· 临床论著 ·

腔镜获取大隐静脉在冠状动脉搭桥术中的应用

徐灿，　潘俊，　周庆，　王东进

南京大学医学院附属鼓楼医院心胸外科，江苏 南京 210008

摘要：目的　评价在冠状动脉搭桥术中应用腔镜获取大隐静脉的早期临床效果。**方法**　以 2019 年 6 月至 2023 年 10 月南京鼓楼医院腔镜获取大隐静脉的 262 例患者为研究对象，观察患者手术情况及术后切口并发症发生率。**结果**　获取大隐静脉时间为（39.1±9.2）min，长度为（30.8±7.6）cm，取出后肉眼观察大隐静脉管壁无明显损伤。13 例患者术后出现皮下淤斑，平均约 10 d 后能自行吸收痊愈，患者腿部切口疼痛不明显，没有切口感染、裂开、脂肪液化。**结论**　腔镜获取大隐静脉创伤小，能够带来良好的早期临床效果，提高患者的满意度和生活质量。

关键词：大隐静脉；冠状动脉旁路移植术；腔镜；皮下淤斑

中图分类号：R654.2　**文献标识码：**A　**文章编号：**1674-8182(2024)05-0764-04

Endoscopic vein harvesting in coronary artery bypass grafting

XU Can, PAN Jun, ZHOU Qing, WANG Dongjin

Department of Thoracic and Cardiovascular Surgery, Nanjing Drum Tower Hospital, The Affiliated Hospital of Nanjing University Medical School, Nanjing, Jiangsu 210008, China

Corresponding author: WANG Dongjin, E-mail: wangdongjin@njglyy.com

Abstract: Objective　To evaluate the early clinical effect of the application of endoscopy in coronary artery bypass grafting to obtain the great saphenous vein. **Methods**　A total of 262 patients with great saphenous vein obtained by endoscopy in Nanjing Drum Tower Hospital were used to observe the operation status and incidence of postoperative incision complications from June 2019 to October 2023. **Results**　The time to obtain the great saphenous vein was (39.1±9.2) min, and the length was (30.8±7.6) cm. There was no obvious damage to the wall of the great saphenous vein after removal. Subcutaneous ecchymosis occurred in 13 patients, and it could be absorbed and healed by itself after an average of about 10 days. The pain of the leg incision was not obvious, and there was no incision infection, dehiscence or fat liquefaction. **Conclusion**　Obtaining the great saphenous vein through endoscopy with little trauma can bring good early clinical results and improve patient satisfaction and quality of life.

Keywords: Great saphenous vein; Coronary artery bypass grafting; Endoscope; Subcutaneous ecchymosis

Fund program: National Natural Science Foundation of China (82241212,82270346); Jiangsu Province Key Medical Discipline (ZDXK202229); New Technology Development Fund of Nanjing Drum Tower Hospital (XJSFZJJ201930)

自上世纪 60 年代 Rene Favaloro[1]首次报道大隐静脉临床应用以来，大隐静脉已成为冠状动脉搭桥术中最常用的移植血管[2-3]。腔镜获取大隐静脉能够减轻患者下肢切口疼痛，减少感染等并发症，加速功能康复[4-5]。现总结南京大学医学院附属鼓楼医院心脏大血管外科采用腔镜获取大隐静脉行搭桥手术，并取得良好的效果。现报道如下。

1　资料与方法

1.1　临床资料　2019 年 6 月至 2023 年 10 月，以

DOI: 10.13429/j.cnki.cjcr.2024.05.040

基金项目：国家自然科学基金（82241212，82270346）；江苏省医学重点学科（ZDXK202229）；南京鼓楼医院新技术发展基金（XJSFZJJ201930）

通信作者：王东进，E-mail：wangdongjin@njglyy.com

出版日期：2024-05-20

南京大学医学院附属鼓楼医院心脏大血管外科冠状动脉组病例为研究对象,其中使用腔镜技术获取大隐静脉进行的搭桥手术患者 262 例(米道斯血管采集系统),所有腔镜获取大隐静脉的操作都有同一位外科医生完成。患者男性 195 例,女性 67 例,年龄 49~84(67.5±2.3)岁,既往有糖尿病病史 191 例,高血压病史 201 例,陈旧性脑梗死 15 例,术前行双下肢静脉彩超评估未见明显静脉曲张等情况。

