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动脉瘤性蛛网膜下腔出血后持续腰大池引流的时机探讨 及分流依赖性脑积水的危险因素分析*

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摘要 目的: 研究对比动脉瘤性蛛网膜下腔出血(aSAH)后不同时机开展持续腰大池引流的效果,并对分流依赖性脑积水(SDHC)的危险因素进行分析。**方法:** 本院于2017年1月~2020年12月期间诊治的aSAH患者171例,将其纳入研究。将其按照持续腰大池引流时机不同分为A组(<24h)50例、B组(24~72h)84例以及C组(>72h)37例。观察三组头痛持续时间,双侧大脑中动脉(MAC)血流流速以及SDHC发生率,对aSAH后持续腰大池引流术后并发SDHC的影响因素进行单因素和多因素Logistic回归分析。**结果:** C组头痛持续时间长于A组和B组,MAC血流流速快于A组和B组,SDHC发生率高于A组和B组(均 $P<0.05$);而A组和B组上述指标对比差异均不明显(均 $P>0.05$),但是A组SDHC发生率更低。经单因素分析可得:aSAH持续腰大池引流术后并发SDHC和年龄、病变部位、中枢神经系统感染、改良Fisher分级及Hunt-Hess评分有关(均 $P<0.05$)。经多因素Logistic回归分析可得:年龄 ≥ 60 岁、病变部位后循环、中枢神经系统感染、改良Fisher分级III~IV级、Hunt-Hess评分III~IV级及持续腰大池引流 ≥ 24 h均是aSAH持续腰大池引流术后并发SDHC的危险因素(均 $OR>1, P<0.05$)。**结论:** 以aSAH后<24h为时机开展持续腰大池引流术的效果较佳,SDHC发生率更低,其中年龄、病变部位、中枢神经系统感染、改良Fisher分级、Hunt-Hess评分、持续腰大池引流时机与aSAH持续腰大池引流术后并发SDHC的风险有关,临床工作中应针对上述因素制定相关措施,以期达到降低SDHC发生风险的目的。

关键词: 动脉瘤性蛛网膜下腔出血;持续腰大池引流;分流依赖性脑积水;危险因素

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Timing of Continuous Lumbar Cistern Drainage after Aneurysmal Subarachnoid Hemorrhage and Risk Factors of Shunt-dependent Hydrocephalus*

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ABSTRACT Objective: To study and compare the effects of continuous lumbar cistern drainage at different times after aneurysmal subarachnoid hemorrhage (ASAH), and to analyze the risk factors of shunt-dependent hydrocephalus (SDHC). **Methods:** 171 patients with aSAH were diagnosed and treated in our hospital from January 2017 to December 2020, they were included in the study. The patients were divided into group A (< 24 h) 50 cases, group B (24~72 h) 84 cases, and group C (> 72 h) 37 cases according to the difference in the timing of continuous lumbar cistern drainage. The headache duration time, bilateral middle cerebral artery (MAC) flow rate and the incidence rate of SDHC in the three groups were observed. Univariate and multivariate Logistic regression analysis was performed on the influencing factors of SDHC after continuous lumbar cistern drainage after aSAH. **Results:** The headache duration time of group C was longer than that of group A and B, MAC blood flow velocity was faster than that of group A and B, and the incidence rate of SDHC was higher than that of group A and B (all $P<0.05$). There were no significant differences in the above indexes between group A and group B (all $P>0.05$), but the incidence of SDHC in group A was lower. Univariate analysis showed that SDHC after aSAH continuous lumbar cistern drainage was associated with age, lesion site, central nervous system infection, improved Fisher grade and Hunt-Hess score (all $P<0.05$). The multivariate Logistic regression analysis available: age ≥ 60 years, lesion site posterior circulation, the central nervous system infection, improved Fisher class III~IV grade, Hunt-Hess score III~IV grade, continuous lumbar cistern drainage ≥ 24 h were aSAH continuous lumbar drainage of large pool independent risk factors for postoperative concurrent SDHC (all $OR>1, P<0.05$). **Conclusion:** When the time is less than 24 hours after aSAH, the effect of continuous lumbar cistern drainage is better, and the incidence of SDHC is lower, the age, pathological location, central nervous system infection, modified Fisher grade, hunt Hess score, and the timing of continuous cistern drainage were related to the risk of SDHC after continuous lumbar cistern drainage,

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in order to reduce the risk of SDHC, relevant measures should be taken in clinical work.

