

•临床研究 Clinical research•

低剖面可视化腔内支撑装置双支架技术治疗基底动脉顶端宽颈动脉瘤 3 例

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【摘要】 目的 探讨低剖面可视化腔内支撑装置(LVIS)双支架技术在治疗基底动脉顶端宽颈动脉瘤中的初步临床应用及疗效。**方法** 对 3 例基底动脉顶端宽颈动脉瘤患者进行 LVIS 双支架平行技术辅助弹簧圈栓塞治疗。**结果** 3 例患者均取得成功,术后即刻均显示动脉瘤致密栓塞。患者 1、3 分别于术后 7 个月、6 个月随访,复查造影分别显示为瘤颈复发、瘤体复发,其中瘤体复发患者再次栓塞后达到致密栓塞;患者 2 术后 6 个月电话随访结果显示,改良 Rankin 量表(mRS)评分 2 分,较出院时明显好转。**结论** LVIS 双支架技术治疗基底动脉顶端宽颈动脉瘤安全有效,中远期疗效有待进一步研究,可能与双支架排列方式有关。

【关键词】 宽颈动脉瘤;基底动脉瘤;双支架;Y 形支架

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Dual low-profile visualized intraluminal support device for the treatment of wide-necked aneurysms located at the basilar artery apex: report of three cases XIE Yixing, ZHANG Hongmei, SUN Chengjian, LIU Guoping, ZHANG Zhaolong, ZHAO Xiaolong, SHAO Liming, XU Rui. Department of Interventional Radiology, Affiliated Hospital of Qingdao University, Qingdao, Shandong Province 266000, China

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【Abstract】 Objective To discuss the preliminary clinical application and therapeutic outcome of dual low-profile visualized intraluminal support(LVIS) stent-assisted coil embolization for wide-necked aneurysms located at the basilar artery apex. **Methods** Dual LVIS stent-assisted coil embolization by using dual stent parallel technique was performed in three patients with wide-necked aneurysms located at basilar artery apex. **Results** Successful dual LVIS stent-assisted coil embolization was accomplished in all the three patients. Angiography performed immediately after operation showed that all aneurysms achieved compact embolization. Two patients received follow-up angiography reexamination at postoperative 6 months and 7 months respectively, and the two patients developed recurrence of aneurysm neck($n=1$) or recurrence of aneurysm cavity($n=1$). The patient having recurrence of aneurysm cavity received embolization treatment again and compact embolization of aneurysm cavity was achieved. In another patient, the postoperative 6-month telephone follow-up results showed that the modified Rankin Scale(mRS) score was 2 points, which was significantly improved than that evaluated at the time of discharge. **Conclusion** For the treatment of wide-necked aneurysms located at basilar artery apex, dual LVIS stent-assisted coil embolization is safe and effective, but its mid-long-term efficacy needs to be further investigated. The arrangement pattern of the two stents may have some effect on the efficacy. (J Intervent Radiol, 2021, 30: 1150-1154)

【Key words】 wide-necked aneurysm; basilar aneurysm; dual stent; Y-shaped stent

颅内后循环动脉瘤占颅内动脉瘤的 3.8%~15%。其形成及破裂风险较大,这与其位置、形态、血流量、流速等多种因素密切相关^[1]。近年介入栓塞微创

治疗已在临床广泛应用。由于基底动脉顶端动脉瘤具有特殊的解剖结构及血流动力学特点,双支架辅助栓塞治疗成为研究热点。现将本中心采用低

剖面可视化腔内支撑装置(low-profile visualized intraluminal support, LVIS)双支架辅助弹簧圈栓塞治疗基底动脉顶端动脉瘤患者的临床资料报道如下。

1 材料与方法

1.1 一般资料

收集 2019 年 1 月至 2020 年 3 月青岛大学附属医院采用 LVIS 双支架治疗的 3 例基底动脉顶端宽颈动脉瘤患者的临床资料。3 例患者中女 2 例,男 1 例,年龄 40~72 岁。1 例为破裂动脉瘤,2 例为未破裂动脉瘤;均经 DSA 造影证实为基底动脉顶端动脉瘤累及双侧大脑后动脉,并予以 LVIS 双支架辅助弹簧圈栓塞治疗。