1.2　*方法*　搭桥手术患者常规使用全身麻醉气管插管,在膝关节内侧纵行方向作一长为 1.5~2.0 cm 的腔镜切口,采用米道斯血管采集系统,二氧化碳(CO_2)气流量设定为 3~5 L/min,CO_2 设为 10~13 mmHg,双极电凝剪刀能量为 30 W,先充分游离大隐静脉周围组织及分支,再用双极电凝剪刀距离大隐静脉主干约 5 mm 电凝分支并截掉,轻柔取出大隐静脉后在隧道内放置皮下引流管并缝合切口。弹力绷带加压包扎。详细过程见图 1。

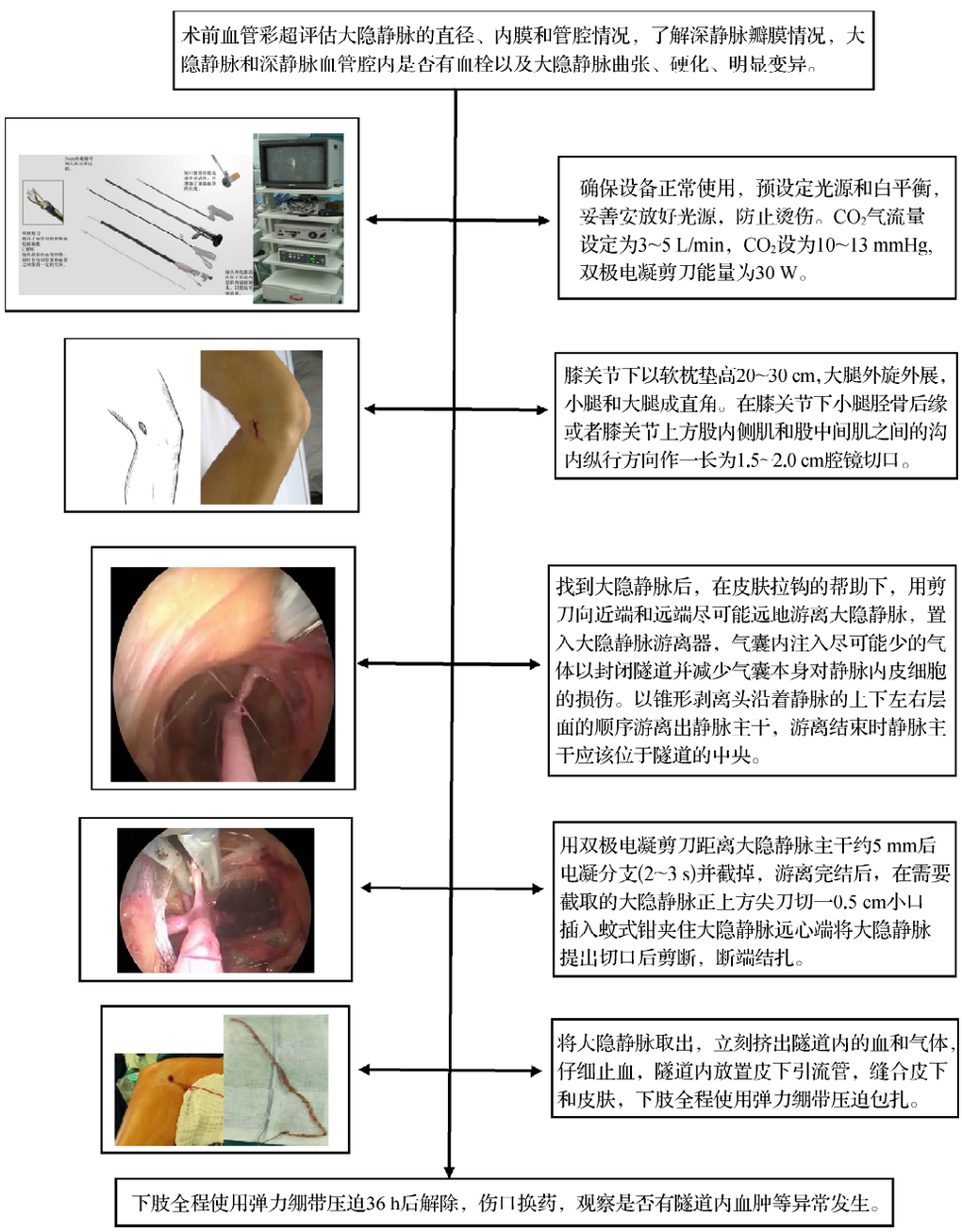

图 1　腔镜获取大隐静脉过程

Fig. 1　Rrocess of obtaining the great saphenous vein through endoscope

2 结　果

腔镜获取大隐静脉(从切皮到缝合皮肤加压包扎)时间为(39.1±9.2)min,大隐静脉长度为(30.8±7.6)cm,取出后肉眼观察大隐静脉管壁无明显损伤。13 例患者术后出现皮下淤斑,平均约 10 d 后能自行吸收痊愈,患者腿部切口疼痛不明显。262 例患者均没有切口感染、裂开、脂肪液化、血肿等发生。

3 讨　论

自从 1997 年报道腔镜获取大隐静脉在搭桥手术的应用[6],在冠状动脉旁路手术中获取搭桥血管的微创技术越来越受欢迎[4]。与传统的开放获取大隐静脉相比,腔镜获取大隐静脉的优点在于能够减少患者疼痛、切口感染、脂肪液化,提高患者满意度[3,7-10]。

对于腔镜获取大隐静脉是否影响术后静脉桥的远期通畅率,目前临床结果存在一定争议。PREVENT Ⅳ (PREVENT Ⅳ; ClinicalTrials. gov, NCT00042081)研究发现在搭桥术后 12~18 个月期间腔镜获取大隐静脉失败率高于开放获取大隐静脉(46.7% *vs* 38.0%, P<0.01),3 年后,腔镜获取大隐静脉也与死亡率、心肌梗死或再次血管化有关(20.2% *vs* 17.4%, 95%*CI*:1.01~1.47, P=0.04)[11]。ROOBY 项目(ROOBY;ClinicalTrials.gov, NCT00032630)实验研究发现在搭桥术后一年腔镜获取大隐静脉失败率低于开放获取大隐静脉(74.5% *vs* 85.2%, P<0.01),但重复再血管化率显著提高(6.7% *vs* 3.4%, P < 0.05)。