Key words: Aneurysmal subarachnoid hemorrhage; Continuous lumbar cistern drainage; Shunt-dependent hydrocephalus; Risk factors
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前言

动脉瘤性蛛网膜下腔出血(aSAH)患者往往因脑脊液吸收异常,从而可能出现脑积水,而脑积水又可加剧神经功能的损害,继而对患者预后转归产生严重影响^[1-3]。相关调查数据显示,脑积水作为 aSAH 最为常见的一种并发症,分为急性、亚急性以及慢性脑积水,其发病率达 6%~67%,其中约有 1~2 成的患者需接受永久性脑脊液分流,临床上将该类患者称之为分流依赖性脑积水(SDHC)患者^[4-6]。SDHC 的发生往往具有较强的隐匿性,无典型的临床表现,从而增加了早期诊治的难度,进一步对患者预后造成负面影响^[7,8]。持续腰大池引流术是一种应用腰椎穿刺方法向椎管内蛛网膜下腔置入引流管来引流脑脊液的手术方式,具有创伤小、穿刺成功率高及降低颅内压等优点,在神经外科中得到较为广泛的应用,但临床应注意把握好穿刺引流的时机^[9]。鉴于此,本文通过研究对比 aSAH 后不同时机开展持续腰大池引流的效果,并对 SDHC 的危险因素进行分析,以期临床 aSAH 持续腰大池引流术后 SDHC 的防治提供参考依据,现作以下报道。

1 对象与方法

1.1 一般资料

本院于 2017 年 1 月~2020 年 12 月期间诊治的 aSAH 患者 171 例,将其纳入研究。其中男性 94 例,女性 77 例;年龄 24~78 岁,平均(58.23±10.16)岁;病变部位:前循环 72 例,后循环 99 例;病灶数目:单发 130 例,多发 41 例;入院格拉斯哥昏迷指数(GCS)评分 3~15 分,平均(10.39±3.21)分;吸烟 58 例,饮酒 60 例;合并基础疾病:糖尿病 30 例,高血压 82 例;改良 Fisher 分级: I 级 66 例, II 级 60 例, III 级 25 例, IV 级 20 例; Hunt-Hess 评分: I 级 33 例, II 级 27 例, III 级 61 例, IV 级 50 例。纳入标准:(1)诊断标准参考《中国动脉瘤性蛛网膜下腔出血诊疗指南》^[10],所有患者均经头颅 CT 检查确诊为 aSAH;(2)开颅手术或介入栓塞手术时机均为发病后 72 h 内;(3)预计生存期≥3 个月;(4)无临床病历资料的缺失。排除标准:(1)合并重要器官严重病变者;(2)因脑组织损伤或脑梗死等引发的蛛网膜下腔出血;(3)出血前即已存在脑积水者;(4)正参与其它研究者。将其按照持续腰大池引流时机的差异分为 A 组(<24h)50 例、B 组(24~72 h)84 例以及 C 组(>72 h)37 例,其中 A 组男性 27 例,女性 23 例;年龄 24~77 岁,平均(58.28±10.12)岁;病变部位:前循环 21 例,后循环 29 例;病灶数目:单发 38 例,多发 12 例;入院 GCS 评分 3~15 分,平均(10.36±3.25)分;吸烟 17 例,饮酒 18 例;合并基础疾病:糖尿病 9 例,高血压 24 例;改良 Fisher 分级: I 级 19 例, II 级 22 例, III 级 7 例, IV 级 2 例; Hunt-Hess 评分: I 级 10 例, II 级 8 例, III 级 18 例, IV 级 14 例。B 组男性 46 例,女性 38 例;年龄 25~78 岁,平均(58.20±10.19)岁;病变部位:前循环 35 例,后循环 49

