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脑脊液引流治疗主动脉夹层术后脊髓损伤 8 例*

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[摘要] 目的 探讨主动脉夹层(AD)术后脊髓损伤(SCI)患者脑脊液(CSF)引流的作用。方法 选取 2011 年 1 月至 2021 年 4 月该院收治的行 AD 手术患者 631 例,术后发生 SCI 8 例,其中接受开胸手术 7 例,血管内主动脉修复(TEVAR)手术 1 例。均于麻醉清醒后常规评估肢体功能,发现异常后立即行 CSF 引流术,在 CSF 引流术后 7 d 或患者肌力恢复后拔除引流管。术后随访 6~24 个月,根据临床资料分析 CSF 引流的临床特点和病程。结果 AD 术后 SCI 发生率为 1.27%(8/631),开胸手术后 SCI 发生率为 1.59%(7/440),TEVAR 术后 SCI 发生率为 0.52%(1/191)。随访期间 6 例患者基本康复,2 例患者诊断为截瘫。结论 CSF 引流是治疗 AD 术后 SCI 的有效方法。

[关键词] 脑脊液引流;脊髓损伤;主动脉夹层

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Cerebrospinal fluid drainage in treating 8 cases of spinal cord injury after aortic dissection operation*

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[Abstract] **Objective** To investigate the effects of cerebrospinal fluid (CSF) drainage in spinal cord injury (SCI) after aortic dissection(AD) operation. **Methods** A total of 631 patients with AD operation in this hospital from January 2011 to April 2021 were selected. Among them, SCI occurred in 8 cases, in which 7 cases received the open chest surgery, and 1 case underwent thoracic endovascular aortic aneurysm repair (TEVAR). The limb function was routinely evaluated after awake, and the CSF drainage was performed immediately after abnormalities were found. The drainage tube was removed within postoperative 7 d or after muscle strength recovery. Six cases had patients were followed up from 6. The clinical characteristics and course of CSF drainage were analyzed according to clinical data. **Results** The occurrence rate of SCI after AD was 1.27%(8/631), which after open surgery was 1.59%(7/440) and which after TEVAR was 0.52%(1/191). During followed up period, 6 cases were basically recovered and 2 cases were diagnosed as paraplegia. **Conclusion** The CSF drainage is an effective method for treating SCI after AD operation.

[Key words] cerebrospinal fluid drainage; spinal cord ischemia; aortic dissection

主动脉夹层(AD)是危重心血管疾病之一。主动脉内膜破裂引起血液大量流入撕裂处,导致中层和内层分离,最终形成 AD。根据国际常用的 Stanford 分型将 AD 分为 A 型(TAAD)和 B 型(TBAD),分别累及升主动脉和降主动脉^[1]。AD 的主要治疗方法为开胸手术和血管内主动脉修复(TEVAR)术。近年来,手术方法和术后诊断的发展提高了术后患者存活率。然而脊髓损伤(SCI)仍然是主动脉修复术后最常见和

最严重并发症之一。TAAD 患者开胸手术后 SCI 发生率可高达 20%^[2]。在 TEVAR 术后发生 SCI 的风险尚未完全确定,据文献报道,发生率为 2%~12%^[3-4]。SCI 可表现为截瘫、知觉丧失或尿便失禁,可显著降低患者生活质量^[5]。此外,术后发生 SCI 患者在术后病程中病死率显著增加,除年龄和术后急性肾衰竭外,截瘫也是死亡率的重要预测因素之一^[6]。

既往研究表明,脑脊液(CSF)引流对 SCI 的预防

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和治疗均具有显著效果^[7-9]。SCI 早期治疗中单用升高血压治疗或结合 CSF 引流对大多数患者有效,大多数患者实现了完全或长期的神经功能恢复^[6,10]。然而现有的研究样本量均很少,有效的循证医学证据不足。本研究发现 AD 术后 CSF 引流具有有效的治疗作用,现报道如下。

