

经皮穿刺入路腔内修复腹主动脉瘤使用 ProGlide 缝合的效果

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[摘要] **目的** 探讨经皮穿刺入路行腹主动脉瘤腔内修复术(EVAR)使用 ProGlide 缝合的效果。**方法** 我院 2015 年 5 月—2017 年 8 月行 EVAR 治疗的腹主动脉瘤(AAA)病人 179 例,其中传统股总动脉切开入路 104 例(A 组),使用 ProGlide 经皮入路 75 例(B 组)。比较两组手术入路闭合成功率、手术入路相关并发症、手术及住院时间等。股总动脉穿刺点缝合顺利完成无需额外的外科及介入手段干预视为入路闭合成功。**结果** 所有病人均成功实施了 EVAR。A 组 208 条股总动脉中行补片修补 1 条,闭合成功率为 99.5%(207/208);相关并发症包括切口出血 2 条,切口感染 1 条,淋巴漏 2 条,感觉异常 1 条,术后管腔轻-中度狭窄 2 条。B 组 150 条股总动脉中 146 条使用 ProGlide 闭合成功,闭合成功率为 97.3%,2 条股总动脉闭合失败中转外科切开缝合,2 条股总动脉皮下血肿形成进一步行外科修复;相关并发症包括术后渗血 1 条,假性动脉瘤 2 条。两组手术入路并发症总体发生情况比较,差异无统计学意义($P>0.05$)。B 组手术及住院时间较 A 组均明显缩短,差异具有统计学意义($t=6.12, 7.04, P<0.01$)。**结论** 经皮穿刺入路行 EVAR 使用 ProGlide 缝合安全可靠,并不增加手术入路相关并发症,且可明显缩短手术及住院时间,值得临床推广应用。

[关键词] 外科缝合器;穿刺术;主动脉瘤,腹;血管内操作;手术后并发症

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CLINICAL EFFECT OF PROGLIDE SUTURE IN ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR VIA PERCUTANEOUS PUNCTURE CUI Wenjun, AN Qian, SI Jiangtao, WANG Ying, WU Fei, LI Yang, WANG Bing (Department of Vascular Surgery, The Fifth Affiliated Hospital of Zhengzhou University, Zhengzhou 450001, China)

[ABSTRACT] **Objective** To investigate the clinical effect of ProGlide suture in endovascular abdominal aortic aneurysm repair (EVAR) via percutaneous puncture. **Methods** A total of 179 patients with abdominal aortic aneurysm who underwent EVAR in our hospital from May 2015 to August 2017 were enrolled, and among these patients, 104 underwent EVAR via common femoral artery incision (group A) and 75 underwent EVAR with ProGlide via percutaneous puncture (group B). The two groups were compared in terms of the success rate of surgical incision closure, complications associated with the surgical approach, time of operation, and length of hospital stay. Successful surgical incision closure referred to successful suture of the puncture point of the common femoral artery, without the need for further surgical or interventional measures. **Results** All patients underwent a successful EVAR surgery. Patch repair was performed for 1 out of the 208 common femoral arteries in group A, and the success rate of surgical incision closure was 99.5% (207/208); related complications included incision bleeding in 2 arteries, incision infection in 1 artery, lymphorrhea in 2 arteries, paresthesia in 1 artery, and mild-to-moderate angiostenosis in 2 arteries. Among the 150 common femoral arteries in group B, 146 were successfully closed with ProGlide suture, with a success rate of 97.3%; 2 common femoral arteries were converted to surgical incision and suture due to failed closure with ProGlide, and surgical repair was performed for 2 common femoral arteries due to subcutaneous hematoma; related complications included oozing of blood in 1 artery and pseudoaneurysm in 2 arteries. There was no significant difference in the incidence rate of complications between the two groups ($P>0.05$). Group B had significantly shorter time of operation and length of hospital stay than group A ($t=6.12, 7.04, P<0.01$). **Conclusion** ProGlide suture is safe and reliable in EVAR via percutaneous puncture and does not increase the complications associated with surgical approach. It can also significantly shorten time of operation and length of hospital stay and thus holds promise for clinical application.

[KEY WORDS] Surgical staplers; Punctures; Aortic aneurysm, abdominal; Endovascular procedures; Postoperative complications

腹主动脉瘤腔内修复术(EVAR)已成为治疗肾下腹主动脉瘤(AAA)的首选治疗方法, EVAR 有创

伤小、恢复快、住院周期短、手术风险较小等优点,现已基本取代传统外科手术治疗^[1-2]。常规行 EVAR 治疗 AAA 需行腹股沟小切口,显露并控制双侧股总动脉,作为支架输送系统入路,由此引发的感染、出血、血肿、淋巴漏、手术瘢痕等也不容忽视^[3-5]。为

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进一步减少手术创伤,我院使用预置 ProGlide 血管缝合系统经皮行 EVAR 操作,效果较好。

