·临床研究　Clinical research·

股腘动脉双通路介入治疗股浅动脉慢性完全闭塞

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【摘要】 目的　评估仰卧位顺行再通失败后，股腘动脉双通路技术在股浅动脉慢性完全闭塞(CTO)中应用的安全性和临床意义。**方法**　收集 2012 年 5 月至 2014 年 5 月收治的顺行开通失败后改经腘动脉逆向穿刺并配合顺行开通术的股浅动脉 CTO 患者 36 例，术前均表现为间歇性跛行，其中 11 例有静息痛，5 例足趾缺血性溃疡；股浅动脉平均闭塞长度为(88.4±5.6) mm，平均踝-肱指数(ABI)为 0.52±0.12。手术均先采用经对侧股动脉穿刺顺行开通，失败后取仰卧位结合透视或路径图导引下经腘动脉逆行穿刺，导丝逆行通过闭塞段进入真腔后再作闭塞段球囊扩张及支架植入术。比较术前及术后 1 d、1 个月、6 个月、12 个月患者症状及血管通畅率。**结果**　36 例患者均通过股腘动脉双入路开通闭塞段动脉，共植入支架 68 枚，技术成功率 100%。所有患者无穿刺点出血、血肿、假性动脉瘤、夹层、动静脉瘘、神经损伤等并发症，间歇性跛行症状均得到改善。术后 1 个月超声随访未出现支架内再狭窄，术后 6 个月有 6 例出现支架内再狭窄，但无明显症状；术后 12 个月 27 例中有 13 例支架内再狭窄，其中 3 例再次出现间歇性跛行，复查造影后予以球囊扩张，症状得到缓解。11 例术前静息痛患者术后缓解，术后 1、6 个月随访中未再出现静息痛。5 例足部溃疡患者中 2 例术后 1 个月内愈合，3 例术后 3 个月内完全愈合。ABI 由术前 0.52±0.12 改善至术后 1 d 0.83±0.16(n=36, P<0.05)，术后 1 个月 0.82±0.12(n=36, P<0.05)，术后 6 个月 0.75±0.10(n=36, P<0.05)，术后 12 个月 0.68±0.13(n=27, P<0.05)。**结论**　股浅动脉 CTO 患者仰卧体位下经股动脉顺行和腘动脉逆行开通闭塞段技术安全、有效，患者耐受性好，近期疗效确切，是股浅动脉 CTO 治疗的有效选择。

【关键词】 动脉闭塞性疾病；股动脉；腘动脉；经皮腔内血管成形术

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Dual access intervention via femoropopliteal artery for the treatment of chronic total occlusion of superficial femoral artery

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【Abstract】 Objective　To evaluate the safety and clinical significance of dual access intervention via femoropopliteal artery in treating chronic total occlusion (CTO) of superficial femoral artery (SFA) when antegrade recanalization procedure in supine position failed. **Methods**　A total of 36 patients with CTO of SFA, who were admitted to authors' hospital during the period from May 2012 to May 2014 to receive retrograde puncture of popliteal artery combined with dual access intervention via femoropopliteal artery because antegrade recanalization procedure failed, were enrolled in this study. Before operation, all patients complained of intermittent claudication. Among the 36 patients, 11 had rest pain and 5 had ischemic ulceration on toes. The average occlusion length of SFA measured on preoperative MRA was (88.39±5.6) mm, and the mean preoperative ankle-brachial index (ABI) was 0.52±0.12. Puncture of contralateral femoral artery to perform antegrade recanalization was adopted first; when it failed, the retrograde puncture of popliteal artery guided by fluoroscopy or road mapping was carried out in supine position, the guide wire was retrogradely inserted and was pushed through the obstructed segment until its tip entered the arterial true lumen, which was followed by balloon dilation and stent implantation for the obstructed segment. The improvement of

