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· 临床研究 ·

保持载瘤动脉通畅的椎动脉夹层动脉瘤治疗：附 28 例报告

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摘要

目的: 探讨保持载瘤动脉的椎动脉夹层动脉瘤治疗方法及效果。

方法: 回顾性分析 2013 年 1 月—2018 年 10 月 28 例接受保持载瘤动脉通畅治疗的颅内椎动脉夹层动脉瘤患者的临床资料。

结果: 28 例患者中, 未破裂 12 例, 破裂 16 例, 平均年龄 (51.8 ± 7.5) 岁。28 例患者手术技术成功率为 100%。5 例未破裂患者采用单纯 2 枚及 2 枚以上支架植入, 术后即刻造影显示动脉瘤内造影剂滞留, 随访造影发现动脉瘤消失或动脉瘤明显变小, Raymond 分级 I 级 3 例 (3/5), II 级 2 例 (2/5)。另外 23 例患者采用 2 枚重叠支架辅助弹簧圈栓塞, 术后即刻造影显示, 动脉瘤 Raymond 分级 I 级 11 (11/23) 例, Raymond 分级 II 级 5 (5/23) 例, Raymond 分级 III 级 7 (7/23) 例, 其中 19 例 (19/23) 获随访 (14.5 ± 7.9) 个月。随访造影发现动脉瘤 Raymond 分级 I 级 16 例 (16/19), Raymond 分级 II 级 3 例 (3/19), 无 Raymond 分级 III 级病例。16 例破裂患者中, 2 例发生支架内血栓形成或术后穿支事件, 给予溶栓治疗后消退。预后 mRS 评分 ≤ 2 分 27 例 (27/28), ≥ 3 分 1 例 (1/28)。

结论: 保持载瘤动脉通畅, 多支架或多支架辅助弹簧圈栓塞椎动脉夹层动脉瘤可以获得较好的临床结果。

关键词

动脉瘤, 夹层; 椎动脉; 支架; 栓塞, 治疗性

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Treatment of vertebral artery dissection aneurysm keeping parent artery patent: a report of 28 cases

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Abstract

Objective: To investigate the treatment method for vertebral artery dissecting aneurysms keeping the parent artery patent and the efficacy.

Methods: The clinical data of 28 patients with vertebral artery dissecting aneurysms treated with the parent artery patent from January 2013 to October 2018 were retrospectively analyzed.

Results: Of the 28 patients, 12 cases had unruptured lesions and 16 cases had ruptured lesions, with an average age of (51.8 ± 7.5) years. The surgical technical success rate of the 28 patients was 100%. Five patients with unruptured aneurysms were implanted with two or more stents. Immediate postoperative angiography showed

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that the contrast agent was retained in the aneurysm. The follow-up angiography showed that the aneurysms disappeared or diminished, with the Raymond grade I in 3 cases (3/5) and grade II in 2 cases (3/5). The other 23 patients were treated with double overlapping stent-assisted coil embolization. Immediate postoperative angiography showed Raymond grade I in 11 cases (11/23), grade II in 5 cases (5/23) and grade III in 7 cases (7/23), of whom, 19 cases (19/23) were followed up for (14.5±7.9) months, and the follow-up imaging results showed Raymond grade I in 16 cases (16/19), grade II 3 cases (3/19) and no grade III lesion. In the 16 patients with ruptured lesions, 2 cases developed in-stent thrombosis or perforating branch events, which were resolved after thrombolytic therapy. The prognostic mRS score ≤2 in 27 patients and ≥3 in one patient.

Conclusion: Leaving the parent artery patent, multiple stent placement or multiple stent assisted coil embolization can achieve good clinical results in treatment of vertebral artery dissection aneurysms.

