

Willis 覆膜支架治疗外伤性颈内动脉假性动脉瘤的中期随访

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【摘要】 目的 评价 Willis 覆膜支架治疗外伤性颈内动脉假性动脉瘤的疗效和中期预后。方法 在 38 例头颈部外伤患者的脑血管造影中发现了 13 例、14 枚延迟性颈内动脉假性动脉瘤, 所有假性动脉瘤使用 Willis 覆膜支架治疗, 术后 1、3、6 和 12 个月随访脑血管造影, 分为完全闭塞和不完全闭塞; 临床症状随访分为完全恢复、明显改善、无明显改善和恶化。结果 所有病例成功植入 Willis 覆膜支架, 术中无一例出现并发症。最初 9 例假性动脉瘤完全闭塞, 4 例不完全闭塞; 3~12 个月随访造影显示 12 例假性动脉瘤完全闭塞, 所有病例颈内动脉通畅, 无明显支架内狭窄。临床随访 11 例完全恢复, 1 例改善, 1 例无明显改善; 无致残和致死病例。结论 Willis 覆膜支架治疗外伤性颈内动脉假性动脉瘤是切实可行的, 能够很好地保留载瘤动脉。

【关键词】 创伤性脑损伤; 假性动脉瘤; Willis 覆膜支架; 颈内动脉

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Treatment of traumatic internal carotid artery pseudoaneurysms with Willis covered stents: a mid-term follow-up result WANG Wu, LI Ming-hua, LI Yong-dong, GU Bin-xian, FANG Chun, TAN Hua-qiao, WANG Ju, ZHANG Pei-lei. Department of Diagnostic and Interventional Radiology, the Affiliated Sixth People's Hospital, School of Medicine, Shanghai Jiaotong University, Shanghai 200233, China

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【Abstract】 Objective To evaluate the efficacy and mid-term follow-up results of endovascular treatment with Willis covered stent for traumatic pseudoaneurysms located in the internal carotid artery (ICA). **Methods** ICA angiography was performed in 38 patients with traumatic brain and neck injury. Of the 38 patients, 13 delayed traumatic pseudoaneurysms were found. All the pseudoaneurysms were treated with Willis covered stents. Follow-up angiography was performed at 1, 3, 6 and 12 months after the procedure, and the results were categorized as complete or incomplete occlusion. Clinical manifestations were graded as full recovery, improvement, unchanged and aggravation. **Results** Willis covered stent placement was technically successful in all traumatic pseudoaneurysms. No procedure-related complications occurred. The initial angiographic results showed a complete occlusion in 9 patients, and an incomplete occlusion in 4. The angiographic follow-up within 3-12 months exhibited a complete occlusion in 12 patients and the parent arteries remained patency in all patients. The clinical follow-up observation demonstrated that full recovery was obtained in 11 patients, clinical improvement in one, and unchanged condition in one. No morbidity or mortality occurred. **Conclusion** Willis covered stent implantation is a feasible and practical treatment for traumatic pseudoaneurysms located in the ICA. This technique can well preserve the parent artery with excellent therapeutic results. (J Intervent Radiol, 2010, 19: 257-261)

【Key words】 traumatic brain injury; pseudoaneurysm; Willis covered stent; internal carotid artery

颈内动脉(internal carotid arteries, ICA)外伤性假性动脉瘤很少见,在成年人群的脑动脉瘤中的比率小于 1%,但是能导致潜在的和延迟的灾难性

后果,包括血栓和缺血事件等,破裂出血可危及生命^[1-2]。传统的外科治疗具有一定的难度,尤其是临近颅底部位的假性动脉瘤,手术过程中动脉瘤近端和远端血流的阻断会导致明显的致残甚或致死^[3,4]。近年来众多学者使用覆膜支架治疗 ICA 外伤性假

性动脉瘤取得了满意的疗效^[5-8]。覆膜支架覆盖动脉瘤口能够立即引起动脉瘤内血栓形成,并且重建载瘤动脉。应用颅内专用国产 Willis 覆膜支架(Micro-Port)治疗颅内动脉瘤日见增多^[9-11],本文评价 Willis 覆膜支架治疗外伤性 ICA 假性动脉瘤的疗效和中期随访结果。

