

球囊联合支架辅助弹簧圈栓塞颅内分叉部宽颈动脉瘤

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【摘要】 目的 分析球囊联合支架辅助弹簧圈栓塞术治疗颅内分叉部宽颈动脉瘤的优势。方法 回顾性分析 2014 年 1 月至 4 月昆明医科大学第一附属医院采用球囊联合支架辅助弹簧圈栓塞术治疗 20 例共 25 枚颅内分叉部宽颈动脉瘤患者的临床资料。20 例患者中曾患蛛网膜下腔出血 12 例,无出血史 8 例;25 枚颅内分叉部宽颈动脉瘤中位于基部动脉末端分叉部 14 枚,大脑中动脉分叉部 8 枚,颈内动脉末端分叉部 3 枚。根据 Raymond 分级评价介入治疗术后即刻和 3 个月后三维 DSA 检查结果,根据改良 Rankin 量表(mRS)评分评价术后 3 个月临床疗效。结果 球囊联合支架辅助弹簧圈栓塞术后即刻三维 DSA 检查显示 25 枚颅内分叉部宽颈动脉瘤中 Raymond I 级 21 枚, II 级 2 枚, III 级 2 枚;术后 3 个月 DSA 随访显示 Raymond I 级 20 枚, II 级 3 枚, III 级 2 枚。术后 3 个月 mRS 评分显示 17 例患者 0 分, 1 例患者 1 分,均预后良好;2 例患者 4~6 分,预后不良。结论 球囊联合支架辅助弹簧圈栓塞术在颅内分叉部宽颈动脉瘤介入治疗中具有明显优势。

【关键词】 球囊; 支架; 弹簧圈; 颅内动脉瘤; 分叉部

中图分类号:R743.3 文献标志码:A 文章编号:1008-794X(2015)-06-0463-04

Balloon combined with stent-assisted steel-coil embolization for the treatment of intracranial wide-necked aneurysms located at artery bifurcation sites LIU Zhi-hua, SHEN Jin, ZHAO Wei, SHI Ying. Medical Imaging Center, First Affiliated Hospital, Kunming Medical University, Kunming, Yunnan Province 650031, China

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【Abstract】 Objective To discuss the advantages of balloon combined with stent-assisted steel-coil embolization in treating intracranial wide-necked aneurysms located at artery bifurcation sites. **Methods** The clinical data of 20 patients with intracranial wide-necked aneurysms located at artery bifurcation sites (25 aneurysms in total), who were admitted to the First Affiliated Hospital of Kunming Medical University during the period from January 2014 to May 2014 to receive balloon combined with stent-assisted steel-coil embolization treatment, were retrospectively analyzed. Among the 20 patients, 16 had a history of subarachnoid hemorrhage and 4 had no history of subarachnoid hemorrhage. A total of 25 intracranial aneurysms located at artery bifurcation were detected; the locations included basilar terminal bifurcation ($n=14$), middle cerebral artery (MCA) bifurcation ($n=8$) and internal carotid artery (ICA) bifurcation ($n=3$). Three dimensional DSA was performed immediately and three months after the treatment, and the manifestations were evaluated according to Raymond classification. The clinical efficacy at three months after the treatment was assessed with the modified Rankin scale (mRS). **Results** Three dimensional DSA performed immediately after the balloon combined with stent-assisted steel-coil embolization treatment showed that among the 25 intracranial wide-necked aneurysms located at artery bifurcation 21 belonged to Raymond grade I, 2 belonged to Raymond grade II and 2 belonged to Raymond grade III. Follow-up DSA performed three months after the treatment revealed that 20 aneurysms were Raymond grade I, 3 aneurysms were Raymond grade II and 2 aneurysms were Raymond grade III. Three months after the treatment the mRS score

DOI:10.3969/j.issn.1008-794X.2015.06.001

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was 0 point in 17 patients and one point in one patient, and the prognosis of these patients was good; the mRS score was 4–6 points in 2 patients, and the prognosis of the two patients was poor. **Conclusion** For the treatment of intracranial wide-necked aneurysms located at artery bifurcation sites, balloon combined with stent-assisted steel-coil embolization has obvious advantages. (J Intervent Radiol, 2015, 24: 463-466)

【Key words】 balloon; stent; coil; intracranial aneurysm; bifurcation

随着介入材料不断改进和介入治疗水平不断提高,血管腔内治疗以创伤小、可操作性强的优点,逐渐成为近年治疗颅内动脉瘤的首选方法。但宽颈动脉瘤,尤其是颅内分叉部宽颈动脉瘤仍是神经介入医师面临的十分棘手的难题^[1]。宽颈动脉瘤指瘤颈宽度>4 mm 或瘤颈与瘤体宽径比>0.5 的动脉瘤。目前针对颅内分叉部宽颈动脉瘤的介入治疗方法主要有 Y 型支架释放技术^[2]、水平支架释放技术^[3]、双微导管技术、双球囊辅助技术。2014 年 1 月至 4 月,昆明医科大学第一附属医院采用球囊联合支架辅助弹簧圈栓塞术治疗 20 例患者 25 枚颅内分叉部宽颈动脉瘤,取得了良好疗效。现将该技术应用及其优势报道如下。

