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• 主动脉疾病专题研究 •

胸主动脉腔内修复术中原位开窗重建左锁骨下动脉

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摘要

目的: 探索一种新的安全有效全腔内重建左锁骨下动脉(LSA)的方法。

方法: 针对2例胸主动脉腔内修复术中需要重建LSA的患者, 采用目前市售的介入器材并改进, 先释放胸主动脉覆膜支架覆盖LSA, 再于LSA开口处行体内穿刺破膜、球囊扩张并置入左锁骨下动脉支架, 原位开窗重建LSA。

结果: 患者2例均取得技术成功, 主体支架无移位, 无内漏; 重建的LSA通畅, 无内漏。

结论: 原位开窗的方法可以有效的重建LSA, 长期疗效有待进一步随访。

关键词

动脉瘤, 夹层; 腔内修复; 原位开窗

中图分类号: R654.3

Endovascular left subclavian artery reconstruction via fenestration in situ during thoracic endovascular repair

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Abstract

Objective: To explore an innovative approach for left subclavian artery (LSA) reconstruction during thoracic endovascular repair.

Methods: In two cases of thoracic endovascular repair requiring LSA reconstruction via fenestration in situ, a commercially available device and equipment were employed.

Results: All cases achieved technical success without endoleak or stent graft migration.

Conclusion: Fenestration in situ is an effective method for endovascular LSA reconstruction. However, the long term clinical outcome awaits further follow-up.

Key words

Aneurysm, Dissecting, Endovascular Repair, Fenestration in Situ

CLC number: R654.3

胸主动脉腔内修复术(TEVAR)是目前微创治疗胸主动脉夹层以及胸主动脉瘤的有效方式。

但是当夹层或是主动脉瘤累及主动脉弓重要分支时, 如何重建弓上重要分支是目前TEVAR术面

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临的困难和挑战。目前有包括分支技术、烟囱技术、开窗技术等多种方法在不断探索完善^[1-3]。开窗技术包括预开窗技术和原位开窗技术,理论上原位开窗技术能够更为有效迅速的重建弓上分支,但是在体内完成破膜开窗等步骤颇具挑战。笔者近期采用TEVAR术中原位开窗重建左侧锁骨下动脉的方法治疗2例胸主动脉疾病患者,取得良好的近期疗效,现报道如下。

1 资料与方法

1.1 病例报告

患者1 女,59岁。因突发胸背部疼痛1 d入院,入院诊断胸主动脉壁间血肿,胸主动脉夹层(Stanford B型)。CTA显示破口靠近左侧锁骨下动脉(LSA),距离左侧颈总动脉(LCA)约16mm。同时CTA显示左侧锁骨下动脉粗大,左椎动脉优势(图1A-C)。

患者2 女,34岁。因胸背部疼痛1年入院,入院诊断慢性胸主动脉夹层(Stanford B型)。CTA显示破口位于左侧锁骨下动脉(LSA)2 cm处,远端夹层呈瘤样扩张,同时左椎动脉优势(图2A)。

1.2 手术步骤

(1) 患者仰卧位,全身麻醉,左上肢外展,常规消毒铺单。(2) 穿刺左肱动脉,上6 F短鞘,泥鳅导丝引导进入降主动脉,交换超硬导丝,引导6 F翻山鞘到达LSA开口处备用。(3) 常规切开右侧股动脉,左前斜45°造影证实破口位置(图1D),交换超硬导丝,按计划于左侧颈总动脉(LCA)后缘释放胸主动脉覆膜支架,患者1型号为34 mm/28 mm-180 mm(深圳先健公司);患者2型号为32 mm/26 mm-200 mm(深圳先健公司)。造影显示破口封堵满意,LCA通畅,LSA被遮盖(图1E和图2B)。(4) 通过左肱动脉翻山鞘做Roadmap,鞘内置入单弯导