Key words

Aneurysm, Dissecting; Vertebral Artery; Stents; Embolization, Therapeutic

CLC number: R654.3

颅内椎动脉夹层动脉瘤 (vertebral artery dissecting aneurysm, VADA) 发病率低 (0.001%~0.0015%)^[1], 破裂的椎动脉夹层动脉瘤 (ruptured vertebral artery dissecting aneurysm, RVADA) 破裂出血及再发出血, 病情凶险, 病死率及致残率均高, 有报道^[2]保守治疗46.7%的患者再出血1周内死亡。由于介入治疗普及、及时、有效, 已经成为该疾病的有效治疗方式, 介入治疗多采用载瘤动脉闭塞的方法, 不过依然有脑干、小脑梗塞的风险, 而另外一种治疗方式保留载瘤动脉支架辅助栓塞VADA正越来越多的被大家采用, 然而依然有许多不足, 本报告28例治疗结果。

1 资料与方法

1.1 一般资料

入组标准: DSA造影下, 有明确VADA异常影像者。如果是RVADA, CT提示自发性蛛网膜下腔出血或腰穿证实有蛛网膜下腔出血, 结合影像学结果考虑椎动脉夹层动脉瘤为责任病灶者, 排除外伤性者。自2013年1月—2018年10月, 我中心采用支架辅助栓塞治疗VADA患者28例, 其中男8例, 女20例; 年龄 (51.8±7.5) 岁。未破裂12例, 临床表现未破裂者表现为头痛头晕; RVADA 16例为突发头痛, 伴有恶心、呕吐, 伴或不伴有意识障碍。破裂者格拉斯哥昏迷评分法 (Glasgow Coma Scale, GCS) ≥9分13例, GCS≤8分3例。Hunt-Hess分级I~III级以下12例, Hun-Hess分级IV~V级4例。

1.2 影像学资料

脑血管造影进行双侧椎动脉是否是优势供血、颈内动脉系统和椎基底动脉供血系统代偿评估, DSA显示受累有椎动脉扩张和狭窄或局部囊状扩张, 重点分析受累节段是否累及小脑后下动脉 (posterior inferior cerebellar artery, PICA) 起始部, 受累病变段是否有重要穿支支配脊髓前或脑干周围区域。未破裂动脉瘤手术前后行磁共振检查了解有无新发脑梗塞情况。破裂者术后行磁共振检查了解颅内病变情况。动脉瘤治疗术后即刻造影影像及随访影像采用Raymond分级^[3]。

1.3 治疗方法

所有治疗均在全身麻醉下进行, 术中使用肝素80 U/kg肝素化, 自麻醉成功后开始, 并每半小时后半量追加肝素, 直到用量为1 000 U维持, 术中保持动脉通道滴注通畅。经股动脉入路置入6 F动脉鞘, 经鞘置入6 F或者5 F Envoy导引导管 (美国Johnson公司) 至椎动脉平第二颈椎水平。治疗采用2枚或2枚以上Enterprise支架 (美国Codman公司), 支架输送导管为Headway 21 (美国Microvention公司) 或Prowler Select plus微导管 (Prowler Select Plus, 美国Codman公司), 动脉瘤填塞微导管为Enchelon 10 (Echlon-10, 美国EV3公司)。支架的释放方式为首枚支架采用半释放, 待动脉瘤囊状突起被满意填塞后再逐步完全释放支架, 力求动脉瘤不显影, 如果是多支架采用重叠释放方式。支架的长度选择应覆盖整个受累病变段。

未破裂VADA 12例, 治疗前均使用波立维75 mg、阿司匹林100 mg口服3~5 d。RVADA患者16例均

为急诊入院病例,并接受急诊手术,造影结束明确诊断后,治疗开始前给予波立维、阿司匹林各300 mg纳肛或经胃管注入,考虑到抗血小板聚集不充分,备用替罗非班(5 mg/100 mL),发现支架内血栓形成影像及前向血流变慢,根据体质量给予低剂量4~5 mL经动脉导管内灌注10 min,可重复使用至血栓消失或血流明显改善,同时用替罗非班(5 mg/100 mL)4 mL/h静脉泵入维持,共6 h(5 mg/100 mL)。破裂出血患者1例术前出现呼吸暂停,血氧下降,给予气管插管人工支持呼吸,并行脑室外引流手术,另外1例术后再行脑室外引流手术。其它治疗包括腰穿、使用预防脑血管痉挛、补液及营养支持、脱水及控制颅内压及对症处理等。