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symptoms and the vascular patency rate were determined before the operation as well as one day, one, 6 and 12 months after the operation, the results were analyzed and compared. **Results** The obstructed segment was recanalized with dual access intervention technique in all 36 patients; a total of 68 stents were implanted, and the technical success rate was 100%. No complications, such as puncture point bleeding, hematoma, pseudoaneurysm, dissection, arteriovenous fistula or nerve injury, occurred. The symptoms of intermittent claudication were improved in all patients. Follow-up ultrasound examination performed at one month after the operation showed that no in-stent restenosis was seen; 6 months after the operation in-stent restenosis was observed in 6 patients although the patients had no obvious symptoms. Twelve months after the operation, in-stent restenosis was detected in 13 among the 27 patients, and 3 of the 13 patients developed intermittent claudication again, balloon dilatation following angiography had to be carried out and the symptoms were improved. In 11 patients, the preoperative rest pain was relieved after the operation, and at one-month and 6-month follow-up examinations the rest pain did not appear again. Of the 5 patients with foot ulceration, the healing of ulcer was observed in 2 patients within one month and in other 3 patients the ulcer was completely healed in 3 months after the operation. ABI values were improved from preoperative 0.52±0.12 to postoperative 0.83±0.16 (n=36; P<0.05) at one day after the operation, to post operative 0.82±0.12 (n=36; P<0.05) at one month after the operation, to 0.75±0.10 (n=36; P<0.05) at 6 months after the operation, and to 0.68±0.13 (n=27; P<0.05) at 12 months after the operation. **Conclusion** For the treatment of CTO of SFA, dual access intervention via femoropopliteal artery in supine position is safe and effective, the short-term effect is reliable. This technique is an effective means for CTO of SFA.(J Intervent Radiol, 2016, 25: 1002-1006)

【Key words】 arterial occlusive disease; femoral artery; popliteal artery; percutaneous endovascular angioplasty

临床上股浅动脉慢性完全闭塞(CTO)较常见,其危险因素为糖尿病、高血压、高脂血症等[1]。随着介入放射学科发展,CTA、DSA 成为该病诊疗的重要手段[2]。经皮腔内血管成形术(PTA)已成为目前治疗血管闭塞性疾病最常用手段[3-4],然而在实际操作中常因顺行开通股动脉闭塞段时导丝无法自流入道真腔进入流出道真腔而开通失败。本研究通过仰卧体位下直接经股动脉顺行和腘动脉逆行入路开通股浅动脉闭塞段,分析其治疗股浅动脉 CTO 的安全性和有效性。