图 1 病例 1 TEVAR 术中原位开窗重建 LSA A-C: 术前 CTA 显示破口靠近左侧锁骨下动脉(LSA),距离左侧颈总动脉(LCA)约 16 mm, LSA 粗大,左椎动脉优势; D: 左前斜 45° 造影证实破口位置; E: LCA 后缘释放胸主动脉覆膜支架; F: 导丝破膜; G: 导丝形成股动脉牵张; H-I: 3 mm 球囊和 6 mm 球囊扩张; J: 主动脉造影显示破膜孔通畅; K: 主动脉弓造影显示 LSA 通畅,主动脉破口隔绝,无内漏; L: 术后 4 d 的复查的 CTA 结果显示夹层破口封堵满意, LSA 通畅,无内漏发生

Figure 1 In situ fenestration for LSA during TEVAR A-C: The dissection located close to LSA. The distance was only 16mm from the original of LCA to the dissection. The left vertebral artery and LSA was the dominant form; D: Angiography showed the location of the dissection; E: The LSA was covered by the stent graft; F: Puncture the stent graft by the wire; G: The wire went through the stent graft and came out through the common femoral artery; H-I: The stent graft was dilated by the 3mm and 6mm balloon respectively; J: Aortic angiography demonstrated the patency of the hole; K: Aortic angiography demonstrated that the dissection was covered successfully and no endoleak was observed; L: CTA at 4 days after operation showed that the dissection was covered successfully and the LSA was unblocked

管,取自备0.018导丝(V-18导丝,术中将尾端体外磨尖,消毒备用),在2.6 F直径的支撑导管的保护下进入单弯导管,到位LSA开口。(5)在Roadmap的指引下,调整确认破膜导丝的位置和角度。确认后破膜,跟进2.6 F直径的支撑导管(CXI Support Catheter, Cook公司)进入降主动脉(图1F和图2C)。(6)V-18导丝通过降主动脉、右髂动脉从右股动脉切口牵出,形成肱股牵张(图1G)。(7)在肱股牵张导丝的引导下,患者1从肱动脉依次通过3 mm球囊和6 mm球囊扩张胸主动脉破膜孔(图1H-I);

患者2从肱动脉依次通过4 mm球囊和8 mm球囊扩张胸主动脉破膜孔(图1D-E)。主动脉造影显示破膜孔通畅(图1J)。(8)肱股牵张交换为0.035导丝(图2F),患者1从股动脉入路于LSA内释放覆膜支架(10 mm×40 mm, Bard公司, Fluency)重建LSA(图1K);患者2从股动脉入路于LSA内释放覆膜支架(10 mm×50 mm, Gore公司, Viabahn)重建LSA(图2G)。(9)主动脉弓造影显示LSA通畅,主动脉破口隔绝,无内漏,主体支架无移位(图1L,图2H)。

