤体隔绝后脾脏呈明显动脉缺血状态,包膜张力显著减低;2H:逐支结扎离断贲门周围曲张的回流静脉支;2I:完全离断食管支及高位食管支曲张静脉,向上直达食管下段8~10 cm,完成贲门周围血管离断术

**Figure 2** Totally laparoscopic splenic artery aneurysm isolation combined with pericardial devascularization 2A: The location of splenic artery aneurysm and its adjacent important anatomical structures were determined; 2B: Splenic artery aneurysm was dissected and separated from the proximal splenic artery and suspended; 2C: The distal splenic artery was dissected and suspended; 2D: Double clipping of the proximal splenic artery of the splenic artery aneurysm; 2E: Ligation and clipping of the distal splenic artery; 2F: The dorsal pancreatic artery branch from the splenic aneurysm was dissected and clipped with ligation; 2G: After splenic artery aneurysm exclusion, the spleen showed obvious arterial ischemia, and the capsular tension was significantly reduced; 2H: Ligation of the varicose circumferential venous branches of the cardia; 2I: The esophageal branch and the varicose vein of the higher esophageal branch were completely severed up to the 8–10 cm lower part of the esophagus, and the pericardial devascularization was completed



胸腔积液、感染、脓肿形成、发热、血管栓塞等。(3)随访情况:获得随访的患者例数,随访时间,了解术后 3 个月动脉瘤体隔绝治疗效果及血液复流情况、门静脉内血栓情况和生存情况。

评价标准:参考中华医学会内镜学分会 2008 年制订的食管胃底静脉曲张不同分级标准及疗效判定<sup>[8-9]</sup>。

## 五、随访

采用门诊和电话方式进行随访,了解患者术后 3 个月动脉瘤体隔绝治疗效果及血液复流情况、门静脉内血栓情况和生存情况。随访时间截至 2020 年 12 月。

## 六、统计学分析

正态分布的计量资料以  $\bar{x} \pm s$  表示,偏态分布的计量资料以  $M(\text{范围})$  表示。

# 结 果

## 一、手术及术后情况

17 例患者均顺利完成手术,无围手术期死亡患者。17 例患者手术时间为  $(181 \pm 30)\text{min}$ ,术中出血量为  $187(90 \sim 420)\text{mL}$ ,术后第 3 天 WBC 计数为  $(9 \pm 4) \times 10^9/\text{L}$ ,RBC 计数为  $(3.5 \pm 0.9) \times 10^{12}/\text{L}$ ,Hb 为  $(86 \pm 17)\text{g/L}$ ,血清 Alb 为  $(36 \pm 7)\text{g/L}$ ,术后拔除腹腔引流管时间为  $(7 \pm 4)\text{d}$ ,术后住院时间为  $(11 \pm 4)\text{d}$ 。

## 二、并发症情况

17 例患者术后均有腹水,予利尿剂口服治疗后好转。所有患者未见腹腔内大出血、消化道瘘、胸腔积液、感染、脓肿形成、发热、血管栓塞等并发症。

## 三、随访情况

17 例患者均获得随访,随访时间为  $28.6(7.0 \sim 84.0)$  个月。随访期间,所有患者脾动脉瘤腔隔绝完全,其内未见血液复流;门静脉内未见血栓形成;无死亡患者。

# 讨 论

## 一、门静脉高压症合并脾动脉瘤的临床特点

我国的门静脉高压症多以肝炎后肝硬化为主要病因,其常合并脾动脉瘤<sup>[5-6]</sup>。手术治疗是门静脉高压症合并脾动脉瘤患者的首选治疗方案<sup>[8-11]</sup>。手术方式要根据患者具体情况和术者的手术经验等因素综合决定,常规分为同期手术和分期手术<sup>[2-9,12-13]</sup>。

同期手术包含开放手术和腹腔镜手术<sup>[14-19]</sup>。分期手术多先行介入手术治疗脾动脉瘤,二期再行腹腔镜或开放脾切除联合贲门周围血管离断术<sup>[20-25]</sup>。