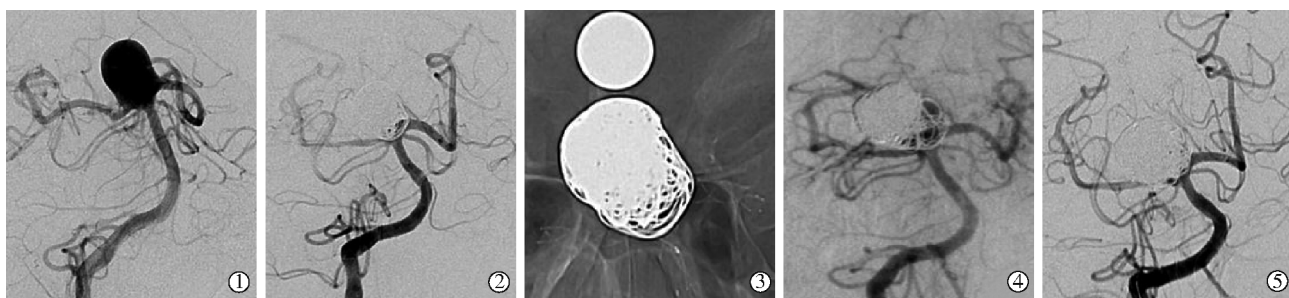
1.2 围手术期情况和处理方式

患者 1,男,57 岁,因查体发现颅内动脉瘤 1 个月入院。外院 MRA 示基底动脉顶端中型动脉瘤,无阳性体征。介入栓塞术中 DSA 造影示基底动脉顶端囊状动脉瘤(13.5 mm×14.5 mm),瘤颈累及双侧大脑后动脉 P1 段,左侧大脑后动脉直径约 3 mm,右侧大脑后动脉直径不足 2.5 mm,右侧椎动脉优势,余脑血管未见异常;采用 6 F Envoy DA 远端通路导引导管(美国 Codman 公司)及瘤内成襻技术分别将 Headway 21 微导管(美国 MicroVention 公司)选入左侧大脑后动脉 P2 段,Headway 17 微导管选入右侧大脑后动脉 P2 段,SL-10 微导管(美国 Stryker 公司)塑大弯选入动脉瘤腔内;经 SL-10 微导管填入 20 mm×50 cm Axiom 弹簧圈(美国 ev3 公司)、16 mm×40 cm Axiom 弹簧圈成篮,经 Headway 21 微导管释放 3.5 mm×20 mm LVIS(美国 MicroVention 公司),经 Headway 17 微导管释放 2.5 mm×17 mm LVIS Jr,使两支架在基底动脉内呈平行排列,再经 SL-10 微导管填入另 13 枚弹簧圈;复查造影示动脉瘤致密栓塞(Raymond I 级),支架形态良好,双侧大脑后动脉通畅(图 1)。术后 5 d 患者出院,改