1 资料与方法

1.1 一般资料

2015 年 5 月—2017 年 8 月我院行 EVAR 治疗的 AAA 病人共 179 例,其中男 153 例,女 26 例,平

均年龄 75.0 岁。排除标准包括:髂动脉严重扭曲加硬导丝无法通过者;股总动脉严重狭窄或者钙化者;腹股沟区血肿,或者既往腹股沟区有手术史者;凝血功能异常者;过度肥胖者^[6]。行传统股总动脉切开 EVAR 术 104 例(A 组),行经皮入路使用 ProGlide 的 EVAR 术 75 例(B 组)。两组病人的一般资料比较,差异无统计学意义,具有可比性。见表 1。

表 1 两组病人一般资料比较

分组	年龄(岁, $\bar{x}\pm s$)	性别(例,男/女)	BMI(kg/m ² , $\bar{x}\pm s$)	糖尿病(例(X/%))	高血压(例(X/%))	吸烟(例(X/%))	高脂血症(例(X/%))
A 组	75.6±8.7	88/16	23.3±2.7	18(17.3)	79(76.0)	57(54.8)	39(37.5)
B 组	74.2±7.9	65/10	22.9±3.3	10(13.3)	51(68.0)	35(46.7)	28(37.3)

1.2 治疗方法

A 组均采用全身麻醉,双侧腹沟区股总动脉搏动处沿皮纹皱褶斜行向内小切口长约 5 cm,分离并控制股总动脉,手术后采用 CV-5 血管缝合线缝合血管穿刺点,并逐层缝合切口。B 组均采用局部麻醉辅以镇静、止痛药物,X 线透视下定位股骨头中线水平,采用 Seldinger 技术穿刺股总动脉并导入 6F 动脉鞘,造影提示穿刺点位于股总动脉前壁且局部无夹层及血肿后,经动脉鞘引入超滑导丝置于降主动脉,撤出 6F 动脉鞘并按压穿刺点,由导丝引入第 1 把 ProGlide 血管缝合器并内旋 20°左右,按操作说明完成定位、进针、拔针及收结 4 步操作后,将 2 根缝线拉出用止血钳固定于穿刺点内侧备用(先不进行第 5 步锁结操作);同样由导丝引入第 2 把 ProGlide 外旋 20°左右,同上 4 步操作后用止血钳固定 2 根缝线于穿刺点外侧备用。若输送外鞘>16F 则预置 2 把 ProGlide,对于输送外鞘≤16F 则可预置 1 把 ProGlide。送入支架输送系统前,可先用扩张器扩张穿刺点。腔内隔绝完成后保留导丝退出支架输送系统,助手适当按压穿刺点近心端,逐渐收紧预留的缝线进行第 5 步锁结操作。观察缝合止血效果:①止血满意,收紧缝线后未见明显渗血则拔出导丝并剪断缝线局部适当加压包扎,术后制动 6 h 以上并注意观察远端动脉搏动及肢体末端血运情况;②止血不彻底有少量渗血,可进一步收紧缝线辅加以加压并继续观察;③若渗血较多或压迫后仍有渗血,则可进一步置入第 3 把或第 4 把 ProGlide 并观察止血效果;④止血失败,经上述操作后不能控制出血,则可由导丝再次引入输送外鞘封堵穿刺点,转行外科切开修复。

1.3 疗效评判及并发症观察

股总动脉穿刺点封堵缝合顺利完成无需额外的

外科及介入手段干预视为闭合成功。腹股沟区手术操作入路相关的 30 d 内并发症主要包括:需内科纠正的出血(需要输血、输胶体或应用升压药物)^[7]、感染、淋巴漏、局部麻木感、血管夹层、假性动脉瘤、血管狭窄等。

2 结 果

所有病人均成功实施了 EVAR。A 组 208 条股总动脉中仅有 1 例需行血管补片修补,技术成功率为 99.5%;B 组 150 条股总动脉中 146 条股总动脉闭合成功,技术成功率为 97.3%,2 条技术失败中转外科缝合,2 条皮下血肿二期行外科清除,两组技术成功率比较差异无显著性。使用 1 把 ProGlide 的股总动脉 43 条,使用 2 把 ProGlide 的股总动脉 80 条,使用 3 把 ProGlide 的股总动脉 17 条,使用 4 把 ProGlide(24F 鞘管 6 条,26F 鞘管 4 条)的股总动脉 10 条,共使用 294 把 ProGlide。A 组共 8 条股总动脉发生并发症,包括淋巴漏 2 条,感觉异常 1 条,术后渗血 2 条,切口感染 1 条,血管狭窄 2 条;B 组共 3 条股总动脉发生并发症,包括术后渗血 1 条,假性动脉瘤 2 条,两组手术入路相关并发症总体发生率差异无显著意义($P>0.05$)。A、B 组手术时间分别为(217±72)、(155±59)min,住院时间分别为(10.3±4.7)、(5.5±4.2)d,B 组手术及住院时间较 A 组明显缩短,差异具有显著统计学意义($t=6.12$ 、7.04, $P<0.01$)。