## 二、完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术的优势

目前介入手术行脾动脉瘤腔内隔绝或行瘤腔填塞术多用于动脉瘤发生破裂出血或存在动脉夹层形成等急性并发症,此类手术需在瘤腔内放置大量弹簧圈,局部栓塞会导致瘤体周围组织炎性水肿,增加二期手术操作的难度和风险<sup>[26-34]</sup>。

对于能够耐受手术的患者,笔者建议行同期手术治疗门静脉高压症及脾动脉瘤。门静脉高压症患者行贲门周围血管离断术时,减少术中出血量是术者需要面对的重要问题,与手术治疗的成败及患者的安全相关<sup>[35-37]</sup>。笔者团队通常采用预先控制脾动脉血流的方法减少术中出血量。脾动脉被阻断后,脾脏的动脉灌注压力急剧下降,会使脾脏血窦内的压力下降,降低术中渗血风险;另外,脾脏内贮存的血液还可以继续经过脾静脉回流,使脾脏体积缩小,脾脏表面包膜张力降低,手术操作中脾脏破裂的风险减小,即使手术中脾脏包膜破裂,术中出血量较少且容易止血。完全腹腔镜手术操作的创伤更小,术后患者恢复更快,但同时对于术者手术技能的要求也更高,尤其是腹腔镜下动、静脉血管解剖及分离阻断技术。因此,对于门静脉高压症合并脾动脉瘤患者,笔者团队常规行完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术,不仅可以使脾动脉瘤体隔绝,消除脾动脉瘤破裂出血的风险,又可以完全阻断脾动脉,为下一步行贲门周围血管离断术创造良好的手术条件<sup>[38-40]</sup>。如果脾动脉瘤体靠近脾门,则可以在结扎脾动脉后一并切除脾门动脉瘤体及脾脏(有时含部分胰腺尾部)<sup>[41-42]</sup>。

## 三、门静脉高压症合并脾动脉瘤患者的治疗经验

笔者治疗门静脉高压症合并脾动脉瘤患者的经验:(1)二者可以同期行腹腔镜手术治疗。(2)手术治疗时必须先行脾动脉瘤体隔绝术,再行贲门周围血管离断术。(3)载瘤脾动脉主干结扎的顺序,应遵循“先近心端,再远心端”的原则。如果颠倒顺序,动脉瘤可能会因为腔内压力骤升而破裂出血,危及生命。(4)结扎曲张回流静脉支的时候宜靠近胃壁及下段食管壁,应尽量保留冠状静脉回流通路,以减低门静脉压力。(5)可配合行术中出血洗涤 RBC 回输,以减少术中、术后异体血液制品的输

入<sup>[43]</sup>。(6)完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术能同时治疗脾动脉瘤、门静脉高压症、食管胃底静脉曲张及脾功能亢进等系列门静脉高压症相关疾病,既可以缩短治疗周期,及时缓解患者痛苦,又同时减轻患者的经济负担。(7)该手术方式具有创伤小,恢复快,术中出血量少,术后住院时间短,术后并发症发生率低等优势。

综上,完全腹腔镜脾动脉瘤隔绝联合贲门周围血管离断术治疗门静脉高压症合并脾动脉瘤安全、可行。由于本研究样本量较小,所得结论尚需大样本量、多中心研究进行验证。

**利益冲突** 所有作者均声明不存在利益冲突

**作者贡献声明** 曾志武:临床手术操作及资料收集,论文撰写修改;邓次妮:临床资料收集整理,影像资料及数据处理,论文修改,研究经费支持;刘莉:临床数据处理;夏辉、杨光耀、陈冬、周程、龚昭:部分临床数据收集处理,论文修改;王炜煜:临床数据统计处理,审阅修改论文