1 材料与方法

1.1 一般资料

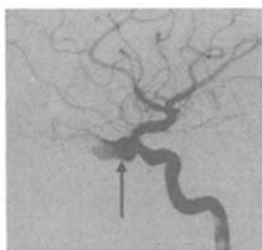
2005 年 4 月到 2008 年 7 月年间,38 例头颈部外伤患者在我科进行了脑血管造影,结果检出 13 例患者 14 枚外伤性 ICA 假性动脉瘤。其中男 12 例,女 1 例;年龄 11 ~ 60 岁,中位年龄 34 岁。动脉瘤位置:3 例位于 C7 段,3 例 C6 段,1 例 C5 段,5 例 C4 段,1 例 C2 和 V2 段^[12]。临床症状有反复鼻出血、头痛、视力减退等,其中蛛网膜下腔出血 4 例,颅内血肿 2 例。本组有 4 例曾在以前报道中描述^[10]。

1.2 方法

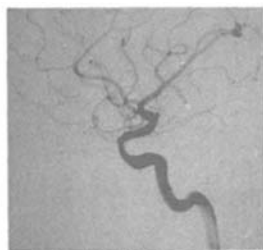
1.2.1 血管内治疗技术 Willis 覆膜支架植入术在



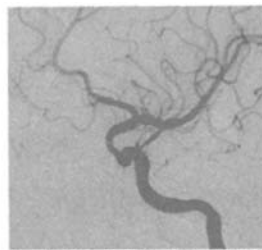
a 增强头颅 CT 示 ICA C4 段假性动脉瘤(箭)



b 左侧 ICA 造影证实了 C4 段大的假性动脉瘤,11.8 mm x 25.0 mm (箭)



c Willis 覆膜支架植入后即刻造影示假性动脉瘤完全闭塞,ICA 通畅



d 术后 12 个月复查造影示假性动脉瘤完全闭塞,ICA 通畅,支架内无明显狭窄

图 1 外伤后 ICA C4 段假性动脉瘤介入治疗前后

2.2 脑血管造影随访和临床结果

本组 13 例患者在术后 3 个月复查了脑血管造影,9 例在 12 个月复查脑血管造影,2 例在 24 个月复查脑血管造影。在术后 3 个月随访的 13 例中,最初闭塞的 10 枚假性动脉瘤无一例复发,出现内漏的 4 枚假性动脉瘤中 1 例原发性消失,假性动脉瘤完全闭塞(图 2),其余 3 例内漏仍然存在,但是动脉瘤的残腔明显缩小,所有 ICA 得到有效重建,无一例支架内狭窄。术后 6 ~ 12 个月随访,3 例有内漏病例中 2 例自发性消失,其余病例无明显变化。在术后 12 个月随访中,12 例患者的 13 枚假性动脉瘤完全闭塞,另 1 枚假性动脉瘤不完全闭塞,所有病例 ICA 通畅,无明显支架内狭窄。

所有病例进行了术后临床检查随访,最后检查显示 11 例完全恢复,1 例改善,而永存内漏的病例

全身麻醉下实施,其操作技术和步骤详见参考文献^[10]。

1.2.2 随访 术后 1、3、6、12 个月复查脑血管造影、头颅 CT 扫描和临床检查,由 2 名医师记录和评价结果。脑血管造影结果分为完全闭塞和不完全闭塞,同时评价支架内狭窄,分为正常、轻度狭窄($\leq 29\%$)、中度狭窄($30\% \sim 69\%$)、重度狭窄($70\% \sim 99\%$)和闭塞($99\% \sim 100\%$);临床症状随访分为完全恢复、明显改善、无明显改善和恶化。

2 结果

2.1 术后即刻结果

所有病例成功植入 Willis 覆膜支架,技术成功率 100%,11 例植入了 1 枚支架,2 例植入了 2 枚支架,其中 1 例有 2 枚假性动脉瘤。最初完全闭塞 9 例、10 枚假性动脉瘤(图 1),4 例出现内漏,1 例没有进行后扩,1 例在球囊后扩后明显缩小,其他 2 例仍然存在,其中 1 例植入了第 2 枚支架后明显减少 术中无一例出现并发症,无新发临床症状。