但 PREVENT Ⅳ和 ROOBY 研究的结果都是基于数据的二次研究,而且这两项研究都不是为了研究腔镜获取大隐静脉而设计的[12]。尽管存在这样的争议,国际微创胸腔外科学学会在发布了一份共识:腔镜获取大隐静脉与心脏相关事件的发生率或通畅率没有相关性,相反建议腔镜取大隐静脉应该在搭桥手术中常规使用[4]。近来最近的一项前瞻性随机试验 REGROUP 证实(REGROUP; ClinicalTrials. gov, NCT01850082)与开放获取大隐静脉手术相比,腔镜获取大隐静脉与较高的心脏相关不良事件发生率无关[9]。临床试验中期结果发现,在中位随访 4.7 年期间,接受开放获取大隐静脉的患者与接受腔镜获取大隐静脉治疗冠状动脉旁路移植术(CABG)的患者证明腔镜或开放方法在心血管事件方面无显著差异,腔镜获取大隐静脉减少了腿部伤口并发症[13]。另一项三种不同技术对获取大隐静脉的临床研究表明,腔镜获取大隐静脉腿部伤口并发症发生率最低[14]。一项系统评价和荟萃分析共纳入 22 项研究,涉及 27 911 名患者。腔镜和开放获取大隐静脉的全因死亡率、院内死亡率和主要心血管不良事件(MACE)发生率相似,但与开放技术相比,腔镜获取观察到的腿部伤口并发症较少(OR = 0.19, 95% CI: 0.12 ~ 0.30, P < 0.01)[15]。一项对 CABG 中三种主要大隐静脉采集技术的全因死亡率、血运重建进行了荟萃分析,与腔镜获取大隐静脉相比,开放获取大隐静脉的全因死亡率更高,各组的血运重建率相似[16]。与开放获取大隐静脉相比,没有证据表明腔镜获取大隐静脉与更低的出院成本花费相关。一项 REGROUP 临床试验成本研究中发现,与开放获取大隐静脉相比,腔镜获取大隐静脉的使用分别增加了 1 238 美元的成本,但两者的差异均无统计学意义[17]。汉娜·埃基等人从英国国家卫生服务的角度评估了腔镜获取大隐静脉采集与开放静脉采集的成本效益,结果显示与开放式静脉采集相比,腔镜获取大隐静脉采集每位患者可节省 68.46 英镑的成本,腔镜获取大隐静脉是一种经济高效的大隐静脉移植物采集方法[18]。腔镜获取大隐静脉改善患者切口愈合、更快地恢复日常生活活动和提高生活质量,而且该技术似乎在经济上也是可行的,更多的研究表明在有经验熟练的外科医生进行操作[19],MACE 或死亡率不会增加,并且该手术在中长期同样安全[20-24]。