## 参 考 文 献

- Salman AA, Shaaban HE, Atallah M, et al. Long-term outcome after endoscopic ligation of acute esophageal variceal bleeding in patients with liver cirrhosis[J]. *Acta Gastroenterol Belg*, 2020, 83(3): 373-380.
- 杨连粤. 门静脉高压症外科治疗的进展[J]. *中华外科杂志*, 2020, 58(3): 183-188. DOI: 10.3760/cma.j.issn.0529-5815.2020.03.005.
- 中国人体健康科技促进会门静脉高压专业委员会, 亚太门静脉高压联盟, 中国门静脉高压诊断与监测研究组, 等. 新型冠状病毒肺炎后疫情时代门静脉高压症全病程管理专家共识[J]. *中华消化外科杂志*, 2020, 19(7): 703-713. DOI: 10.3760/cma.j.cn115610-20200602-00408.
- 田明国, 贾东, 杨勇, 等. 选择性脾胃区静脉分流治疗门静脉高压症的临床疗效[J]. *中华消化外科杂志*, 2020, 19(12): 1286-1292. DOI: 10.3760/cma.j.cn115610.20201028.00681.
- Hamid H, Suliman A, Piffaretti G, et al. A systematic review on clinical features and management of true giant splenic artery aneurysms[J]. *J Vasc Surg*, 2020, 71(3): 1036-1045.e1. DOI: 10.1016/j.jvs.2019.09.026.
- Rehman ZU. Multiple giant splenic artery aneurysms with hypersplenism and portal hypertension: a case report[J]. *Ann Vasc Dis*, 2019, 12(2): 250-252. DOI: 10.3400/avd.cr.19-00021.
- Derebey M, Ozbalci GS, Yuruker S, et al. Comparison of Hem-o-lok polymeric clip and tri-staple in laparoscopic splenectomy[J]. *Ann Ital Chir*, 2021, 92: 64-69.
- 中华医学会肝病学会, 中华医学会消化病学分会, 中华医学会消化内镜学分会. 肝硬化门静脉高压食管胃静脉曲张出血的防治指南[J]. *中华内科杂志*, 2016, 55(1): 57-72. DOI: 10.3760/cma.j.issn.0578-1426.2016.01.015.
- 中华医学会外科学分会脾及门静脉高压外科学组. 腹腔镜贲门周围血管离断术中国专家共识(2022版)[J]. *中华消化外科杂志*, 2022, 21(6): 701-707. DOI: 10.3760/cma.j.cn115610-20220513-00272.
- 肖勇, 于红刚, 陈明镭. 肝硬化门静脉高压食管胃静脉曲张出血的内镜诊治策略[J]. *中华消化内镜杂志*, 2018, 35(2): 84-88. DOI: 10.3760/cma.j.issn.1007-5232.2018.02.002.
- Acosta S, Asciutto G. Endovascular therapy for visceral artery aneurysms[J]. *Int Angiol*, 2016, 35(6): 573-578.
- Chen H, Yang F, Li TT, et al. Comparison of efficacy of laparoscopic and open splenectomy combined with selective and nonselective pericardial devascularization in portal hypertension patients[J]. *Surg Laparosc Endosc Percutan Tech*, 2018, 28(6): 401-403. DOI: 10.1097/SLE.0000000000000581.
- Hogendoorn W, Lavidia A, Hunink MG, et al. Cost-effectiveness of endovascular repair, open repair, and conservative management of splenic artery aneurysms[J]. *J Vasc Surg*, 2015, 61(6): 1432-1440. DOI: 10.1016/j.jvs.2014.12.064.