临床症状改善不明显;术后所有病例无一例发生脑缺血事件。

3 讨论

假性动脉瘤缺乏真正的瘤颈,周围包绕薄弱的纤维组织,形态不规则,造影表现为对比剂慢慢进出。严重的外伤导致血管壁中膜和外膜损伤后形成假性动脉瘤,往往伴有载瘤动脉狭窄、夹层瘤或动脉瘘,更多见于 ICA 颅外段^[7,13-18]。然而,外伤性 ICA 假性动脉瘤的自然史仍然不确定,其治疗方法存在争议,诊断往往延迟,短则数小时,长则数年^[5,7,14,19-20]。严重的颅面部、颈部和四肢损伤和伴发的其他器官损伤可能掩盖了颅内假性动脉瘤的症状,难以及时治疗。传统的治疗方法有抗凝治疗、外科手术和血管内治疗,单纯抗凝治疗一般无效,有时甚至会增

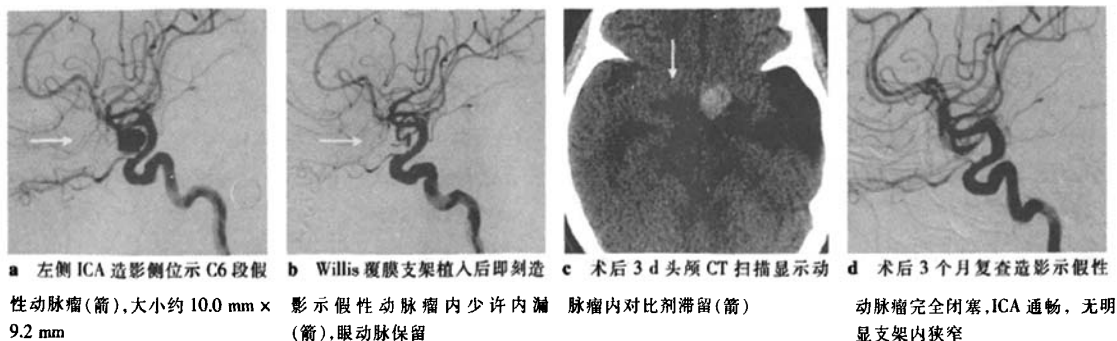


图 2 外伤后颈内动脉 C6 段假性动脉瘤治疗前后

加血肿,延迟假性动脉瘤的愈合,发生出血并可危及生命;有时发生远端脑栓塞或缺血事件^[4,21-27]。外科手术包括直接夹闭、包埋和结扎颈动脉等,有时需要血管旁路移植术。在 BOT 阴性的病例中,可以闭塞 ICA,但导致的缺血事件高达 17.2%,致残率达到 20%^[28-29]。

血管内重建载瘤动脉和闭塞假性动脉瘤治疗优于其他疗法。最初的血管内治疗策略是使用弹簧圈、裸支架、双裸支架或联合应用,尽可能地维持载瘤动脉通畅,促进假性动脉瘤内血栓形成^[14,17-19,30],这些方法虽可取得短期疗效,但存在潜在的再通和脑栓塞风险,急性期使用弹簧圈栓塞更增加了再次破裂出血的机会^[14,16,31]。近来,覆膜支架较为广泛地应用于颅内动脉,成功地治疗了 ICA 颅外段的动脉瘤、假性动脉瘤、动静脉瘘和 ICA 狭窄等病变^[6,8,10,13,15,26,32-40]。诸多学者认为覆膜支架可能是治疗颅内假性动脉瘤最好的方法,能立即闭塞假性动脉瘤,保留 ICA 通畅,减少脑梗死事件和占位效应。

回顾文献,在 1998 年,Reiter 等^[41]和 Marotta 等^[42]首先报道了使用 PTFE 和自体静脉覆盖支架成功治疗外伤性 ICA 颅外段假性动脉瘤。此后,陆续出现了很多报道覆膜支架治疗外伤性 ICA 假性动脉瘤的病例^[5,8,33-34,43-44]。在 2004 年,Saatci 等^[36]报道了最大宗覆膜支架(Jomed coronary covered stent grafts)治疗 ICA 动脉瘤,共计 25 例,其中外伤性 17 例,并随访 6 ~ 42 个月,所有病例的占位性症状消失。在 2006 年,Maras 等^[7]报道 1 例并回顾自 1990 年以来报道的所有覆膜支架治疗的外伤性 ICA 颅外段假性动脉瘤,共计 20 例,无明显和严重的并发症。从 1990 年至今,英语文献报道了超过 43 例的外伤性 ICA 假性动脉瘤应用不同的覆膜支架治疗,涉及 4 种非颅内专用的支架:自体静脉覆盖式支架、Symbiot 覆膜支架、Jostent 覆膜支架和 Wallstent 覆膜支架,但位于 ICA 的 C6 和 C7 段的动脉瘤很少