良 Rankin 量表(mRS)评分 0 分。

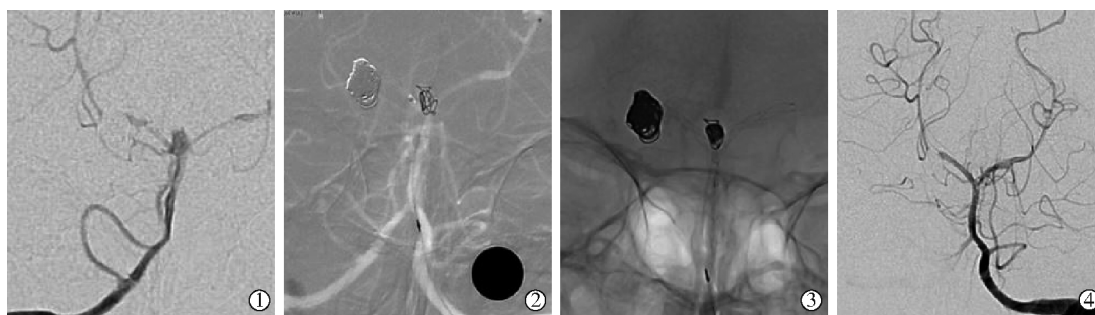
患者 2,女,40 岁,因头痛 2 d 加重伴意识丧失 6 h 入院。20 d 前曾因蛛网膜下腔出血接受右侧后交通动脉瘤栓塞术。急诊 DSA 造影示原右侧后交通动脉瘤栓塞致密,未见对比剂逸出,基底动脉顶端见宽颈动脉瘤(4.6 mm×2.8 mm)伴子瘤,对比 20 d 前造影示基底动脉瘤子瘤为新发。介入栓塞术中 6 F Envoy DA 导引导管置于椎动脉 V3 段,3 根 Headway 17 微导管分别送入双侧大脑后动脉 P2 段及瘤体内;动脉瘤内填入 4 mm×6 cm Target 弹簧圈 1 枚成篮,于右侧大脑后动脉至基底动脉释放 2.5 mm×17 mm LVIS Jr,左侧大脑后动脉内释放 2.5 mm×17 mm LVIS Jr,使两支架于基底动脉呈平行排列,于动脉瘤内填入 4 枚弹簧圈;复查造影示动脉瘤致密栓塞(Raymond I 级),支架形态良好,双侧大脑后动脉通畅(图 2)。术后口服双抗血小板聚集药治疗,并予以腰穿测压、甘露醇静脉滴注等治疗。术后第 4 天患者神志转清,第 5 天突发意识障碍,即行脑血管造影示脑血管多发痉挛,予以脑动脉灌注 60 mg 罂粟碱后痉挛改善,后又行脑室-腹腔分流术后意识渐清,出院时 mRS 评分 4 分。

患者 3,女,72 岁,因头晕 1 个月余入院。外院 MRA 示基底动脉顶端中型动脉瘤,查体无阳性体征。DSA 造影示基底动脉顶端囊状动脉瘤(8.5 mm×8.5 mm),瘤颈累及右侧大脑后动脉 P1 段,双侧后交通动脉不发达。介入栓塞术中采用 6 F Envoy DA 导引导管和瘤内成襻技术分别将 2 根微导管选入双侧大脑后动脉 P2 段,另 1 根 Headway 17 微导管塑大弯选入动脉瘤腔内;左侧大脑后动脉释放 2.5 mm×17 mm LVIS Jr,右侧大脑后动脉释放 3.5 mm×20 mm LVIS,使两支架在基底动脉内呈平行排列;经微导管填入 8 mm×30 cm、6 mm×20 cm、3 mm×10 cm、3 mm×10 cm Axiom 弹簧圈;复查造影示动脉瘤致密栓塞(Raymond I 级),支架形态良好,双侧大脑



①动脉 DSA 造影示动脉瘤形态;②动脉瘤栓塞即刻造影;③术后支架和弹簧圈形态,两支架在基底动脉内平行排列;④术后 7 个月复查见动脉瘤左侧部分复发;⑤单微导管选入动脉瘤内并填入 4 枚弹簧圈后示 Raymond I 级

图 1 患者 1 介入栓塞治疗过程影像



①动脉 DSA 造影示动脉瘤形态;②动脉瘤栓塞造影,双侧大脑后动脉支架微导管及弹簧圈栓塞微导管到位,于动脉瘤内填塞弹簧圈;③术后支架和弹簧圈形态,两支架在基底动脉内平行排列;④动脉瘤致密栓塞,呈 Raymond I 级

图 2 患者 2 介入栓塞治疗过程影像

后动脉通畅。术后 3 d 患者出院, mRS 评分 0 分。

1.3 评价标准及随访

根据 Raymond 等提出的分级标准评价术后即刻治疗效果。术后 6 个月时随访患者 mRS 评分、Raymond 分级等。

2 结果

3 例患者手术顺利, LVIS 双支架均成功释放, 术后即刻均显示动脉瘤致密栓塞。出院后均口服阿司匹林(100 mg/d)和氯吡格雷(75 mg/d)。3 例患者中有 2 例接受造影随访, 患者 1 术后 7 个月复查造影示动脉瘤偏左侧部分复发, 予以再次栓塞术后 Raymond I 级, mRS 评分 0 分; 患者 3 术后 6 个月复查造影示瘤颈处复发, 继续予以口服阿司匹林(100 mg/d)治疗, mRS 评分 0 分。患者 2 术后 6 个月电话随访示, mRS 评分 2 分, 较出院时明显好转。