1 材料与方法

1.1 一般资料

2014 年 1 月至 4 月,昆明医科大学第一附属医院影像科采用球囊联合支架辅助弹簧圈栓塞术治疗 20 例患者 25 枚颅内分叉部宽颈动脉瘤。20 例患者中男性 8 例,女性 12 例;年龄 35~67 岁,平均 50 岁。根据 Hunt-Hess 分级,0 级 12 例,Ⅰ级 3 例,Ⅱ级 1 例,Ⅲ级 2 例,Ⅳ级 2 例。20 例中曾患蛛网膜腔出血 12 例,均有突发剧烈头痛等病史,4 例出现昏迷,2 例出现偏瘫;有 8 例无出血史,2 例表现为头痛,6 例无症状。

1.2 影像学资料

所有患者术前均经全脑动脉数字减影血管造影(IADSA)检查确诊为颅内分叉部宽颈动脉瘤,并以三维 DSA 准确观察动脉瘤位置、形态、大小、瘤颈宽度及与载瘤动脉和穿支血管的空间关系,并选择最佳工作体位 1~2 个。20 例患者中单发动脉瘤 15 例,多发动脉瘤 5 例。总计 25 枚动脉瘤中位于基部动脉末端分叉部 14 枚,大脑中动脉分叉部 8 枚,颈内动脉末端分叉部 3 枚;11 枚瘤颈宽度为 4~5 mm,9 枚为 5~6 mm,5 枚为 6 mm 以上。

1.3 围手术期处理

所有患者术前均接受三大常规、心肝肾功能、凝血功能检查。有蛛网膜下腔出血史患者术前 0.6~1 h

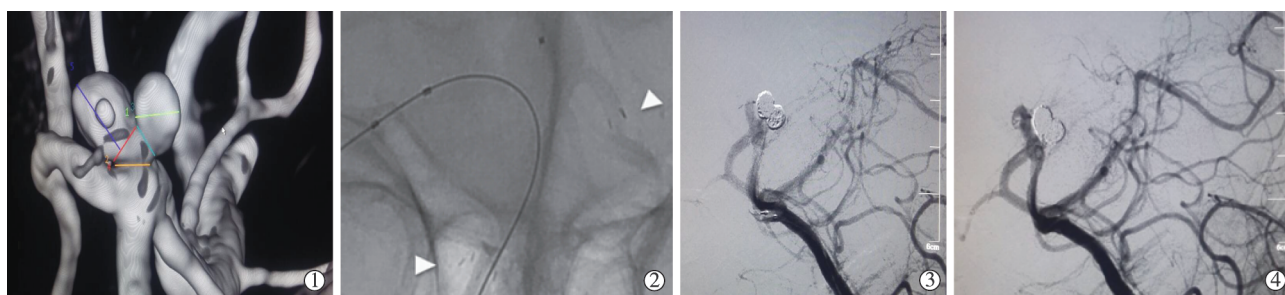
顿服阿司匹林和氯吡格雷各 300 mg,无出血史患者术前 3 d 口服阿司匹林 100 mg/d 和晨起顿服氯吡格雷 75 mg/d。所有患者术前 1 d 开始从静脉持续微量泵注尼莫地平 3~5 ml/h;术中充分肝素化(45 U/kg),每隔 1 h 追加肝素 1 000 U;术后 72 h 内皮下注射低分子肝素(4 000 U,每 12 小时 1 次),3 d 后口服氯吡格雷(75 mg/d)、阿司匹林(100 mg/d)持续 3 个月,3 个月后改为持续口服阿司匹林(100 mg/d)。

1.4 治疗方法

手术在气管内插管全身麻醉下进行,术中全程肝素化。采用经股动脉 Seldinger 穿刺技术置入 8 F 动脉鞘,将 8 F 导引导管置于颈内动脉或 C1~2 水平椎动脉。以基底动脉末端分叉部宽颈动脉瘤介入治疗为例,在 0.014 英寸神经导丝引导下先将球囊置于一侧大脑后动脉近端并靠近动脉瘤颈处,再将支架送至跨基底动脉主干和另一侧大脑后动脉处^[4]并完全释放;将用于装载和释放弹簧圈的微导管通过穿网孔技术从支架网孔送至动脉瘤内近心端 1/3 处,扩张球囊重塑形瘤颈后送入弹簧圈成篮,每次释放球囊之前先抽瘪球囊并手推减影,确认弹簧圈未突入载瘤动脉时才予以解脱(图 1)。本组 20 例患者 25 枚颅内分叉部宽颈动脉瘤介入治疗中使用 Neuroform 支架^[5]7 个,Enterprise 支架^[6]18 个;Hyperform 球囊 25 个。术后所有患者即刻接受 DSA 造影复查,了解支架位置、动脉瘤栓塞情况、载瘤动脉及其累及分支血管通畅情况。