见^[7,10,31,32,36]。

应用覆膜支架治疗 ICA 病变,类似于外科手术使用合成的膜或静脉覆盖修复损伤的血管,但明显简化了操作过程,提高了治愈率,同时降低了并发症。但是这些非颅内专用支架本身质地较硬,难以顺利到达靶部位,尤其是脑池段 ICA(C6 和 C7 段)和扭曲的 ICA,有时会引起血管痉挛、血管夹层和血管再损伤,往往需要另外的支架提供支持和保护靶部位的血管,尤其是在治疗少数脑池段假性动脉瘤中,使用 8 ~ 10 F 双同轴导引导管加强支撑力^[15,32,35-36]。另外存在的问题是支架的释放压力高达 16 atm,可能会进一步加重血管损伤。

Willis 覆膜支架已经应用于 ICA 的假性动脉瘤和复发性动脉瘤以及大/巨大动脉瘤^[10-11,45-47]。本组病例中应用 Willis 覆膜支架的初衷是闭塞假性动脉瘤,保留 ICA 的通畅,治愈损伤的 ICA,结果是我科有限的经验进一步证实了它的切实可行性,所有 Willis 覆膜支架成功植入到靶部位,包括 6 例 C6 和 C7 段假性动脉瘤,成功率为 100%,除外最后 1 例术后永存内漏外,无明显抵抗和阻力,无支架源性夹层,无围手术期和中期随访的并发症,包括出血和再出血、血栓事件、支架移位等不良事件。

但是 PTFE 覆膜支架存在几个重要的问题——血栓形成、支架内狭窄和内漏。任何支架具有促栓性,这需要术前充分的双重抗血小板聚集治疗,一般至少术前 3 d 开始治疗,术中充分肝素化,术后继续至少 48 h 肝素化,以及至少 6 个月的规范化双重抗血小板聚集治疗,降低缺血事件和支架内狭窄的发生率^[15,35-36]。内漏是经常遇到的、亟待解决的问题,经常见于支架释放后即刻造影,可能由于血管的搏动、血管痉挛、支架与血管的大小匹配失误、PTFE 膜的破裂和缩短,往往需要正确测量血管管径的大小,选择稍微大的支架,支架释放后使用球囊进一步后扩支架,增加支架的贴壁性,有时需要附加支

架进行远期治疗,但有时在随访中发现会自发性消失^[36],本组 3 例内漏病例在随访 3、6 和 12 个月时消失。

总之,本研究的结果显示 Willis 覆膜支架治疗外伤性颈内动脉假性动脉瘤是切实可行的,所有病例 ICA 通畅,中期随访显示无明显支架内狭窄,但是病例数较少,尚需进一步扩大病例数和长期随访。