3 讨论

颅内动脉瘤支架辅助栓塞术已广泛应用于临床, 该技术相对于单纯栓塞可提升栓塞率, 降低复发率^[2-4]。对于基底动脉顶端宽颈动脉瘤, 采用支架辅助栓塞治疗时常用支架植入技术, 有单支架辅助栓塞和双支架辅助栓塞。单支架辅助栓塞包括: ①“华夫筒”技术, 支架头端位于动脉瘤瘤体内或瘤颈处, 尾端置于基底动脉内; ②一侧大脑后动脉-基底动脉技术, 支架头端位于一侧大脑后动脉, 尾端位于基底动脉内; ③水平技术, 支架头端位于一侧大脑后动脉 P1 段, 尾端位于对侧大脑后动脉内。双支架辅助栓塞包括: ①T 形技术, 1 枚支架头端位于一侧大脑后动脉, 尾端位于基底动脉内, 另 1 枚支架头端位于对侧大脑后动脉内, 尾端位于瘤颈处, 使 2 枚支架于瘤颈处形成 T 形连接; ②交叉 Y 形技术, 第 1 枚支架头端位于一侧大脑后动脉, 尾端位

于基底动脉内, 第 2 枚支架穿越第 1 枚支架网孔, 头端位于对侧大脑后动脉, 尾端位于基底动脉内; ③平行 Y 形技术, 2 枚支架头端分别位于双侧大脑后动脉内, 尾端均位于基底动脉, 呈平行置放。基底动脉顶端动脉瘤双支架技术主要适用于基底动脉顶端宽颈动脉瘤患者, 瘤颈累及大脑后动脉或大脑后动脉发自于瘤体, 且后交通动脉发育不良; 栓塞此种动脉瘤时, 必须保留双侧大脑后动脉, 应用双支架技术不仅可更致密地栓塞动脉瘤, 还可更好地重建血管。

在支架对血流动力学影响方面, Kono 等^[5]通过对 8 种支架置放方法几何模型研究, 得出交叉 Y 形支架技术对动脉瘤瘤颈处血流降速作用最大, 对血流重定向能力最强, 这些主要归功于两支架相交处的狭窄结构, 并预测这种效应可能会减少动脉瘤复发。Matsuda 等^[6]通过计算不同基底动脉与大脑后动脉分叉角度, 认为 Y 形支架促进了基底动脉顶端动脉瘤内血栓形成, 而单支架置放增加了动脉瘤复发和破裂风险。张学敬等^[7]回顾性分析患者 DSA 造影资料显示, 基底动脉顶端动脉瘤形成与较宽的动脉分叉顶角及相应血流动力学应力呈显著相关。然而 Cekirge 等^[8]研究认为, Y 形支架植入减小了双侧大脑后动脉的动脉分叉顶角。Melber 等^[9]研究显示, 交叉 Y 形支架植入分叉部宽颈动脉瘤可使两植入支架血管间角度重塑, 减少动脉瘤复发。

目前双支架技术多选择激光雕刻支架(分为开环设计和闭环设计)及编织支架。双开环支架在交叉 Y 形植入后, 在交叉处物狭窄产生且稳定性较好, 不容易移位, 尤其是在导丝导管穿网孔及支架释放时。双闭环支架对植入血管夹角重塑性强, 这种夹角重塑性可减少动脉瘤复发, 有研究认为交叉处狭窄对患者是有益的, 可发挥强大的血流动力学作用, 使瘤内血流速度减低, 从而减少动脉瘤复

发^[8,10-15]。编织支架目前常用的有 LVIS 及 Leo(法国 Balt 公司),其相对金属雕刻支架网孔更密,可增加动脉瘤栓塞率,减少弹簧圈向瘤外凸出;LVIS Jr 还可应用于<2 mm 血管,可选择更细的微导管输送,保证了动脉血流灌注,从而降低栓塞术中缺血事件发生,在双支架辅助栓塞双侧大脑后动脉这种细支血管受累的动脉瘤手术中起到重要作用。编织支架的血流导向作用更强^[16-17],更适合血流和血管重建。考虑到以上优点,本研究对 3 例患者动脉瘤均予以双 LVIS/LVIS Jr 辅助栓塞,结果证实术后即刻均呈致密栓塞(Raymond I 级),且载瘤动脉通畅,无缺血事件发生。