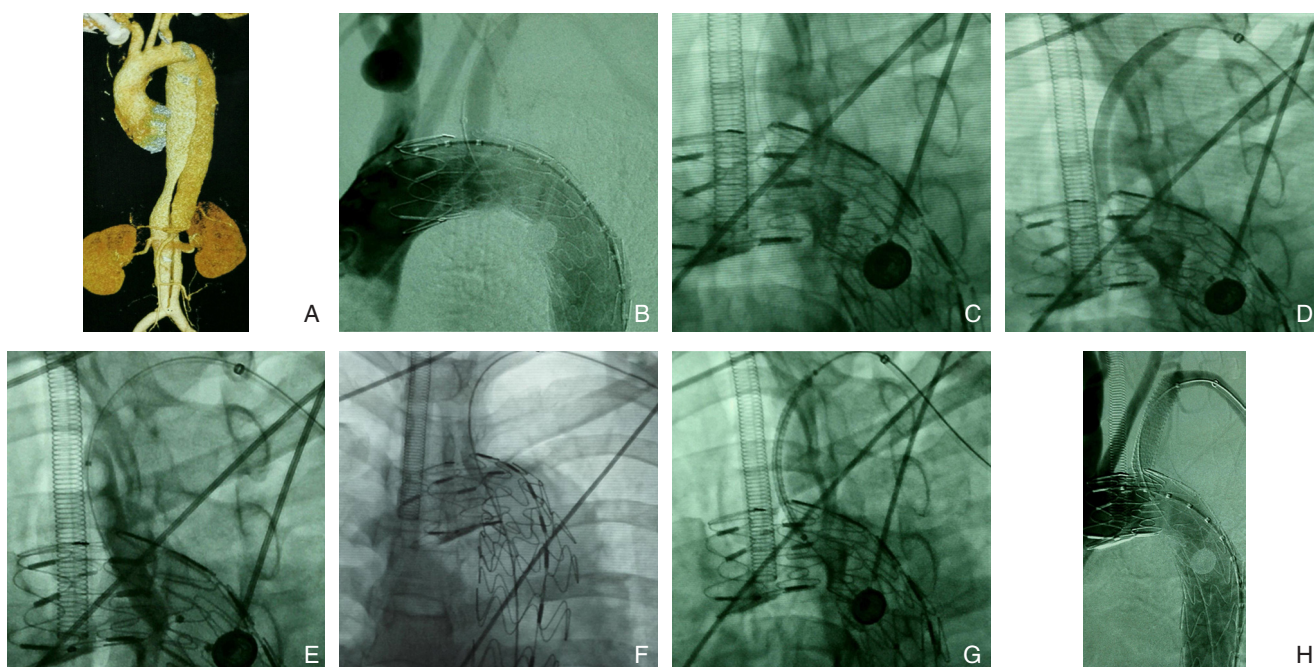


图2 病例2 TEVAR术中原位开窗重建LSA A:术前CTA显示破口位于左侧锁骨下动脉(LSA)2 cm处,远端夹层呈瘤样扩张,同时左椎动脉优势;B:LCA后缘释放胸主动脉覆膜支架;C:导丝破膜;D-E:4 mm球囊和8 mm球囊扩张;F:交换0.035导丝;G:从股动脉入路于LSA内释放覆膜支架(10 mm×50 mm, Gore公司, Viabahn)重建LSA;H:主动脉弓造影显示LSA通畅,主动脉破口隔绝,无内漏

Figure 2 In situ fenestration for LSA during TEVAR A: The dissection located nearly to LSA. The distance was only 2 cm from the original of LSA to the dissection. The left vertebral artery was the dominant form; B: The LSA was covered by the stent graft; C: Puncture the stent graft by the wire; D-E: The stent graft was dilatated by the 4 mm and 8 mm balloon respectively; F: Exchanging the 0.035 wire; G: The viabahn(10 mm×50 mm, Gore company) was replace to reconstruct the LSA successfully; H: Aortic angiography demonstrated that the dissection was covered successfully and no endoleak was observed

2 结果

2.1 手术效果

患者2例均获得技术成功。主动脉夹层破口被成功封堵,无内漏,主体支架无移位。重建的LSA血流通畅,开窗无内漏(图1L,图2H)。术后胸痛症状明显缓解。无手术相关并发症及围术期并

发症发生。

2.2 术后复查及随访

术后4 d CTA复查显示主动脉破口隔绝,无内漏及主体支架移位;LSA血流通畅(图1L)。术后1个月电话随访2例患者左桡动脉搏动均可及。未诉其余不适。

3 讨论

TEVAR术中是否需要保留或是重建LSA一直存在争议。目前主流的观点认为对于左椎动脉优势的患者需要保留或是重建LSA,这可以有效降低窃血综合征、后循环中风以及脊髓缺血的风险^[4]。病例1患者LSA粗大,左椎为优势动脉,但是破口位置非常靠近LSA,为保证足够的锚定区,需要覆盖并重建LSA;而病例2患者为使得支架更加顺应主动脉弓,亦有必要将覆膜支架置入LSA前缘。