【参考文献】

- [1] Cogbill TH, Moore EE, Meissner M, et al. The spectrum of blunt injury to the carotid artery: a multicenter perspective[J]. J Trauma, 1994, 37: 473 - 479.
- [2] Larson PS, Reisner A, Morassutti DJ, et al. Traumatic intracranial aneurysms[J]. Neurosurg Focus, 2000, 8: e4.
- [3] Fleischer AS, Guthkelch AN. Management of high cervical-intracranial internal carotid artery traumatic aneurysms [J]. J Trauma, 1987, 27: 330 - 332.
- [4] Layton KF, Kim YW, Hise JH. Use of covered stent grafts in the extracranial carotid artery: report of three patients with follow-up between 8 and 42 months[J]. AJNR, 2004, 25: 1760 - 1763.
- [5] Akiyama Y, Nakahara I, Tanaka M, et al. Urgent endovascular stent-graft placement for a ruptured traumatic pseudoaneurysm of the extracranial carotid artery[J]. J Trauma, 2005, 58: 624 - 627.
- [6] ul Haq T, Yaqoob J, Munir K, et al. Endovascular-covered stent treatment of posttraumatic cervical carotid artery pseudoaneurysms[J]. Australas Radiol, 2004, 48: 220 - 223.
- [7] Maras D, Lioupis C, Magoufis G, et al. Covered stent-graft treatment of traumatic internal carotid artery pseudoaneurysms: a review[J]. Cardiovasc Intervent Radiol, 2006, 29: 958 - 968.
- [8] Patel JV, Rossbach MM, Cleveland TJ, et al. Endovascular stent-graft repair of traumatic carotid artery pseudoaneurysm[J]. Clin Radiol, 2002, 57: 308 - 311.
- [9] Li MH, Gao BL, Wang YL, et al. Management of pseudoaneurysms in the intracranial segment of the internal carotid artery with covered stents specially designed for use in the intracranial vasculature: technical notes[J]. Neuroradiology, 2006, 48: 841 - 846.
- [10] Li MH, Li YD, Gao BL, et al. A new covered stent designed for intracranial vasculature: application in the management of pseudoaneurysms of the cranial internal carotid artery [J]. AJNR, 2007, 28: 1579 - 1585.
- [11] Li MH, Zhu YQ, Fang C, et al. The feasibility and efficacy of treatment with a Willis covered stent in recurrent intracranial aneurysms after coiling[J]. AJNR, 2008, 29: 1395 - 1400.
- [12] Bouthillier A, van Loveren HR, Keller JT. Segments of the internal carotid artery: a new classification[J]. Neurosurgery, 1996, 38: 425 - 432.
- [13] Redekop G, Marotta T, Weill A. Treatment of traumatic aneurysms and arteriovenous fistulas of the skull base by using endovascular stents[J]. J Neurosurg, 2001, 95: 412 - 419.
- [14] Matsuura JH, Rosenthal D, Jerius H, et al. Traumatic carotid artery dissection and pseudoaneurysm treated with endovascular coils and stent[J]. J Endovasc Surg, 1997, 4: 339 - 343.
- [15] Felber S, Henkes H, Weber W, et al. Treatment of extracranial and intracranial aneurysms and arteriovenous fistulae using stent grafts[J]. Neurosurgery, 2004, 55: 631 - 638.
- [16] Perez-Cruet MJ, Patwardhan RV, Mawad ME, et al. Treatment of dissecting pseudoaneurysm of the cervical internal carotid artery using a wall stent and detachable coils: case report [J]. Neurosurgery, 1997, 40: 622 - 625.
- [17] Lempert TE, Halbach VV, Higashida RT, et al. Endovascular treatment of pseudo aneurysms with electrolytically detachable coils[J]. AJNR, 1998, 19: 907 - 911.
- [18] Coldwell DM, Novak Z, Ryu RK, et al. Treatment of posttraumatic internal carotid arterial pseudoaneurysms with endovascular stents[J]. J Trauma, 2000, 48: 470 - 472.
- [19] Klein GE, Szolar DH, Raith J, et al. Posttraumatic extracranial aneurysm of the internal carotid artery: combined endovascular treatment with coils and stents[J]. AJNR, 1997, 18: 1261 - 1264.
- [20] Ramos A, Tobio R, Ley E, et al. Traumatic aneurysm of the internal carotid artery: a late finding presenting as a mass in the sphenoid sinus[J]. AJNR, 1996, 17: 222 - 225.
- [21] Fabian TC, Patton JH, Croce MA, et al. Blunt carotid injury: importance of early diagnosis and anticoagulant therapy[J]. Ann Surg, 1996, 223: 513 - 522.
- [22] Wahl WL, Brandt MM, Thompson BG, et al. Antiplatelet therapy: an alternative to heparin for blunt carotid injury[J]. J Trauma, 2002, 52: 896 - 901.
- [23] Mokri B. Traumatic and spontaneous extracranial internal carotid artery dissections[J]. J Neurol, 1990, 237: 356 - 361.
- [24] Prêtre R, Kärstener K, Reverdin A, et al. Blunt carotid artery injury: devastating consequences of undetected pseudoaneurysm [J]. J Trauma, 1995, 39: 1012 - 1014.
- [25] Chen D, Concus AP, Halbach VV, et al. Epistaxis originating from traumatic pseudoaneurysm of the internal carotid artery: diagnosis and endovascular therapy [J]. Laryngoscope, 1998, 108: 326 - 331.
- [26] Auyeung KM, Lui WM, Chow LC, et al. Massive epistaxis related to petrous carotid artery pseudoaneurysm after radiation therapy: emergency treatment with covered stent in two cases[J]. AJNR, 2003, 24: 1449 - 1452.
- [27] Zanini MA, Tahara A, Santos GS, et al. Pseudoaneurysm of the internal carotid artery presenting with massive (recurrent) epistaxes: a life-threatening complication of craniofacial trauma [J]. Arq Neuropsiquiatr, 2008, 66: 268 - 271.
- [28] Larson JJ, Tew JM Jr, Tomsick TA, et al. Treatment of aneurysms of the internal carotid artery by intravascular balloon occlusion: long-term follow-up of 58 patients[J]. Neurosurgery, 1995, 36: 26 - 30.
- [29] Timperman PE, Tomsick TA, Tew JM Jr, et al. Aneurysm formation after carotid occlusion[J]. AJNR, 1995, 16: 329 -