1 材料与方法

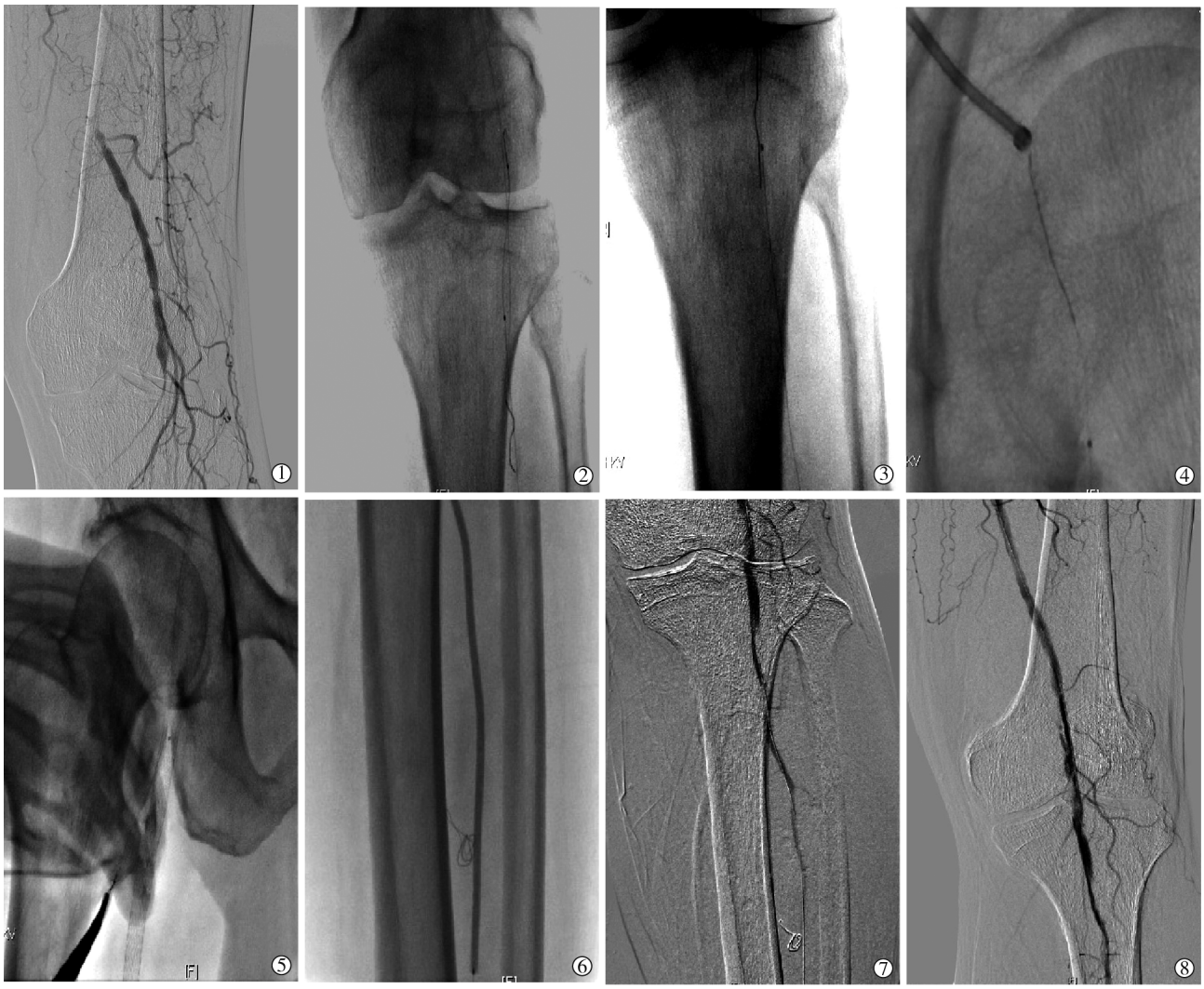
1.1 临床资料

收集 2012 年 5 月至 2014 年 5 月在上海中医药大学附属龙华医院接受股浅动脉闭塞段顺行开通失败后改经腘动脉入路逆向穿刺,并配合股动脉顺行入路得以开通的 36 例股浅动脉 CTO 患者临床资料,其中男 22 例,女 14 例;年龄 53~80 岁,平均(74.6±4.2)岁。术前均表现为患肢发凉、麻木、间歇性跛行,病程 4 个月至 5 年;伴发静息痛 11 例,足趾缺血性溃疡 5 例。术前 CTA 显示股浅动脉闭塞段平均长度为(88.4±5.6) mm,踝-肱指数(ABI)为平均 0.52±0.12;泛大西洋学会联盟(TASC)Ⅱ分型为 C~D 型。

1.2 介入治疗方法

介入手术在仰卧体位、局部麻醉下进行,经对侧股动脉穿刺,导管跨越髂总动脉开口,顺行开通股浅动脉闭塞段失败后造影显示腘动脉流出道显影清晰且尚有血流通过(图 1①),则抬高患者足跟,轻轻弯曲膝部并外旋, 选择膝下穿刺点,DSA 增强器投射角度与穿刺点垂直,透视或路径图导引下用 7 cm 长 21 G 微穿刺针(美国 Cook 公司)作腘动脉穿刺,穿刺针与腘动脉走行保持一致,有动脉回血时置入 V18 导丝(美国 Boston 科技公司),置入 10 cm 长 4 F 短鞘(日本 Terumo 公司)或直接选择支撑导管或不同球囊配合 V18 导丝作无鞘逆行开通,并尽量选择经血管真腔开通闭塞段;有时逆行导丝可能进入内膜下,无法回到血管真腔,可采用同期双向内膜下血管成形(SAFARI)技术通过双球囊将逆行导丝引入真腔(图 1②~⑤),再引入顺行置入导管并将其一端引出体外;撤出顺行置入导管,再沿导丝顺行置入适当直径和长度球囊导管,逐级扩张开通的闭塞段后植入合适支架;顺行造影显示支架内血流通畅后于腘动脉穿刺点处置入 5 mm 球囊, 拔出腘动脉血管鞘,充盈球囊暂时阻断血流,或用高于患者收缩压 10~20 mmHg 压力袖带包绕膝部穿刺