- Lozano Sánchez FS, García-Alonso J, Torres JA, et al. Decision-making and therapeutic options in intact splenic artery aneurysms: single-center experience and literature review[J]. *Int Angiol*, 2020, 39(3): 241-251. DOI: 10.23736/S0392-9590.20.04304-7.
- Venturini M, Marra P, Colombo M, et al. Endovascular treatment of visceral artery aneurysms and pseudoaneurysms in 100 patients: covered stenting vs transcatheter embolization[J]. *J Endovasc Ther*, 2017, 24(5): 709-717. DOI: 10.1177/1526602817717715.
- Chin JA, Heib A, Ochoa Chaar CI, et al. Trends and outcomes in endovascular and open surgical treatment of visceral aneurysms[J]. *J Vasc Surg*, 2017, 66(1): 195-201.e1. DOI: 10.1016/j.jvs.2017.02.036.
- Yan C, Qiang Z, Jin S, et al. Spleen bed laparoscopic splenectomy plus pericardial devascularization for elderly patients with portal hypertension[J]. *Wideochir Inne Tech Maloinwazyjne*, 2022, 17(2): 338-343. DOI: 10.5114/wiitm.2022.114538.
- Hashizume M, Ohta M, Ueno K, et al. Laparoscopic ligation of splenic artery aneurysm[J]. *Surgery*, 1993, 113(3): 352-354.
- Correia de Sá T, Soares C, Queirós J, et al. Laparoscopic resection of a splenic artery aneurysm with spleen preservation[J]. *Case Rep Surg*, 2020, 2020: 2873560. DOI: 10.1155/2020/2873560.
- Veterano C, Monteiro E, Rego D, et al. Laparoscopic resection of a splenic artery aneurysm with vascular reconstruction during pregnancy[J]. *Ann Vasc Surg*, 2021, 72: 666.e7-666.e11. DOI: 10.1016/j.avsg.2020.10.016.
- Yoon T, Kwon T, Kwon H, et al. Transcatheter arterial embolization of splenic artery aneurysms: a single-center experience[J]. *Vasc Specialist Int*, 2014, 30(4): 120-124. DOI: 10.5758/vsi.2014.30.4.120.
- Hogendoorn W, Lavidia A, Hunink MG, et al. Open repair, endovascular repair, and conservative management of true splenic artery aneurysms[J]. *J Vasc Surg*, 2014, 60(6): 1667-1676.e1. DOI: 10.1016/j.jvs.2014.08.067.
- Zhu C, Zhao J, Yuan D, et al. Endovascular and surgical management of intact splenic artery aneurysm[J]. *Ann Vasc Surg*, 2019, 57: 75-82. DOI: 10.1016/j.avsg.2018.08.088.
- Deng ZC, Jiang WZ, Chen L, et al. Laparoscopic vs. open splenectomy and oesophagogastric devascularisation for liver cirrhosis and portal hypertension: a retrospective cohort study[J]. *Int J Surg*, 2020, 80: 79-83. DOI: 10.1016/j.ijsu.2020.06.026.
- Ouchi T, Kato N, Nakajima K, et al. Splenic artery aneu-