- 331.
- [30] Hori Y, Kiyosue H, Kashiwagi J, et al. Double stent technique for the treatment of an internal carotid artery pseudoaneurysm caused by zone III stab injury[J]. J Vasc Interv Radiol, 2007, 18: 1300 - 1304.
- [31] Cohen JE, Gomori JM, Segal R, et al. Results of endovascular treatment of traumatic intracranial aneurysms[J]. Neurosurgery, 2008, 63: 476 - 485.
- [32] Hoit DA, Schirmer CM, Malek AM. Stent graft treatment of cerebrovascular wall defects: intermediate-term clinical and angiographic results[J]. Neurosurgery, 2008, 62: ONS380 - 388.
- [33] Scavée V, De Wispelaere JF, Mormont E, et al. Pseudoaneurysm of the internal carotid artery: treatment with a covered stent[J]. Cardiovasc Intervent Radiol, 2001, 24: 283 - 285.
- [34] Kubaska SM 3rd, Greenberg RK, Clair D, et al. Internal carotid artery pseudoaneurysms: treatment with the Wallgraft endoprosthesis[J]. J Endovasc Ther, 2003, 10: 182 - 189.
- [35] Archondakis E, Pero G, Valvassori L, et al. Angiographic follow-up of traumatic carotid cavernous fistulas treated with endovascular stent graft placement[J]. AJNR, 2007, 28: 342 - 347.
- [36] Saatci I, Cekirge HS, Ozturk MH, et al. Treatment of internal carotid artery aneurysms with a covered stent: experience in 24 patients with mid-term follow-up results[J]. AJNR, 2004, 25: 1742 - 1749.
- [37] Kocer N, Kizilkilic O, Albayram S, et al. Treatment of iatrogenic internal carotid artery laceration and carotid cavernous fistula with endovascular stent-graft placement[J]. AJNR, 2002, 23: 442 - 446.
- [38] Gomez F, Escobar W, Gomez AM, et al. Treatment of carotid cavernous fistulas using covered stents: midterm results in seven patients[J]. AJNR, 2007, 28: 1762 - 1768.
- [39] Islak C, Kocer N, Albayram S, et al. Bare stent-graft technique: a new method of endoluminal vascular reconstruction for the treatment of giant and fusiform aneurysms[J]. AJNR, 2002, 23: 1589 - 1595.
- [40] Cil BE, Akpinar E, Peynircioglu B, et al. Utility of covered stents for extracranial internal carotid artery stenosis[J]. AJNR, 2004, 25: 1168 - 1171.
- [41] Reiter BP, Marin ML, Teodorescu VJ, et al. Endoluminal repair of an internal carotid artery pseudoaneurysm[J]. J Vasc Interv Radiol, 1998, 9: 245 - 248.
- [42] Marotta TR, Buller C, Taylor D, et al. Autologous vein-covered stent repair of a cervical internal carotid artery pseudoaneurysm: technical case report[J]. Neurosurgery, 1998, 42: 408 - 412.
- [43] Alimi YS, Di Mauro P, Fiace E, et al. Blunt injury to the internal carotid artery at the base of the skull: six cases of venous graft restoration[J]. J Vasc Surg, 1996, 24: 249 - 257.
- [44] Duane TM, Parker F, Stokes GK, et al. Endovascular carotid stenting after trauma[J]. J Trauma, 2002, 52: 149 - 153.
- [45] Li MH, Li YD, Fang C, et al. Endovascular treatment of giant or very large intracranial aneurysms with different modalities: an analysis of 20 cases[J]. Neuroradiology, 2007, 49: 819 - 828.
- [46] Wang JB, Li MH, Fang C, et al. Endovascular treatment of giant intracranial aneurysms with willis covered stents: technical case report[J]. Neurosurgery, 2008, 62: E1176 - 1177.
- [47] 李永乐, 李明华, 方 淳, 等. 颅内巨大或大型动脉瘤的血管内治疗: 三种技术的比较[J]. 介入放射学杂志, 2006, 15: 707 - 712.