例;病灶数目:单发 64 例,多发 20 例;入院 GCS 评分 3~15 分,平均(10.46±3.16)分;吸烟 29 例,饮酒 29 例;合并基础疾病:糖尿病 15 例,高血压 40 例;改良 Fisher 分级: I 级 33 例, II 级 25 例, III 级 12 例, IV 级 14 例; Hunt-Hess 评分: I 级 16 例, II 级 13 例, III 级 30 例, IV 级 25 例。C 组男性 21 例,女性 16 例;年龄 25~77 岁,平均(58.21±10.17)岁;病变部位:前循环 16 例,后循环 21 例;病灶数目:单发 28 例,多发 9 例;入院 GCS 评分 3~15 分,平均(10.35±3.23)分;吸烟 12 例,饮酒 13 例;合并基础疾病:糖尿病 6 例,高血压 18 例;改良 Fisher 分级: I 级 14 例, II 级 13 例, III 级 6 例, IV 级 4 例; Hunt-Hess 评分: I 级 7 例, II 级 6 例, III 级 13 例, IV 级 11 例。三组基线资料比较无差异($P>0.05$),均衡可比。患者或其家属均知情并签署同意书,我院医学伦理委员会已批准本研究。

1.2 持续腰大池引流

术前进行局麻处理,消毒铺巾后,选择腰 3~4 或 4~5 椎间隙进行穿刺,拔除针芯若有血性脑脊液即穿刺成功。随后取腰穿持续外引流管置入骶尾部,以 10~15cm 为最佳植入深度,退出穿刺针后对引流管进行妥善固定,每日引流量控制在 200 mL 左右。

1.3 SDHC 判定标准^[11,12]

① 出现意识障碍、步态不稳、颅内高压、尿失禁等症状表现;② 发病后 3 个月内经头颅 CT 检查提示脑室系统进行性扩大,且侧脑室前角间最大径和同一层面的颅腔最大径之比>0.3;③ 需开展永久分流术干预;④ 中脑导水管无严重狭窄。

1.4 统计学处理

将 SPSS 22.0 软件作为数据处理工具,以($\bar{x}\pm s$)表示计量资料,多组间比较实施 F 检验,以[n(%)]表示计数资料,采用 χ^2 检验,等级资料比较采用秩和检验,采用单因素和多因素 Logistic 回归分析 aSAH 持续腰大池引流术后并发 SDHC 的影响因素,检验水准为 $\alpha=0.05$, $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 三组头痛持续时间、双侧大脑中动脉(MAC)血流流速以及 SDHC 发生率比较

C 组头痛持续时间长于 A 组和 B 组,MAC 血流流速快于 A 组和 B 组,SDHC 发生率高于 A 组和 B 组(均 $P<0.05$),A 组 SDHC 发生低于 B 组,但是对比差异均不明显(均 $P>0.05$),见表 1。

2.2 aSAH 持续腰大池引流术后并发 SDHC 的单因素分析

经单因素分析可得:aSAH 持续腰大池引流术后并发 SDHC 和年龄、病变部位、中枢神经系统感染、改良 Fisher 分级及 Hunt-Hess 评分有关(均 $P<0.05$);而与性别、病灶数目、入院 GCS 评分、吸烟、饮酒、糖尿病及高血压无关(均 $P>0.05$),见表 2。

2.3 aSAH 持续腰大池引流术后并发 SDHC 影响因素的多因素

Logistic 回归分析

以 aSAH 持续腰大池引流术后是否并发 SDHC 为因变量, 赋值如下: SDHC=1, 无 SDHC=0。以年龄, 病变部位, 中枢神经系统感染, 改良 Fisher 分级, Hunt-Hess 评分, 持续腰大池引流时机为自变量, 赋值如下: 年龄 < 60 岁 = 0, ≥ 60 岁 = 1; 病变部位前循环 = 0, 后循环 = 1; 中枢神经系统感染 = 1, 无感染 = 0; 改