1.4 随访

患者术后3~6个月,12~18个月,24~36个月接受DSA脑血管造影随访或CTA、MRA复查。患者影像学随访采用改良Rankin量表(modified Rankin

Scale, mRS)评分,预后不良者mRS \geq 3分^[4]。

2 结果

2.1 总体治疗情况

28例患者中支架辅助栓塞治疗技术成功率100%,未破裂者其中5例采用单纯2枚及2枚以上支架植入,术后即刻动脉瘤内造影剂滞留,随访发现动脉瘤消失或动脉瘤明显变小,Raymond分级I级3例,II级2例(图1),另23例采用支架辅助弹簧圈栓塞,术后即刻动脉瘤完全不显影Raymond分级I级11例(11/23),Raymond分级II级5例(5/23),Raymond分级III级7例(7/23),其中19例(19/23)获得DSA影像学成功随访,平均随访(14.5 \pm 7.9)个月,随访发现动脉瘤完全不显影Raymond分级I级16例(16/19),Raymond分级II级3例(3/19),无Raymond分级III级病例。随访中1例因其它原因死亡,3例无随访结果。

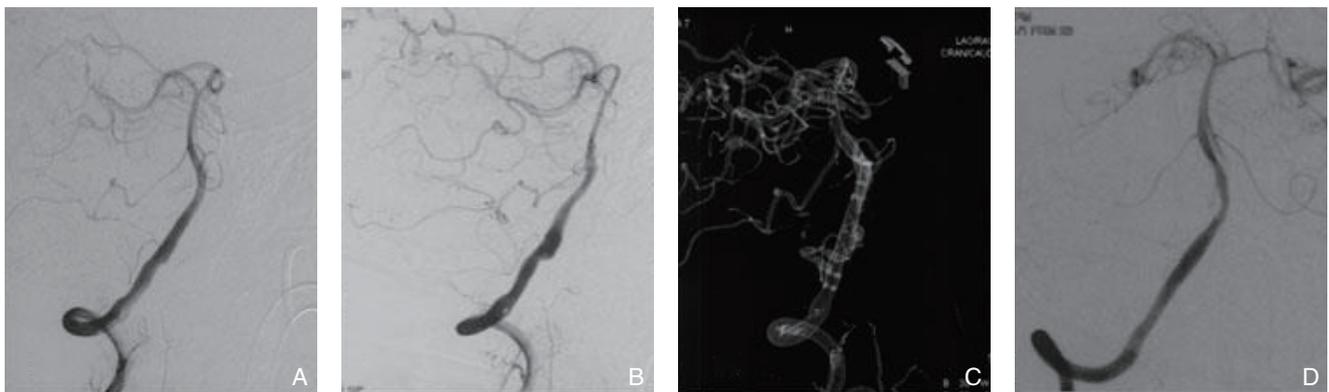


图1 单纯多支架植入 A:术前显示局部椎动脉狭窄伴扩张;B:支架植入后瘤体显影减少;C: Dyn CT显示双支架;D:随访血管重塑好

Figure 1 Simple multiple stent placement A: Preoperative angiography showing stenosis with dilation of the vertebral artery; B: Reduced display of the aneurysm after stent placement; C: Dyn CT showing the double stent; D: Good vascular remodeling during follow-up

2.2 支架内血栓事件发生情况

12例未破裂VADA,术中术后未发生支架内血栓事件。16例RVADA,1例发生治疗中支架内血栓形成,经替罗非班动脉内联合静脉维持给药后,血栓消退,另外1例术后18 h发生意识恶化,给予替罗非班溶栓后,同时复查DSA造影,提示椎动脉穿支事件,重复小剂量替罗非班给药后穿支再次显影,患者病情迅速好转神志转清(图2)。