2 结果

球囊联合支架辅助弹簧圈栓塞治疗后即刻作三维 DSA 检查,并依据 Raymond 分级^[7]进行评估,结果显示 20 例患者 25 枚颅内分叉部宽颈动脉瘤中 Raymond Ⅰ级 21 枚,Ⅱ级 2 枚,Ⅲ级 2 枚。术后 3 个月 DSA 随访显示 Raymond Ⅰ级 20 枚,Ⅱ级 3 枚,Ⅲ级 2 枚。术后 3 个月改良的 Rankin 量表(mRS)评分^[8]显示 17 例为 0 分(完全无症状),1 例为 1 分(有症状但无明显功能障碍,能完成日常活动),均为预后良好;2 例为 4~6 分(预后不良),表现为中度动能障碍(不能独立行走,日常生活需别人



①患者女,46岁,因自发性蛛网膜下腔出血入院,头部IADSA造影显示动脉末端分叉部宽颈动脉瘤;②采用球囊结合支架辅助弹簧圈进行栓塞治疗;③术后即刻DSA显示支架位置正确,展开充分,动脉瘤被致密填塞;④术后3个月DSA复查显示支架位置正确,展开充分,动脉瘤被致密填塞

图1 球囊联合支架辅助弹簧圈栓塞术治疗颅内分叉部宽颈动脉瘤影像图

帮助)。本组患者并发症发生率仅为15%(3/20)。

3 讨论

随着介入材料改进及操作技术发展,颅内分叉部宽颈动脉瘤介入治疗水平有了突飞猛进的提高。目前针对颅内分叉部宽颈动脉瘤的介入治疗方法主要有双微导管技术、Y型支架释放技术、水平支架释放技术、冰淇淋蛋筒(waffle-cone)技术以及球囊联合支架辅助弹簧圈栓塞技术,其中球囊联合支架辅助弹簧圈栓塞技术具有明显优势。

双微导管技术利用2根微导管同时在同一动脉瘤腔内实施栓塞治疗,使得通过2根微导管输送的弹簧圈相互交错以达到较为稳定的成篮效果,术后部分患者可达到相当满意的栓塞效果,但仍不能够完全替代球囊和支架的辅助作用,其对载瘤动脉管腔的保护作用不如球囊和支架辅助技术确切可靠,尤其是在治疗分叉部宽颈动脉瘤时,术后即刻DSA造影虽显示弹簧圈在动脉瘤内稳定成篮,但弹簧圈仍有可能从瘤腔内向载瘤动脉内突入,甚至从瘤腔内逃逸,从而栓塞载瘤动脉或其远端重要分支。

Y型支架释放技术是通过先后释放2枚支架分别保护宽颈动脉瘤累及的2个分支,2枚支架植入后在形态上呈Y型。该技术是治疗分叉部宽颈动脉瘤的一种安全有效方法^[9-12],但也存在不可避免的缺点:①多支架植入增加了操作难度;②第2枚支架植入过程中通过第1枚支架网孔时可能会遇到困难,甚至导致第1枚支架移位;③2枚支架并行置放,局部网孔细密,金属含量相对增高,使得致栓性增强^[13]。

水平支架释放技术将支架系统通过Willis环的前交通动脉或后交通动脉输送到颈内动脉或基底

动脉分叉处,将支架从分叉后的一个分支释放到另一个分支,水平覆盖动脉瘤颈。这对分叉部宽颈动脉瘤是一种较理想的方法。但该技术仍存在一定缺陷:首先,该技术的关键或前提条件是前交通动脉或后交通动脉必须粗大,如果存在发育不良或变异则无法实施;其次,该技术对正常血流动力学改变较大,更易导致支架内血栓形成,从而增加缺血性并发症发生概率;最后,该技术对于大脑中动脉分叉处动脉瘤无法实施。

球囊联合支架辅助弹簧圈栓塞术兼具球囊辅助达到瘤颈重新塑形和支架结合弹簧圈栓塞治疗之优势,其单个球囊辅助技术相对双球囊技术减少了血管内膜损伤,且术中只暂时性阻断分叉部1条载瘤动脉,血栓形成概率降低;同时相对Y型支架释放技术仅植入1个支架,既为弹簧圈成篮栓塞提供支撑力,又可减少2个支架相互重叠导致的血栓形成概率,避免2个支架相互挤压造成的支架受压变形,甚至塌陷^[14]。

综上所述,球囊联合支架辅助弹簧圈栓塞术是目前颅内分叉部宽颈动脉瘤,如基底动脉顶端分叉部、颈内动脉末端分叉部及大脑中动脉分叉部宽颈动脉瘤介入治疗方法中具有明显优势的技术,值得临床应用。相信随着介入材料和技术不断发展,颅内分叉部宽颈动脉瘤介入治疗效果会不断提高。

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(收稿日期:2015-01-14)

(本文编辑:边 皓)