1 资料与方法

1.1 一般资料

选取 2011 年 1 月至 2021 年 4 月本院心血管外科收治的行 AD 手术(包括开放性手术 440 例和介入手术 191 例)患者 631 例,8 例患者术后发生 SCI,均行 CSF 引流,8 例患者中男 7 例,女 1 例;年龄 32~61 岁;TAAD 6 例,TBAD 2 例;手术方式:开放 7 例,介入 1 例;SCI 发生时间:即刻(麻醉苏醒后即发现)5 例,延迟(术后 24 h 以上才发现)3 例;累及肋间动脉 4 例,术前平均动脉压(MAP) < 90 mm Hg (1 mm Hg=0.133 kPa)4 例,伴高血压 6 例,术前下肢运动及感觉异常 1 例,均为急性期。

1.2 方法

1.2.1 治疗方法

8 例患者中行全胸腹主动脉置换术 2 例,行升主动脉置换、全主动脉弓置换联合象鼻支架植入术 3 例,行升主动脉置换(Bentall 术)、全主动脉弓置换联合血管内主动脉修复(TEVAR)术 2 例,介入行单纯 TEVAR 术 1 例。1 例患者术前存在 SCI,因此在术

中行 CSF 引流,其他患者在术后麻醉清醒后常规评估肢体功能,每 4 小时 1 次,发现异常后立即行 CSF 引流术。操作方式:于 L3~4 或 L4~5 腰椎间隙进行穿刺,测量 CSF 压力后留置引流管,持续引流 CSF。CSF 引流期间去枕平卧,禁止抬高床头。集液器位于脊柱平面以上至少 10 cm,通过调节其高度严格控制引流速度,不超过 10~15 mL/h,全天引流量小于 300 mL。CSF 引流术后 7 d 或患者肌力恢复后拔除引流管。发生 SCI 患者均维持 MAP>90 mm Hg,并给予脱水、激素冲击、营养神经、间断高浓度吸氧等治疗。辅以肢体功能康复训练及针灸治疗。

1.2.2 随访

8 例患者术后随访 6~24 个月。

2 结果

AD 术后 SCI 发生率为 1.27%(8/631),开胸手术后 SCI 发生率为 1.59%(7/440),TEVAR 术后 SCI 发生率为 0.52%(1/191)。随访期间 6 例患者于截瘫后 4~11 d 肌力基本恢复,其中 3 例患者出院后继续进行康复训练,1 年后下肢肌力及感觉恢复,生活可自理;2 例患者双下肢肌力及感觉未恢复,诊断为永久性截瘫(其中 1 例为术中行 CSF 的患者)。8 例患者均未出现 CSF 引流相关并发症。1 例永久性截瘫患者于出院后 6 个月因肝癌死亡。手术方式及患者预后见表 1。

表 1 手术方式及患者预后(n=8)

序号	手术方式	临床表现	肌力(级)		CSF 压力 (cm H ₂ O)	CSF 引流 时间(d)	出院时状态	肌力(级)		随访 时间(月)	结局
			右下肢	左下肢				右下肢	左下肢		
1	TEVAR 术	髂前上棘平面以下无痛觉	4	1	18	4	痛觉恢复	5	4	24	正常
2	全胸腹主动脉置换术	耻骨联合水平以下无痛觉	4	0	21	7	痛觉恢复	5	3	24	正常
3	升主动脉置换、全主动脉弓置换联合 TEVAR 术	脐水平以下无痛觉	1	3	23	7	右下肢无痛觉	3	4	24	正常
4	升主动脉置换、全主动脉弓置换联合象鼻支架植入术	脐水平以下无痛觉	0	0	17	2	痛觉恢复	2	3	6	康复治疗
5	升主动脉置换、全主动脉弓置换联合象鼻支架植入术	脐水平以下无痛觉	0	0	23	7	痛觉未恢复	2	2	6	康复治疗
6	全胸腹主动脉置换术	剑突水平以下无痛觉	0	0	11	7	痛觉未恢复	0	0	6	截瘫死亡(肝癌)
7	Bentall 术、全主动脉弓置换联合 TEVAR 术	剑突水平以下无痛觉	0	0	15	7	痛觉未恢复	0	0	18	截瘫
8	升主动脉置换、全主动脉弓置换联合象鼻支架植入术	耻骨联合水平以下无痛觉	1	0	22	3	痛觉恢复	2	3	12	康复治疗