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·病例报告 Case report·

双侧髂内动静脉瘘并左髂总静脉闭塞一例

王彦军, 乔宏宇, 王晓白

【关键词】 动静脉瘘; 静脉闭塞; 数字减影血管造影; 磁共振血管成像
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Bilateral internal iliac arteriovenous fistula complicated by left common iliac venous occlusion: report of one case WANG Yan-jun, QIAO Hong-yu, WANG Xiao-bai. Medical Imaging Center, the First Affiliated Hospital, Jinan University, Guangzhou, Guangdong Province 510630, China


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【Key words】 arteriovenous fistula; venous occlusion; digital subtract angiography; MR angiography

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参考文献(47条)

- 1.Cogbill TH.Moore EE.Meissner M The spectrum of blunt injury to the carotid artery:a multicenter perspective 1994
- 2.larson PS.Reisner A.Morassutti DJ Traumatic intracranial aneurysms 2000
- 3.Fleischer AS.Guthkelch AN Management of high cervicalintracranial internal carotid artery traumatic aneurysms 1987
- 4.Layton KF.Kim YW.Hise JH Use of covered stent grafts in the extracranial carotid artery:report of three patients with follow-up between 8 and 42 months 2004
- 5.Akiyama Y.Nakabara I.Tanaka M Urgent endovascular stent-graft placement for a ruptured traumatic pseudoaneurysm of the extracranial carotid artery 2005
- 6.ul Haq T.Yaqoob J.Munir K Endovascular-covered stent treatment of posttraumatic cervical carotid artery pseudoaneurysms 2004
- 7.Maras D.Lioupis C.Magoufis G Covered stent-graft treatment of traumatic internal carotid artery pseudoaneurysms:a review 2006
- 8.Patel JV.Rossbaeh MM.Cleveland TJ Endovascular stentgraft repair of traumatic carotid artery pseudoaneurysm 2002
- 9.Li MH.Gao BL.Wang YL Management of pseudoaneurysms in the intracranial segment of the internal carotid artery with covered stents specially designed for use in the intracranial vasculature:technical notes 2006
- 10.Li MH.Li YD.Gao BL A new covered stent designed for intracranial vasculature:application in the management of pseudoaneurysms of the cranial internal carotid artery 2007
- 11.Li MH.Zhu YQ.Fang C The feasibility and efficacy of treatment with a Willis covered stent in recurrent intracranial aneurysms after coiling 2008
- 12.Bouthillier A.van Loveren HR.Keller JT Segments of the internal carotid artery:a new classification 1996
- 13.Redekop G.Marotta T.Weill A Treatment of traumatic aneurysms and arteriovenous fistulas of the skull base by using endovascular stents 2001
- 14.Matsuura JH.Bosenthal D.Jerius H Traumatic carotid artery dissection and pseudoaneurysm treated with endovascular coils and stent 1997
- 15.Felber S.Henkes H.Weber W Treatment of extracranial and intracranial aneurysms and arteriovenous fistulae using stent grafts 2004