2.3 动脉瘤周邻血管分布情况

28例接受治疗的患者中,21例(21/28)影像学上表现为病变段明显囊状膨出,5例(5/28)累及小脑下后动脉(图3),4例(4/28)有明显细穿支血管发出,2例(2/28)病变血管对侧发育不良,代偿供血缺乏。16例(16/28)表现为明显的病变侧血管向基底动脉主要供血。

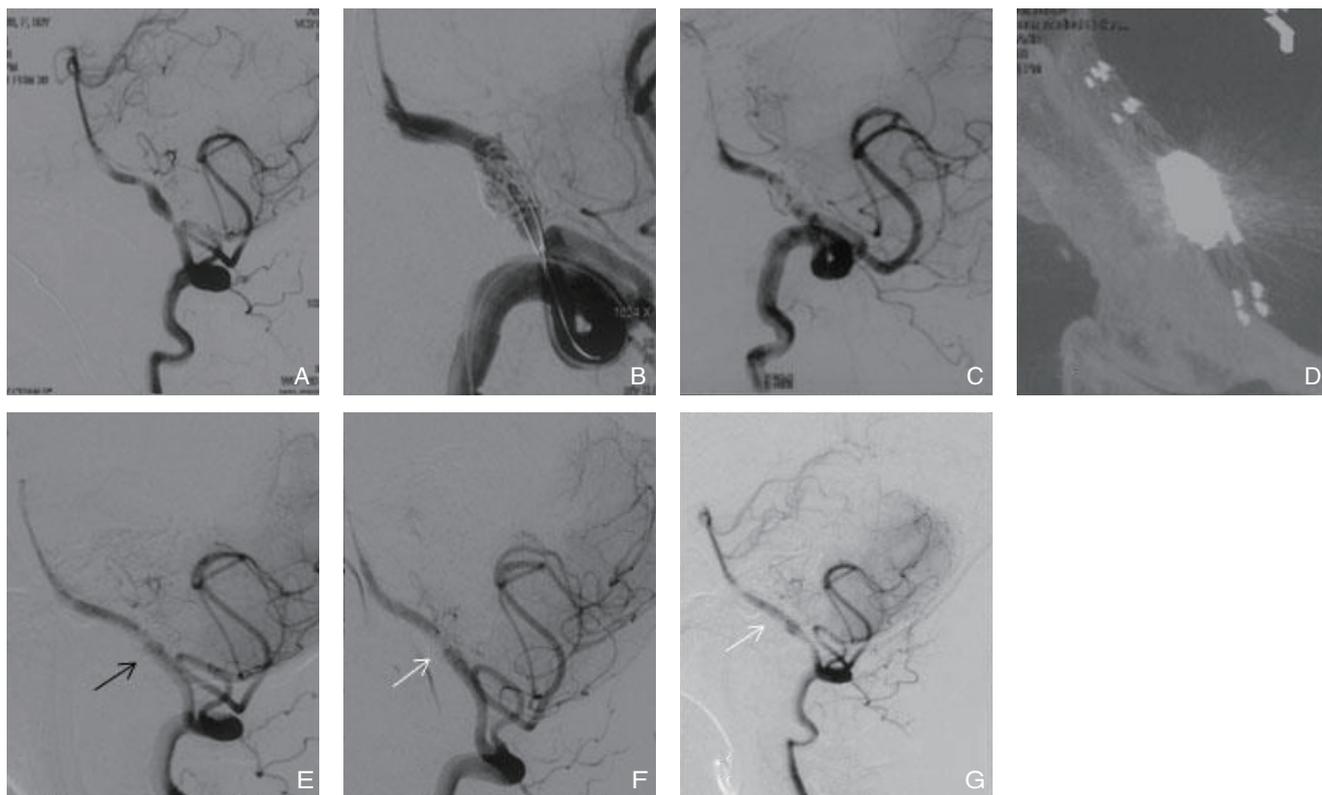


图 2 多支架辅助弹簧圈栓塞 A: 病变受累位置有穿支发出; B: 半释放技术填塞动脉瘤, 保护穿支; C: 双支架辅助弹簧圈栓塞后, 动脉瘤不显影, 穿支显影, 血管较术前变直; D: Dyn CT 显示双支架辅助弹簧圈; E: 术后 18 h 出现意识障碍, DSA 复查见穿支不显影 (黑箭头); F: 术中溶栓患者意识恢复, 穿支再次显示 (白箭头); G: 复查血管重塑良好穿支存在 (白箭头)

Figure 2 Multiple stent assisted coil embolization A: Perforating branches coming off around the affected site; B: Tamping the aneurysm with semi-release technique for protection of the perforating branches; C: No display of the aneurysm, and display of the perforating branches with the vessel becoming more straight after double stent assisted coil embolization; D: Dyn CT showing the double stent assisted coil; E: Disturbance of consciousness 