点,持续 10~20 min 完成止血(图 1⑥~⑧);再次造影复查腘动脉穿刺处有无对比剂外溢、血管痉挛、血栓形成等并发症,弹力绑带压迫膝部穿刺点并双下肢制动 24 h。



①股浅动脉近中段闭塞,远段及腘动脉近段显影;②仰卧位顺行经腘动脉逆行穿刺左侧腘动脉 P3 段,置入 V18 导丝和 3 mm×60 mm 球囊;③经腘动脉逆行将导丝引入腘动脉 P2 段真腔;④将逆向上行的 V18 导丝选入左侧动脉血管折叠鞘(Cook 6 F 40 cm);⑤用血管钳将导丝从右侧动脉鞘内引出;⑥股腘动脉双通路开通股浅动脉;⑦造影复查左侧穿刺点无对比剂外溢;⑧左侧股浅动脉、腘动脉、胫腓动脉血流通畅

图 1 仰卧体位下经股动脉顺行和腘动脉逆行入路开通股浅动脉闭塞段影像

术前应控制患者血压、血糖,口服氯吡格雷(75 mg/d)、阿司匹林(0.1 g/d)3~5 d;术中静脉推注肝素钠(50 U/kg)作全身肝素化,随后每间隔 1 h 加推 1 000 U 肝素钠;术后皮下注射低分子肝素 3 d,口服氯吡格雷(75 mg/d)6 个月,长期口服阿司匹林(0.1 g/d)。

1.3 临床随访

患者术后 1 d 和 1、6、12 个月测量 ABI,了解临床症状改善情况;彩色超声检查患肢血流状态。

1.4 统计学方法

采用 SPSS11.0 软件进行统计学分析。治疗前后 ABI 测量数据比较用配对方差分析,$P<0.05$ 为差异有统计学意义。

2 结果

36 例患者均为股动脉入路顺行开通失败后直接改经腘动脉逆行入路开通股浅动脉闭塞段,共植入支架 68 枚,技术成功率为 100%。术中 20 例逆向导丝进入内膜下向上逆行,其中 8 例导丝越过闭塞段后顺利返回近端股浅动脉/股总动脉真腔,12 例导丝无法返回真腔,经 SAFARI 技术将导丝引入真腔后开通;16 例逆向通过血管真腔作开通。术后未发现穿刺点出血、假性动脉瘤、动静脉瘘、夹层等并发症,或腘动脉穿刺所致神经损伤、膝关节活动障碍等不良后果。

术后所有患者间歇性跛行症状均得到改善。术

后 1 个月超声随访未出现支架内再狭窄;术后 6 个月复查 6 例出现支架内再狭窄，但无明显症状;术后 12 个月时有 9 例失联,27 例中有 13 例支架内再狭窄,其中 3 例再次出现间歇性跛行,复查造影后予以球囊扩张,症状得到缓解。11 例术前静息痛患者术后缓解,且在术后 1、6 个月随访中未再出现静息痛症状。5 例足部溃疡患者中 2 例于术后 1 个月内愈合，3 例于术后 3 个月内完全愈合。

ABI 由术前 0.52±0.12 改善至术后 1 d 0.83±0.16(n=36,P<0.05),术后 1 个月 0.82±0.12(n=36,P<0.05),术后 6 个月 0.75±0.10(n=36,P<0.05),术后 12 个月 0.68±0.13(n=27,P<0.05)。

3 讨论

股浅动脉 CTO 患者常规介入治疗是通过对侧股动脉穿刺顺行开通患侧股浅动脉,再作支架植入术。虽然 CTO 病变常见于股浅动脉下段(股浅动脉穿越收肌管处)和远端血管[5],但股浅动脉起始端闭塞不少见,故顺行开通操作中股浅动脉起始部闭塞而无残端或残端太短，使导丝与导管缺乏必要支撑,始终无法寻找到最安全破入内膜下夹层的突破点[6-7],或患者多有侧支循环形成,使导丝易进入闭塞段近心端小分支内而无法进一步沟通,或闭塞段位于股浅动脉中远端,缺乏通畅的流出道,使导丝始终无法逾越闭塞段,仍处于内膜下夹道中难以返回远端动脉真腔[8-9]。顺行股动脉开通失败情况下,通过腘动脉穿刺逆行入路开通是一种较好选择[10]。其适应证包括自股浅动脉起始端完全闭塞,无法发现开口;股浅动脉闭塞段发出较大侧支,使导丝无法顺行;股浅动脉闭塞段位于中远端;股动脉穿刺区有较深瘢痕或过度肥胖。