良 Fisher 分级 I ~ II 级 = 0, III ~ IV 级 = 1; Hunt-Hess 评分 I ~ II 级 = 0, III ~ IV 级 = 1; 持续腰大池引流 < 24 h = 0, ≥ 24 h = 1。经多因素 Logistic 回归分析可得: 年龄 ≥ 60 岁、病变部位后循环、中枢神经系统感染、改良 Fisher 分级 III ~ IV 级、Hunt-Hess 评分 III ~ IV 级、持续腰大池引流 ≥ 24 h 均是 aSAH 持续腰大池引流术后并发 SDHC 的危险因素 (均 OR > 1, P < 0.05), 见表 3。

表 1 三组头痛持续时间、MAC 血流流速以及 SDHC 发生率比较

Table 1 Comparison of headache duration time, MAC blood flow velocity and incidence rate of SDHC in three groups

Groups	n	Headache duration time(d)	MAC blood flow velocity(cm/s)	Incidence rate of SDHC(%)
Group A	50	6.43±1.33*	96.22±7.41*	3(6.00)*
Group B	84	7.01±1.44*	98.01±7.79*	8(9.52)*
Group C	37	10.87±2.41	112.95±9.83	11(29.73)
χ ² /F	-	88.393	53.699	8.410
P	-	0.000	0.000	0.000

Note: Compared with group C, *P < 0.05.

表 2 aSAH 持续腰大池引流术后并发 SDHC 的单因素分析(n, %)

Table 2 Univariate analysis of SDHC after continuous lumbar cistern drainage with aSAH(n, %)

Factors	n	Incidence rate of SDHC	χ ² /Z	P	
Gender	Male	94	12(12.77)	0.002	0.966
	Female	77	10(12.99)		
Age(years)	< 60	103	8(7.77)	6.006	0.014
	≥ 60	68	14(20.59)		
Lesion site	Anterior circulation	72	5(6.94)	3.889	0.049
	Posterior circulatior	99	17(17.17)		
Number of lesions	Single shot	130	16(12.31)	0.150	0.698
	Multiple	41	6(14.63)		
Admission GCS score(scores)	3~8	44	3(6.82)	1.933	0.164
	9~15	127	19(14.96)		
Smoke	Yes	58	7(12.07)	0.050	0.824
	No	113	15(13.27)		
Drink wine	Yes	60	8(13.33)	0.018	0.893
	No	111	14(12.61)		
Diabetes	Yes	30	5(16.67)	0.469	0.493
	No	141	17(12.06)		
Hypertension	Yes	82	10(12.20)	0.063	0.802
	No	89	12(13.48)		
Central nervous system infection	Yes	33	16(48.48)	46.279	0.000
	No	138	6(4.35)		
Improved Fisher class	I grade	66	4(6.06)	19.226	0.000
	II grade	60	3(5.00)		
	III grade	25	8(32.00)		
	IV grade	20	7(35.00)		
Hunt-Hess score	I grade	33	2(6.06)	8.376	0.001
	II grade	27	1(3.70)		
	III grade	61	11(18.03)		
	IV grade	50	8(16.00)		

表3 aSAH持续腰大池引流术后并发SDHC影响因素的多因素 Logistic 回归分析

Table 3 Multivariate Logistic regression analysis of influencing factors of SDHC after aSAH continuous lumbar cistern drainage

Variable	Regression coefficient	Standard error	P	OR	95%CI
Age≥ 60 years	2.741	2.066	0.002	1.582	1.171~3.866
Lesion site posterior circulatio	3.196	2.608	0.013	1.387	1.051~3.261
Central nervous system infectio	3.497	3.276	0.000	1.562	1.166~4.227
Improved Fisher class III~IV grade	5.187	2.087	0.004	2.118	1.511~6.954
Hunt-Hess score III~IV grade	4.266	3.116	0.003	1.287	1.023~3.117
Continuous lumbar cistern drainage ≥ 24 h	4.305	2.522	0.000	2.351	1.725~7.610
Constant term	-5.167	2.201	0.002	0.001	-