总之,越来越多的证据支持使用腔镜获取大隐静脉,可能是未来心脏外科发展趋势之一。相关声明(Ⅰb 级)推荐使用腔镜获取大隐静脉,腔镜获取大隐静脉是否影响搭桥术后静脉桥的临床结果和通畅率,需要更多的随机对照长期随访结果进一步探讨。

利益冲突　无

参考文献

[1] Favaloro RG. Saphenous vein autograft replacement of severe segmental coronary artery occlusion: operative technique[J]. Ann Thorac Surg, 1968, 5(4): 334-339.

[2] Caliskan E, de Souza DR, Böning A, et al. Saphenous vein grafts in contemporary coronary artery bypass graft surgery[J]. Nat Rev Cardiol, 2020, 17(3): 155-169.

[3] El-Akkawi AI, Holdflod Møller CJ, Olsen PS, et al. Saphenous vein harvesting techniques for coronary artery bypass grafting[J]. Ugeskr Laeger, 2019, 181(3): V03180175.

[4] Ferdinand FD, MacDonald JK, Balkhy HH, et al. Endoscopic conduit harvest in coronary artery bypass grafting surgery: an ISMICS systematic review and consensus conference statements[J]. Innovations, 2017, 12(5): 301-319.

(下转第 772 页)

ular osteoarthritis of the knee[J]. Chin J Tissue Eng Res, 2020, 24(30): 4905-4913.

[17] D'Ambrosi R, Nuara A, Mariani I, et al. Titanium niobium nitride mobile-bearing unicompartmental knee arthroplasty results in good to excellent clinical and radiographic outcomes in metal allergy patients with medial knee osteoarthritis[J]. J Arthroplasty, 2021, 36(1): 140-147.e2.

[18] Becher C, Beckmann J, von Eisenhart-Rothe R, et al. Unicondylar tibiofemoral arthroplasty—opinions of the members of the German knee society (DKG) and the German professional association of orthopaedic and trauma specialists (BVOU)[J]. Z Orthop Unfall, 2021, 159(1): 47-53.

[19] Konings MJ, De Vroey H, Weygers I, et al. Effect of knee arthroplasty on sports participation and activity levels: a systematic review and meta-analysis[J]. BMJ Open Sport Exerc Med, 2020, 6(1): e000729.

[20] 惠曙国,赵光辉,王建朋,等.单髁置换术与全膝关节置换术治疗同一患者双膝关节单间室骨性关节炎的疗效观察[J].中国骨与关节损伤杂志,2022,37(4):359-362.
Hui SG, Zhao GH, Wang JP, et al. Effectiveness comparison between unicompartmental knee arthroplasty and total knee arthroplasty in same patient with bilateral unicompartment knee osteoarthritis[J]. Chin J Bone Jt Inj, 2022, 37(4): 359-362.

[21] Kayani B, Konan S, Tahmassebi J, et al. Robotic-arm assisted medial unicondylar knee arthroplasty versus jig-based unicompartmental knee arthroplasty with navigation control: study protocol for a prospective randomised controlled trial[J]. Trials, 2020, 21: 721.

[22] Deng MC, Hu Y, Zhang ZZ, et al. Unicondylar knee replacement versus total knee replacement for the treatment of medial knee osteoarthritis: a systematic review and meta-analysis[J]. Arch Orthop Trauma Surg, 2021, 141(8): 1361-1372.

收稿日期:2023-08-27　**修回日期**:2023-12-07　**编辑**:王宇

(上接第 766 页)

[5] Allen K, Cheng D, Cohn W, et al. Endoscopic vascular harvest in coronary artery bypass grafting surgery: a consensus statement of the international society of minimally invasive cardiothoracic surgery (ISMICS) 2005[J]. Innovations, 2005, 1(2): 51-60.