18 h after operation, and DSA showing no display of the perforating branches (black arrow); F: Consciousness recovery after thrombolysis and the perforating branches presented again (white arrow); G: Good vascular remodeling and presence of the perforating branches (white arrow)

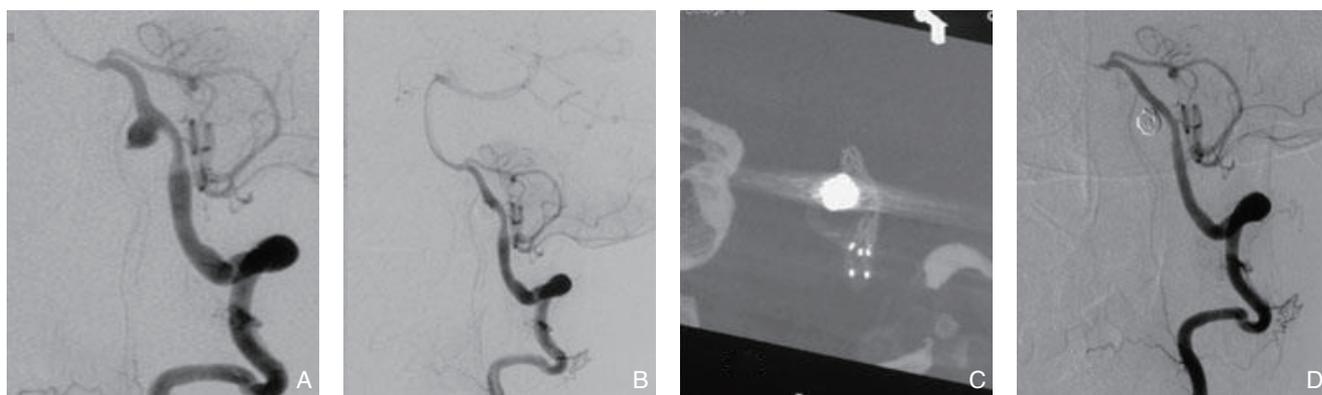


图 3 病变累及小脑后下动脉的处理 A: 破裂动脉瘤累及小脑后下动脉; B: 双支架辅助弹簧圈栓塞动脉瘤凸起薄弱部分; C: Dyn CT 显示双支架辅助弹簧圈栓塞; D: 随访结果动脉瘤隔绝于血流外, 血管重塑, 血管较术前变直

Figure 3 Treatment of the lesion involving the posterior inferior cerebellar artery A: The ruptured aneurysm involving the posterior inferior cerebellar artery; B: Double stent assisted coil embolization of the weak portion of the aneurysm; C: Dyn CT showing the double stent assisted coil; D: Follow-up result showing the aneurysm excluded from blood flow, vascular remodeling and straightened vessel