文献报道 Y 形支架技术成功率均在 90%以上,大多报道为 100%,这其中既涵盖金属雕刻的开环支架、闭环支架以及编织支架,也包括交叉 Y 形技术和平行 Y 形技术;技术失败的原因主要有,采用平行 Y 形技术时患者血管条件差,使得双侧大脑后动脉无法同时超选,或采用交叉 Y 形支架技术时,导丝无法穿过第 1 枚释放的支架网孔到达对侧大脑后动脉^[8,15-20]。本组 3 例患者均接受编织支架和双支架平行 Y 形技术治疗,均达到技术成功,与文献报道基本一致。术中及术后并发症较少见,主要有支架移位、支架内血栓或闭塞、支架或弹簧圈凸出,鲜有致死性并发症报道^[8,21-22]。6~12 个月随访及 24 个月以上远期随访发现,采用 Y 形支架栓塞的动脉瘤绝大多数稳定,复发率低^[8,14-18,20,23],且术中造影证实的残余瘤颈患者大部分在随访时已转为致密栓塞^[16]。本组 3 例患者中 2 例分别于术后 6、7 个月随访时显示有复发,可能与双支架在基底动脉内平行排列方式有关,而文献报道的随访患者多数为交叉 Y 形双支架连接。

综上所述,LVIS 双支架辅助栓塞基底动脉顶端宽颈动脉瘤是一项即刻安全有效的技术,中远期疗效有待进一步研究,可能与双支架排列方式有关。

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·临床研究 Clinical research·

DSA 引导的经减压孔快速交换法置入经鼻型肠梗阻导管

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【摘要】 目的 研究快速交换法置入经鼻型肠梗阻导管的可行性和优势。**方法** 29 例小肠梗阻患者接受快速交换法置入肠梗阻导管。泥鳅交换导丝到位后,其尾端经肠梗阻导管端孔进入,并经减压侧孔引出,透视下快速交换法置管。临床转归分为:痊愈、手术、好转、无效。其中,痊愈、好转、手术视为临床有效。以技术成功率和临床有效率评价效果。**结果** 技术成功率 100%。临床转归计有痊愈 9 例、手术 5 例、好转 13 例、无效 2 例。临床有效率 93.1%(27/29)。**结论** DSA 引导的经侧孔快速交换法可简捷地置入经鼻型肠梗阻导管,是治疗小肠梗阻的有效方法。

【关键词】 小肠梗阻; 肠梗阻导管; 快速交换; 恶性肠梗阻

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DSA-guided transnasal insertion of intestinal obstruction tube via decompression hole with rapid catheter-wire exchange technique REN Qimeng, LIU Zhao, LOU Jiahao, HU Bo, ZHANG Shuai, ZOU Jianwei, LI Zhi. Department of Radiology, Soochow Kowloon Hospital, School of Medicine, Shanghai Jiao Tong University, Suzhou, Jiangsu Province 215028, China

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【Abstract】 Objective To investigate the feasibility and advantages of rapid catheter-wire exchange technique in DSA-guided transnasal insertion of intestinal obstruction tube via decompression hole. **Methods** Twenty-nine patients with small bowel obstruction(SBO) received placement of intestinal obstruction tube by using rapid catheter-wire exchange technique. After the loach exchange guide-wire tip was placed in the target site, its tail-end was inserted into the top-hole of intestinal obstruction tube and the guide-wire was pushed forward until it came out through the lateral decompression hole of the tube. Then, under fluoroscopy guidance the intestinal obstruction tube implantation was carried out with rapid catheter-wire exchange technique. The clinical outcomes of patients included clinical cure, receiving surgery, clinical improvement, and invalid. The clinical cure, receiving surgery and clinical improvement were regarded as clinical effective outcomes. The technical success rate and clinical effective rate were used to evaluate the therapeutic efficacy. **Results** The technical success rate was 100%. Clinical outcomes included cure($n=9$), receiving surgery($n=5$), clinical improvement($n=13$) and invalid($n=2$). The clinical effective rate was 93.1%(27/29). **Conclusion** Under

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