[6] Allen KB, Shaar CJ. Endoscopic saphenous vein harvesting[J]. Ann Thorac Surg, 1997, 64(1): 265-266.

[7] Salsano A, Mariscalco G, Santini F. Endoscopic saphenous vein harvesting and surgical site infections after coronary artery bypass surgery[J]. Ann Transl Med, 2018, 6 Suppl 1: S37.

[8] Mirza AK, Stauffer K, Fleming MD, et al. Endoscopic versus open great saphenous vein harvesting for femoral to popliteal artery bypass[J]. J Vasc Surg, 2018, 67(4): 1199-1206.

[9] Zenati MA, Bhatt DL, Bakaeen FG, et al. Randomized trial of endoscopic or open vein-graft harvesting for coronary-artery bypass[J]. N Engl J Med, 2019, 380(2): 132-141.

[10] Klopsch C, Kaminski A, Prall F, et al. Synergizing antegrade endoscopic with bridging vein harvesting for improvement of great saphenous vein graft quality from the lower leg[J]. J Vis Exp, 2019(153): (153).

[11] Lopes RD, Hafley GE, Allen KB, et al. Endoscopic versus open vein-graft harvesting in coronary-artery bypass surgery[J]. N Engl J Med, 2009, 361(3): 235-244.

[12] Hess CN, Lopes RD, Gibson CM, et al. Saphenous vein graft failure after coronary artery bypass surgery: insights from PREVENT IV[J]. Circulation, 2014, 130(17): 1445-1451.

[13] Zenati MA, Bhatt DL, Stock EM, et al. Intermediate-term outcomes of endoscopic or open vein harvesting for coronary artery bypass grafting: the REGROUP randomized clinical trial[J]. JAMA Netw Open, 2021, 4(3): e211439.

[14] Zivkovic I, Krasic S, Stankovic M, et al. Influence of three different surgical techniques on microscopic damage of saphenous vein grafts-a randomized study[J]. Medicina, 2023, 59(2): 217.

[15] Li GH, Zhang Y, Wu ZC, et al. Mid-term and long-term outcomes of endoscopic versus open vein harvesting for coronary artery bypass: a systematic review and meta-analysis[J]. Int J Surg, 2019, 72: 167-173.

[16] Yokoyama Y, Shimamura J, Takagi H, et al. Harvesting techniques of the saphenous vein graft for coronary artery bypass: insights from a network meta-analysis[J]. J Card Surg, 2021, 36(11): 4369-4375.

[17] Wagner TH, Hattler B, Stock EM, et al. Costs of endoscopic vs open vein harvesting for coronary artery bypass grafting: a secondary analysis of the REGROUP trial[J]. JAMA Netw Open, 2022, 5(6): e2217686.

[18] Eckey H, Heseler S, Hiligsmann M. Economic evaluation of endoscopic vs open vein harvesting[J]. Ann Thorac Surg, 2023, 115(5): 1144-1150.

[19] Akowuah E, Burns D, Zacharias J, et al. Endoscopic vein harvesting[J]. J Thorac Dis, 2021, 13(3): 1899-1908.

[20] Mubarak Y, Abdeljawad A. Leg wound complications: a comparison between endoscopic and open saphenous vein harvesting techniques[J]. Heart Surg Forum, 2021, 24(4): E604-E610.

[21] Kopjar T, Dashwood MR. Towards endoscopic No-touch saphenous vein graft harvesting in coronary bypass surgery[J]. Braz J Cardiovasc Surg, 2022, 37(Spec 1): 57-65.

[22] Ran J, Liu Y, Li Y, et al. The effect of endoscopic vein harvesting in coronary artery bypass surgery[J]. J Thorac Dis, 2020, 12(5): 1991-1998.

[23] Kirmani BH, Power S, Zacharias J. Long-term survival after endoscopic vein harvest for coronary artery bypass grafting[J]. Ann R Coll Surg Engl, 2020, 102(6): 422-428.

[24] Filip T, Schröther F, Haase R, et al. Patient satisfaction and clinical complications after endoscopic or surgical saphenous vein harvesting[J]. Thorac Cardiovasc Surg, 2020, 68(8): 700-705.

收稿日期:2023-08-28　**修回日期**:2023-11-09　**编辑**:叶小舟