3 讨 论

常规行 EVAR 治疗 AAA 需行腹股沟小切口,血管缝合器 ProGlide 的出现使得 EVAR 由微创变成无创成为可能,自 DOSLUOGLU 等^[8]首次报道使用 ProGlide 完全经皮入路成功实施 EVAR 后陆

续有成功案例报道^[9-14],这项回顾性研究也进一步证实了完全经皮入路的可行性。常规行 EVAR 需切开皮肤及皮下组织显露并控制股总动脉,术中缝合股总动脉穿刺点时,手术入路的管理需要高度重视^[15-16]。经皮使用 ProGlide 可以有效闭合血管,减少手术创伤,不增加手术入路相关的并发症^[17],并且可以明显缩短病人手术及术后住院时间^[18-20]。当行主动脉瘤腔内修复手术时,对于支架输送外鞘 $\leq 24F$,完全经皮完成手术是切实可行的,对于较大直径外鞘($>24F$)及过度肥胖病人,仍推荐经外科切开行腔内修复手术。

TIMARAN 等^[21]观察 90 例经皮行 EVAR 治疗的 AAA 病人,其闭合成功率达 92%,研究认为一旦经皮缝合失败,术中需急转外科切开修复,会使手术时间及术中出血量明显增加,所以经皮行 EVAR 最好在复合手术室进行。尽管本项研究中经皮使用 ProGlide 闭合成功率高达 97.3%,但仍有 2 例急转外科切开缝合,有 2 例局部较大血肿后续外科切开修复。分析缝合失败的可能原因有:①支架输送外鞘较粗,动脉穿刺破孔较大不易闭合;②病人年龄较大,合并有动脉硬化,血管壁弹性较差,预置线结易脱落;③局部麻醉操作病人配合较差,保留导丝撤出外鞘按压止血并收紧缝线锁结过程中病人肢体活动,影响缝合效果;④操作者精神紧张,当闭合止血效果不佳时出血较迅速,出血量大,操作者容易慌乱,后续置入第 3、4 把 ProGlide 未能很好完成缝合操作。外科切开探查发现预置缝合线结未能很好缝合血管穿刺处破口。CHEN 等^[22]回顾分析 502 例行 EVAR 治疗的 AAA 病人资料(经皮 129 例,外科 373 例),发现最初经皮行 EVAR 操作时结果并不理想,30 d 病死率明显增高并且手术时间也相对较长,随着手术技术逐渐娴熟,操作技术不断提高,30 d 病死率逐年下降,手术时间也逐年缩短,所以经皮行 EVAR 一定由有经验的医师操作^[23-24]。本研究经皮行 EVAR 组中术后有 1 例病人 12 h 后下床活动出现穿刺点较多渗血,给予输血补液并加压包扎后明显好转并顺利出院。

本研究 A 组有 1 条股总动脉穿刺破口不规则,考虑到直接缝合血管可能会造成血管狭窄,遂行血管补片修补。2 条股总动脉术后复查 CTA 显示缝合血管处轻度狭窄。分析可能原因有:①切口较小,本研究 A 组病人采用腹股沟区沿皮纹斜行小切口(5 cm),仅可显露 1~2 cm 股总动脉,术野有限,操作有一定限度;②穿刺破口不规则,较大口径输送鞘

置入时,钝性撕裂动脉血管,造成血管破口不规则;③穿刺点破口对合欠佳,血管阻断钳钳夹股总动脉后造成穿刺口对合欠佳,使得血管破口缝合有张力或内膜有皱褶;④合并有动脉硬化斑块,血管不易缝合;⑤“8”字缝合或多次加针易造成血管狭窄。缝合血管后需手指探查近心端、缝合处及远心端血管搏动情况,探查缝合处是否有血流通过狭窄处的冲击感等。ONG 等^[25]对比 202 例 EVAR 手术前后股总动脉直径变化,发现经皮 EVAR 与外科 EVAR 股总动脉直径变化无明显差异,与术前股总动脉直径相比均无明显变化,进一步论证了经皮 EVAR 的可行性。

BUCK 等^[26]观察分析 4 112 例行 EVAR 修复的 AAA 病人,结果证实经皮 EVAR 较外科 EVAR 可以明显减少手术创伤相关并发症,可明显缩短手术及住院时间。SIRACUSE 等^[27]进行的一个更大样本的研究显示,经皮 EVAR 较外科 EVAR 可明显减少术中出血量,缩短手术及住院时间,条件适合病人应优先考虑;外科 EVAR 中横切口优于纵切口,可明显减少术中出血、缩短手术及住院时间。

综上所述,使用 ProGlide 经皮入路行 EVAR 是安全有效的,应在复合手术室由有经验医师进行操作。经皮 EVAR 并不明显增加手术入路相关并发症,但可以明显缩短手术及住院时间,然而多把 ProGlide 的应用可能会给病人增加经济负担,可根据病人实际情况选择性使用。

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(上接第 29 页)

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