16. Perez-Cruet MJ, Patwardhan RV, Mawad ME Treatment of dissecting pseudoaneurysm of the cervical internal carotid artery using a wall stent and detachable coils:case report 1997
17. Lempert TE, Halbach VV, Higashida RT Endovascular treatment of pseudo aneurysms with electrolytically detachable coils 1998
18. Coldwell DM, Novak Z, Ryu RK Treatment of posttraumatic internal carotid arterial pseudoaneurysms with endovascular stents 2000
19. Klein GE, Szolar DH, Raith J Posttraumatic extracranial aneurysm of the internal carotid artery:combined endovascular treatment with coils and stents 1997
20. Ramos A, Tobio R, Ley E Traumatic aneurysm of the internal carotid artery:a late finding presenting as a mass in the sphenoid sinus 1996
21. Fabian TC, Patton JH, Croce MA Blunt carotid injury:importance of early diagnosis and anticoagulant therapy 1996
22. Wahl WL, Brandt MM, Thompson BG Antiplatelet therapy:an alternative to heparin for blunt carotid injury 2002
23. Mokri B Traumatic and spontaneous extracranial internal carotid artery dissections 1990
24. Pr(e)tre R, Kürsteiner K, Reverdin A Blunt carotid artery injury:devastating consequences of undetected pseudoaneurysm 1995
25. Chen D, Concus AP, Halbach VV Epistaxis originating from traumatic pseudoaneurysm of the internal carotid artery:diagnosis and endovascular therapy 1998
26. Auyeung KM, Lui WM, Chow LC Massive epistaxis related to petrous carotid artery pseudoaneurysm after radiation therapy:emergency treatment with covered stent in two cases 2003
27. Zanini MA, Tabara A, Santos GS Pseudoaneurysm of the internal carotid artery presenting with massive(recurrent)epistaxes:a life-threatening complication of craniofacial trauma 2008
28. Larson JJ, Tew JM Jr, Tomsick TA Treatment of aneurysms of the internal carotid artery by intravascular balloon occlusion:long-term follow-up of 58 patients 1995
29. Timperman PE, Tomsick TA, Tew JM Jr Aneurysm formation after carotid occlusion 1995
30. Hori Y, Kiyosue H, Kashiwagi J Double stent technique for the treatment of an internal carotid artery pseudoaneurysm caused by zone III stab injury 2007
31. Cohen JE, Gomori JM, Segal R Results of endovascular treatment of traumatic intracranial aneurysms 2008
32. Hoit DA, Schirmer CM, Malek AM Stent graft treatment of cerebrovascular wall defects:intermediate-term clinical and angiographic results 2008
33. Scavée V, De Wispelaere JF, Mormont E Pseudoaneurysm of the internal carotid artery:treatment with a covered stent 2001
34. Kubaska SM 3rd, Greenberg RK, Clair D Internal carotid artery pseudoaneurysms:treatment with the Wallgraft endoprosthesis 2003
35. Archondakis E, Pero G, Valvassori L Angiographic follow-up of traumatic carotid cavernous fistulas treated with endovascular stent graft placement 2007

36. [Saatci I, Cekirge HS, Ozturk MH Treatment of internal carotid artery aneurysms with a covered stent:experience in 24 patients with mid-term follow-up results 2004](#)
37. [Kocer N, Kizilkilic O, Albayram S Treatment of iatrogenic internal carotid artery laceration and carotid cavernous fistula with endovascular stent-graft placement 2002](#)
38. [Gomez F, Escobar W, Gomez AM Treatment of carotid cavernous fistulas using covered stents:midterm results in seven patients 2007](#)
39. [Islak C, Kocer N, Albayram S Bare stent-sraft technique:a new method of endoluminal vascular reconstruction for the treatment of giant and fusiform aneurysms 2002](#)
40. [Cil BE, Akpinar E, Peynircioglu B Utility of covered stents for extracranial intemal carotid artery stenosis 2004](#)
41. [Reiter BP, Matin ML, Teodoreseu VJ Endoluminal repair of an internal carotid artery pseudoaneurysm 1998](#)
42. [Marotta TR, Buller C, Taylor D Autologous vein-covered stent repair of a cervical internal carotid artery pseudoaneurysm:technical case report 1998](#)
43. [Alimi YS, Di Mauro F, Fiacre E Blunt injury to the internal carotid artery at the base of the skull:six cases of venous graft restoration 1996](#)
44. [Duane TM, Parker F, Stokes GK Endovascular carotid stenting after trauma 2002](#)
45. [Li MH, Li YD, Fang C Endovascular treatment of giant or very large intracranial aneurysms with different modalities:an analysis of 20 cases 2007](#)
46. [Wang JB, Li MH, Fang C Endovascular treatment of giant intracranial aneurysms with willis covered stents:technical case report 2008](#)
47. [李永乐, 李明华, 方淳 颅内巨大或大型动脉瘤的血管内治疗:三种技术的比较 2006](#)

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