3 讨论

近年来,随着医疗水平的不断发展,动脉瘤的相关治疗手段层出不穷,从而使得患者早期死亡率显著降低,远期生活质量亦得到明显的提升^[13-15]。其中SDHC属于aSAH患者较为常见的并发症之一,亦是导致患者预后不良的重要因素,患者一旦发生SDHC,往往会表现出痴呆、大小便失禁以及共济失调等症状,在极大程度上影响了患者的生活质量^[16-18]。如何有效防治SDHC显得尤为重要,然而,关于SDHC的预防仍缺乏可靠的手段。关于SDHC的具体发病机制仍存在一定的争议,目前普遍认为可能是aSAH后血凝块引起脑脊液循环通路障碍,蛛网膜颗粒机械性堵塞以及纤维化导致脑脊液的分泌/吸收失衡,血细胞分解代谢产物以及脑组织释放大细胞因子,对血脑屏障造成了损害^[19-21]。迄今为止,针对SDHC的危险因素的研究报道不一^[22-24],基于此,本研究通过分析aSAH持续腰大池引流术后并发SDHC的危险因素,旨在为SDHC的防治提供理论依据。

本研究结果发现,aSAH后开展持续腰大池引流术的时间越短,患者临床症状改善效果越好,发生SDHC的风险更低。提示持续腰大池引流术的时间早晚可能会影响患者的临床症状。究其原因,可能是由于上述引流术越早实施,越有助于患者蛛网膜下腔内的血性脑脊液得到充分、快速的清除,从而可在炎症达至高峰以及蛛网膜出现黏连之前达到引流的目的,继而减少了大量炎症因子以及含铁血黄素等的刺激,进一步导致SDHC的发病率下降。进一步研究发现,年龄≥60岁、病变部位后循环、中枢神经系统感染、改良Fisher分级III~IV级、Hunt-Hess评分III~IV级及持续腰大池引流≥24h均是aSAH持续腰大池引流术后并发SDHC的危险因素。原因可能在于:随着年龄的增加,患者并发基础疾病的风险更高,术后脑血管痉挛以及二次出血的几率随之升高,从而对脑脊液循环系统造成破坏^[25,26]。然而,余舰等人的研究报告显示:年龄不是aSAH持续腰大池引流术后并发SDHC的独立危险因素^[27]。导致两项研究发生差异的原因可能与纳入研究对象年龄跨度不同以及研究样本量差异较大有关。后循环动脉瘤破裂出血主要发生于脑室以及脑池中,易引起脑脊液循环障碍以及蛛网膜颗粒吸收

异常,增加了SDHC发生的风险^[28-30]。改良Fisher分级III~IV级患者的脑室内出血风险更高,极易引起脑室内积血的发生,继而导致脑脊液的黏稠度增高,进一步引起脑脊液循环受阻以及蛛网膜颗粒吸收异常,最终促使SDHC的发生风险升高^[31,32]。这在徐宏等^[33]人的研究报道中得以佐证:Fisher分级III~IV级的aSAH患者术后更易发生SDHC。Hunt-Hess评分是用以评估患者神经功能状况以及意识水平的可靠指标,随着评分的升高可能提示再次出血和脑血管痉挛等并发症的发生,从而对蛛网膜下腔和脑室系统脑脊液循环造成破坏,引起SDHC的发生。

综上所述,以aSAH后<24h为时机开展持续腰大池引流术的效果较佳,有助于改善患者临床症状,降低SDHC的发生率。此外,aSAH后SDHC的发生可能和下述因素有关:年龄、病变部位、中枢神经系统感染、改良Fisher分级、Hunt-Hess评分及持续腰大池引流时机。

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