- rysm treated with endovascular stent grafting: a case report and review of literature[J]. Vasc Endovascular Surg, 2018,52(8):663-668. DOI:10.1177/1538574418785252.
- [26] Wang M, Ding L, Xu M, et al. A novel method detecting the key clinic factors of portal vein system thrombosis of splenectomy & cardia devascularization patients for cirrhosis & portal hypertension[J]. BMC Bioinformatics, 2019, 20 (Suppl 22):720. DOI:10.1186/s12859-019-3233-3.
- [27] Yoon T, Kwon T, Kwon H, et al. Transcatheter arterial embolization of splenic artery aneurysms: a single-center experience[J]. Vasc Specialist Int, 2014,30(4):120-124. DOI: 10.5758/vsi.2014.30.4.120.
- [28] Kauffman P, Macedo A, Sacilotto R, et al. The therapeutic challenge of giant splenic artery aneurysm: a case report [J]. Einstein (Sao Paulo), 2017,15(3):359-362. DOI:10.1590/S1679-45082017RC3873.
- [29] Chauhan U, Puri SK, Jain N, et al. Percutaneous thrombin injection under sonographic guidance for exclusion of non-catheterizable post-pancreatitis pseudoaneurysm of the superior mesenteric artery: a minimally invasive and expeditious treatment option[J]. J Med Ultrason, 2016,43(2): 295-299. DOI:10.1007/s10396-015-0687-4.
- [30] 张伟,张曦彤,田玉龙,等. 不锈钢弹簧圈填塞治疗内脏动脉瘤 8 例[J]. 介入放射学杂志, 2016,25(4):308-311. DOI:10.3969/j.issn.1008-794X.2016.04.008.
- [31] 顾伟,郑博,王令彪,等. 主动脉夹层动脉瘤猝死 16 例尸检临床病理分析[J]. 解放军医药杂志, 2015(3):72-74,84. DOI: 10.3969/j.issn.2095-140X.2015.03.018.
- [32] 卢增新,周建伟,孔建国,等. 副肝动脉瘤破裂出血的诊断与治疗[J]. 中华消化外科杂志, 2021,20(2):246-249. DOI:10.3760/cma.j.cn115610-20210109-00012.
- [33] 田秋思,梁彦彬,王克,等. 双微导管联合弹簧圈填塞治疗对颅内动脉瘤患者认知功能、炎性因子及预后的影响[J]. 解放军医药杂志, 2021,33(5):79-83. DOI:10.3969/j.issn.2095-140X.2021.05.017.
- [34] Ferrara D, Giribono AM, Viviani E, et al. Endovascular management of a large hepatic artery aneurysm[J]. Clin Ter, 2017,168(3):e178-e180. DOI:10.7417/T.2017.2001.
- [35] Regus S, Lang W. Management of true visceral artery aneurysms in 31 cases[J]. J Visc Surg, 2016,153(5):347-352. DOI:10.1016/j.jviscsurg.2016.03.008.
- [36] Lin J, Liu Q, Liang Z, et al. Laparoscopic selective esophagogastric devascularization and splenectomy for patients with cirrhotic portal hypertension[J]. Wideochir Inne Tech Maloinwazyjne, 2019,14(2):187-194. DOI:10.5114/wiitm.2018.80297.
- [37] Zheng S, Sun P, Liu X, et al. Efficacy and safety of laparoscopic splenectomy and esophagogastric devascularization for portal hypertension: a single-center experience [J]. Medicine (Baltimore), 2018,97(50):e13703. DOI:10.1097/MD.00000000000013703.
- [38] Barrionuevo P, Malas MB, Nejim B, et al. A systematic review and meta-analysis of the management of visceral artery aneurysms[J]. J Vasc Surg, 2019,70(5):1694-1699. DOI:10.1016/j.jvs.2019.02.024.
- [39] Pitton MB, Dappa E, Jungmann F, et al. Visceral artery aneurysms: incidence, management, and outcome analysis in a tertiary care center over one decade[J]. Eur Radiol, 2015,25(7):2004-2014. DOI:10.1007/s00330-015-3599-1.
- [40] Kim Y, Johna S. Laparoscopic excision of splenic artery aneurysm[J]. JSLS, 2013,17(1):132-134. DOI:10.4293/108680812X13517013317392.
- [41] Martin D, Teixeira Farinha H, Dattner N, et al. Spontaneous non-traumatic splenic artery aneurysm rupture: a case report and review of the literature[J]. Eur Rev Med Pharmacol Sci, 2018,22(10):3147-3150. DOI:10.26355/eurrev\_2018\_05\_15074.
- [42] Tartaglia E, Reggio S, Cuccurullo D, et al. Laparoscopic near-total splenectomy: a single-center experience of a standardized procedure[J]. Minim Invasive Ther Allied Technol, 2019,28(5):298-303. DOI:10.1080/13645706.2018.1521433.
- [43] 沈国樑,洪德飞,张成武,等. 脾动脉加压灌注自血回输技术在腹腔镜脾切除贲门周围血管离断术中的应用[J]. 中国医师杂志, 2021,23(11):1647-1650. DOI:10.3760/cma.j.cn431274-20201019-01415.

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