2.4 预后情况

随访期间,27例(27/28)mRS \leq 2分;不良预后mRS \geq 3分者1例(1/28),为入院时Hunt-Hess分级IV患者。

3 讨论

自发性VADA发病率低,但其破裂瘤病情凶险,再发出血发生率高,病死率高,防止其再发出血是治疗关键^[5]。载瘤动脉闭塞是常用的方法,但该方法在治疗动脉瘤的同时以牺牲载瘤动脉为代价,缺点也是治疗中必须关注的内容^[6-7]。导致延髓、脊髓、小脑的梗死等,并且闭塞后再通也会发生,再次引起动脉瘤破裂^[8-9]。消除动脉瘤同时保留载瘤动脉理论上最为合理,但需要对异常结构的血管进行重建,其中的方法各不相同,结果也各异^[10-13]。笔者采用单纯多重Enterprise支架或支架辅助弹簧圈栓塞的方法治疗VADA,单纯多重支架全部应用于其中5例未破裂动脉瘤患者,随访发现动脉瘤消失或缩小,结果令人满意。另外23例患者有明显动脉瘤瘤腔的椎动脉夹层动脉瘤,采用支架辅助弹簧圈栓塞的方法,临床结果能够有效的防止再出血,尽管术后即刻影像学结果动脉瘤还不能完全闭塞,但成功影像学随访19例结果发现动脉瘤完全不显影增加或残留明显减少,无Raymond分级III级病例出现。

采用保留载瘤动脉方式治疗VADA的常见原因:(1)椎动脉独立供血基底动脉,或病变侧椎动脉为主要供血对侧椎动脉发育不良,或代偿供血不充分;(2)动脉瘤累及PICA;(3)动脉瘤累及重要穿支如脑干周围穿支或脊髓前动脉^[14];(4)夹层动脉瘤形态向侧方膨出适合保留载瘤动脉。由于一侧载瘤动脉闭塞,有增加另外一侧椎动脉形成动脉瘤的潜在风险^[15],笔者采取尽量保留载瘤动脉的方式,对技术上能采用支架辅助弹簧圈的病例尽量采用该方式治疗。理由:(1)防止再出血是破裂椎动脉夹层动脉瘤治疗的主要目标之一^[16],动脉瘤的出血一般不是持续的出血,持续出血的病例很难有获得治疗的机会,形态学上凸起最明显的地方通常被认为是破裂处,如果优先对破裂点填塞促使血栓形成,动脉瘤可以得到一定的保护^[17];(2)VADA并不是整个血管全周损坏,支架治疗除了其保护弹簧圈突入载瘤动脉、支架植入后“脚手架”作用、炎症作用外,还可以借助于多支架的血流导向作用^[18],促进血管薄弱部分内弹簧圈

治疗后血栓形成与修复;(3)由于椎动脉位于蛛网膜下腔使用Enterprise支架相对于其他编织型支架,更有利于病变段血管拉直,减少血流对动脉瘤体的冲击,这也是本组病例均采用Enterprise支架的理由之一。急性破裂期使用血流导向装置依然有争议^[19-20],是否使用Enterprise联合血流导向支架治疗更加合理还需要更多病例的总结^[20]。

血管内支架使用通常采用阿司匹林联合波立维抗血小板聚集,急性破裂期给与负荷量各300 mg,由于较多患者从影像学确诊RVADA到介入治疗结束不到3 h,抗血小板聚集不充分容易导致支架内血栓或栓塞事件^[21],笔者在未破裂VADA患者中未发现有血栓事件发生,在破裂病例给予负荷量患者中出现支架内血栓和术后穿支事件,给予低剂量的替罗非班,维持6 h,获得满意的临床结果,由于病例数少,仍需要积累观察。

保持载瘤动脉通畅,不轻易牺牲血管具有重要意义,可以获得较好的临床结果,即使影像学上残留或复发,预后也可能较载瘤动脉闭塞后动脉瘤复发再通预后好^[22],该方法是否作为VADA治疗的首选值得进一步观察。

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