无论是正常分支动脉或侧支循环,其开口绝大部分均朝向下方。腘动脉逆行穿刺后置入导丝作逆行开通,可避免干扰侧支小动脉。此外,腘动脉距髂股动脉闭塞段解剖距离较近，且血管走行较直,辅以具有较强支撑力的导管、导丝有利于闭塞段开通。我们认为闭塞段两侧血栓形成差异也利于逆行开通,因为闭塞近端血栓形成早、质地较硬,闭塞远端血栓形成晚、质地较软,从软到硬逆行开通过程会比较顺利。经腘动脉逆行内膜下血管成形术对顺行开通失败的股浅动脉 CTO 患者是一种较好的补救方案，可避免外科旁路转流手术造成较大创伤。Tonnesen 等[11]于 1988 年首次报道经腘动脉逆行穿刺股浅动脉作血管内成形术。Zaitoun 等[12]总结经皮穿刺腘动脉治疗 50 例股浅动脉 CTO 患者，手术即时成功率达 81%,出院时临床有效率达 78%。Chin 等[13]报道提出逆行腘动脉穿刺是一种较好的经皮血管成形术入路改变,可弥补常规操作失败。

成功穿刺腘动脉并导引导丝通过狭窄的闭塞段动脉,是血管内成形术先决条件。DSA 具有路径图功能,通过侧支循环血管使腘动脉显影,能准确显示膝下腘动脉位置、管径及走向。我们认为在 X 线正斜位透视和 DSA 路径图导引下穿刺,可更好地观察远端腘动脉流出道血流情况,评估腘动脉逆行穿刺效果。传统的腘动脉逆行穿刺需要患者俯卧位,穿刺点选择腘动脉中上段,以腘动脉上方并列段中位点作穿刺点并从后方进针,开通入路后患者体位改变为仰卧位再作血管成形术[14]会增加操作困难,同时也使患者感觉不适。本研究让患者仰卧体位下抬高足跟、屈膝及外旋小腿,穿刺点选择在膝下直接穿刺腘动脉。Kawarada 等[15]报道抬高患者小腿,进针点在小腿下方斜向上方。我们认为穿刺针应与腘动脉平行,但与皮肤角度不能太小,因为此处腘动脉位置较深,与皮肤角度太小不易穿刺至腘动脉;同时尽量在正斜位透视导引下穿刺,因为患者腿部移动有时会干扰 DSA 路径图,必要时也可在超声导引下穿刺。腘动脉穿刺点常见并发症包括穿刺点出血、假性动脉瘤、动静脉瘘、夹层、胫神经损伤、腘静脉受压、腘动脉狭窄闭塞等。既往报道腘动脉穿刺并发症发生率为 2.5%~5.2%[11]。Kawarada 等[15]认为小口径介入器械可减少腘动脉损伤,降低穿刺并发症发生率。本研究所用微穿刺经皮导入套件(4 F 鞘、21 G 穿刺针、0.018 英寸导丝)及 0.18 系统球囊等安全性高,引起创伤轻微。经腘动脉穿刺逆行操作中若导丝已越过闭塞段，但仍在内膜下,进入真腔内困难,我们采用 SAFARI 技术将导丝引入真腔,12 例患者因此获得成功。

本研究局限性是病例少和缺乏与其它手术方式对照，但本组患者术后临床症状得到明显改善,近期 ABI 和血管通畅率与既往研究基本相似[16-19];随访 12 个月超声提示 13 例患者支架内出现>50%再狭窄,其中 3 例再次出现间歇性跛行,其重要原因是新生内膜过度增生及血管重塑所致内径变小。

综上所述,股浅动脉 CTO 患者仰卧体位下经股动脉顺行和腘动脉逆行开通闭塞段技术安全、有效,患者耐受性好,近期疗效确切。因此,对股浅动脉起始端完全闭塞、闭塞段位于股浅动脉中远端或有较大侧支从股浅动脉闭塞段发出患者,一旦顺行

开通失败,首选经腘动脉入路逆行开通。

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