3 讨 论

随着诊断技术和手术方法的改进,AD 术后并发症发生率逐年降低,生存率提高。然而,SCI 仍是影响患者生活质量的严重并发症之一。TEVAR 术后 SCI 发生率低于开胸手术^[6-7,11],与本研究结果相同。目前,AD 术后发生 SCI 的具体病理生理机制尚不清楚,可能是一个动态的、复杂的过程。此外,其致病因素多种多样,可能发生在主动脉修复手术前、期间或术后^[7,10,12-14]。有研究表明,SCI 症状的缓解可显著影响急性 TAAD 和急性 TBAD 患者的总体存活率^[15]。SCI 的预防和治疗包括维持围手术期高血压、CSF 引流、左锁骨下动脉血运重建和药物治疗等^[9]。

以往研究表明,CSF 引流是治疗 SCI 的有效方法,但是在术前、术中还是术后进行 CSF 引流仍存在争议^[10,16-20]。神经生理监测可用于早期发现和治疗 SCI,但其效用受医护人员因素和少数术中 SCI 患者的限制^[21]。而术前常规放置 CSF 引流管可避免 CSF 引流延迟安置而致患者术后的突然瘫痪^[22]。DE-SART 等^[23]进行了 607 例 TEVAR 患者的队列研究,其中 57 例(9.4%)患者发生了某种程度的 SCI,54 例(94.7%)患者在护理过程中接受了 CSF 引流,其中术后行 CSF 引流患者为 31 例(54.4%)。但 KITPA-NIT 等^[24]研究表明,常规预防性 CSF 引流可能不合理,因预防性 CSF 引流相关并发症发生率超过了 SCI 发生率,并且 CSF 引流显著增加了重症监护病房和总住院时间。因此,CSF 引流管放置时机对出院后功能损害或长期并发症的影响尚不明确。2010 年美国心脏病学会基金会/美国心脏协会指南建议 CSF 引流用于开放性 TAAD 修复术中的脊髓保护^[25]。2015 年欧洲心胸外科协会同样建议将 CSF 引流用于 SCI 高危患者 TAAD 的修复^[26]。根据指南建议,本研究在术后密切监测患者下肢肌力和感觉,一旦出现 SCI 临床表现立即进行 CSF 引流,效果良好。

发生 SCI 患者的康复效果与损伤严重程度有关^[27]。本研究中 1 例患者术前即出现 SCI,在术中留置引流管,但未获得良好效果,其原因可能与损伤时间较长、损伤程度较重有关。术中低血压是 SCI 发生的独立危险因素,长时间低灌注可能导致不可逆损伤。本研究中 2 例永久性截瘫患者即考虑围术期血压持续偏低,引起脊髓低灌注造成长时间缺血所致。有研究提示,CSF 引流对颅内压低的患者效果不佳^[28]。本研究中 2 例永久性截瘫患者穿刺后测压明显低于其他 6 例患者。因此,发生 SCI 后监测颅内压偏低则可能提示患者预后不良。

CSF 引流是一种侵入性操作,可能会引起一些并发症。HANNA 等^[29]报道了 81 例 TEVAR 患者 CSF 引流并发症发生情况,9 例(11.1%)患者发生轻微 CSF 引流并发症,包括头痛、穿刺部位出血、持续性

CSF 漏或硬膜下血肿等。但一项类似研究结果显示,48 例患者在放置 CSF 引流管期间没有出现并发症^[30]。存在这种差别的原因可能是放置导管的时机(TEVAR 术前 24 h),以及在留置及取出引流管时严格的抗凝管理。另外有研究发现,进行预防性 CSF 引流的患者中 7.6% 发生了 CSF 引流相关的主要并发症,包括 2.6% 的蛛网膜下腔出血、2.6% 的脊髓血肿、1.3% 的小脑出血和 1.3% 的需要椎板切除的脊髓引流骨折^[23]。本研究中 7 例患者均在术后发生 SCI 即刻留置 CSF 引流管,并在留置引流管后进行严格抗凝管理,未出现 CSF 引流术后并发症。

综上所述,SCI 在 AD 术后仍有较高的发生率。在术后初期减少镇痛镇静药物的使用并密切观察患者病情变化,发现 SCI 后即刻行 CSF 引流,75% 的患者获得了良好效果,且 8 例患者均未出现 CSF 引流术后并发症。因此,CSF 引流联合严格的抗凝管理、激素冲击、营养神经及合理的康复治疗,可对 AD 术后 SCI 患者起到良好效果,改善其生活质量。

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