现有包括杂交手术、烟囱技术、分支技术等多种方法重建LSA^[5]。考虑到破口位置位于大弯侧,烟囱技术重建LSA可能存在较高的内漏风险。而分支支架目前尚处于临床实验阶段,无商品化的支架获得。笔者决定尝试开窗技术重建LSA。开窗技术包括预开窗和原位开窗技术。对该2例患者采用导丝直接穿刺原位开窗,简便实用。该方法所用器材均为常规器材,可获得性强。原位开窗相对于预开窗,无需个体化设计支架,因而迅速且可重复性强^[6-8]。但是,原位开窗需完全在体内操作完成,对技术细节要求较高,因而较预开窗应用较少,国内亦鲜有单位开展并报道^[9]。

该技术在实践操作中需要注意以下要点:

(1) 需要选择PTFE覆膜的胸主动脉支架;体外模拟时发现PTFE膜的可穿透性最佳,而且球囊扩展后无撕裂现象,这样可以最大限度的降低内漏的发生,而其它材料的覆膜支架是否合适用于本方法的原位开窗有待进一步验证。(2) 因为导丝非常尖锐,在送入导丝时一定要导管保护,术者要用2.6 F直径的支撑导管保护导丝,再进入单弯导管,可以避免医源性血管损伤。(3) 从肱动脉置入的长鞘要具有较好的顺应性,这样才能通过LSA的弯曲处。(4) 在导丝破膜后如何成功的跟进导管破膜是关键,需要选择头端细小而质地坚硬的支撑导管。(5) 导丝进入后从股动脉穿出,形成肱股牵张是保证后续球囊跟进扩膜的必要保证。

术后4 d对患者进行CTA复查,结果显示夹层破口封堵满意,LSA通畅,无内漏发生,近期疗效满意,但长期疗效有待进一步随访。

参考文献

- [1] Kölbel T, Diener H, Larena-Avellaneda A, et al. Advanced endovascular techniques for thoracic and abdominal aortic dissections[J]. *J Cardiovasc Surg (Torino)*, 2013, 54(1 Suppl 1): 81-90.
- [2] 张承磊,蔡红波.胸主动脉腔内修复术中左锁骨下动脉重建的现状与进展[J].*中国普通外科杂志*, 2014, 23(12):1696-1700.
- [3] 舒畅,王沙龙,姜晓华,等.胸主动脉腔内修复术中封堵左锁骨下动脉的安全性研究[J].*中国普通外科杂志*, 2014, 23(12):1614-1619.
- [4] Baba T, Ohki T, Kanaoka Y, et al. Clinical Outcomes of Left Subclavian Artery Coverage on Morbidity and Mortality During Thoracic Endovascular Aortic Repair for Distal Arch Aneurysms[J]. *World J Surg*, 2015, 39(11):2812-2822.
- [5] Murphy EH, Dimaio JM, Dean W, et al. Endovascular repair of acute traumatic thoracic aortic transection with laser-assisted in-situ fenestration of a stent-graft covering the left subclavian artery[J]. *J Endovasc Ther*, 2009, 16(4): 457-463.
- [6] Ahanchi SS, Almaroof B, Stout CL, et al. In situ laser fenestration for revascularization of the left subclavian artery during emergent thoracic endovascular aortic repair[J]. *J Endovasc Ther*, 2012, 19(2):226-230.
- [7] Redlinger RE Jr, Ahanchi SS, Panneton JM. In situ laser fenestration during emergent thoracic endovascular aortic repair is an effective method for left subclavian artery revascularization[J]. *J Vasc Surg*, 2013, 58(5):1171-1177.
- [8] Tse LW, Lindsay TF, Roche-Nagle G, et al. Radiofrequency in situ fenestration for aortic arch vessels during thoracic endovascular repair[J]. *J Endovasc Ther*, 2015, 22(1):116-121.
- [9] Xiong J, Guo W, Liu X, et al. Novel temporary endovascular shunt technique to assist in situ fenestration for endovascular reconstruction of the distal aortic arch[J]. *J Vasc Surg*, 2015, 62(1):226-228.

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