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贮存式自体输血和异体输血对老年脑外科手术患者炎症反应及 T 淋巴细胞亚群的影响 *

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摘要 目的:探讨老年脑外科手术患者分别经贮存式自体输血和异体输血后,其对机体 T 淋巴细胞亚群和炎症反应的影响。**方法:**选取 2017 年 3 月~2019 年 10 月期间我院收治的行脑外科手术老年患者 150 例,根据随机数字表法将患者分为对照组($n=75$,异体输血)和研究组($n=75$,贮存式自体输血),对比两组围术期相关指标情况,比较两组术前、术后 5d 的炎症因子水平[白介素-6 (IL-6)、肿瘤坏死因子- α (TNF- α)、C 反应蛋白(CRP)]以及 T 淋巴细胞亚群变化情况,记录两组输血不良反应发生情况。**结果:**两组术前住院时间、术前血红蛋白比较差异无统计学意义($P>0.05$);研究组术后住院时间短于对照组,术中出血量、术中输血量少于对照组,术后血红蛋白多于对照组($P<0.05$)。两组术后 5d IL-6、CRP、TNF- α 均升高,但研究组低于对照组($P<0.05$)。两组患者术后 5d $CD3^+$ 、 $CD4^+$ 、 $CD8^+$ 均降低,但研究组高于对照组,CD8⁺ 升高,但研究组低于对照组($P<0.05$)。研究组输血不良反应发生率低于对照组($P<0.05$)。**结论:**与异体输血应用于老年脑外科手术患者相比,贮存式自体输血效果确切,可减轻炎性应激,降低免疫抑制,同时还可减少输血不良反应发生率,节约宝贵的血液资源。

关键词:贮存式自体输血;异体输血;老年;脑外科手术;炎症反应;T 淋巴细胞亚群

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Effects of Storage Autotransfusion and Allogeneic Transfusion on Inflammatory Response and T Lymphocyte Subsets in Elderly Patients Undergoing Brain Surgery*

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ABSTRACT Objective: To investigate the effects of storage autotransfusion and allogeneic blood transfusion on inflammatory response and T lymphocyte subsets in elderly patients undergoing Department of cerebral surgery. **Methods:** 150 elderly patients undergoing brain surgery in our hospital from March 2017 to October 2019 were selected, they were divided into control group ($n=75$, allogeneic blood transfusion) and study group ($n=75$, storage autotransfusion) according to the method of random number table. The perioperative indexes of the two groups were compared, the changes of inflammatory factors [Interleukin-6 (IL-6), tumor necrosis factor- α (TNF- α), C-reactive protein (CRP)] and T-lymphocyte subsets were compared between the two groups before and 5d after operation, the adverse reactions of blood transfusion were recorded in two groups. **Results:** There was no significant difference in preoperative hospitalization time and hemoglobin between the two groups ($P>0.05$). The postoperative hospitalization time of the study group was shorter than that of the control group, the amount of intraoperative blood loss and intraoperative blood transfusion was less than that of the control group, and the postoperative hemoglobin was more than that of the control group ($P<0.05$). The levels of IL-6, CRP and TNF- α in the study group were higher than those in the control group ($P<0.05$). $CD3^+$, $CD4^+$, $CD8^+$ were decreased in the two groups 5d after operation, but the study group were higher than those of the control group, $CD8^+$ were increased, but the study group were lower than that of the control group ($P<0.05$). The incidence of adverse reactions in the study group was lower than that in the control group ($P<0.05$). **Conclusion:** Compared with the allogeneic transfusion, the storage autotransfusion can reduce the immunosuppression and inflammatory stress, reduce the incidence of adverse reactions, and save valuable blood resources.

Key words: Storage autotransfusion; Allogeneic transfusion; Old age; Brain surgery; Inflammatory response; T lymphocyte subsets

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前言

脑外科手术是临床常见的外科手术,由于此类手术创伤较大,失血量多,术中常要求大量输血^[1]。老年脑外科手术患者由于自身各项机能减退,身体恢复能力、适应能力较差,故手术中对于输血方法具有较高的要求^[2]。异体输血是临床上常用的输血方法,但一直存在血源供不应求现象,同时,异体输血所致的免疫抑制和不良反应一直无法避免^[3]。贮存式自体输血是近年来新兴的输血方式之一,因其操作简便、费用低廉逐渐受到临床工作者和患者的喜爱^[4]。贮存式自体输血不仅可缓解血供紧张,同时还可避免免疫抑制和血液相关传染病的发生^[5]。本研究通过探讨贮存式自体输血和异体输血对老年脑外科手术患者炎症反应及 T 淋巴细胞亚群的影响,以期对老年脑外科手术患者输血方式的选择提供数据支持,现整理如下。

1 资料与方法

1.1 一般资料

选取 2017 年 3 月~2019 年 10 月期间我院收治的 150 例行脑外科手术的老年患者,纳入标准:(1)均具备手术指征,择期行脑外科手术者;(2)年龄 ≥ 60 岁;(3)美国麻醉医师协会(American Society of Anesthesiologists, ASA)^[6]分级 II~III 级;(4)预计出血较多,且均为第一次行手术治疗者;(5)患者及其家属知情本研究,且签署同意书者。排除标准:(1)合并血液系统疾病者;(2)术前有颅内感染或全身感染者;(3)合并免疫系统疾病者;(4)术前 2 周内使用过免疫抑制剂者;(5)合并心肝肾肺肾等重要脏器功能障碍者。根据随机数字表法将患者分为对照组($n=75$,异体输血)和研究组($n=75$,贮存式自体输血),其中对照组男 42 例,女 33 例,年龄 60~82 岁,平均(71.68 $\pm$ 3.64)岁;ASA 分级:II 级 38 例,III 级 37 例;疾病类型:转移瘤 29 例,胶质瘤 24 例,脑膜瘤 22 例。研究组男 40 例,女 35 例,年龄 61~78 岁,平均(70.96 $\pm$ 4.18)岁;ASA 分级:II 级 41 例,III 级 34 例;疾病类型:转移瘤 27 例,胶质瘤 25 例,脑膜瘤 23 例。两组一般资料比较无差异($P>0.05$),具有可比性。本研究已通过我

院伦理学委员会批准。

1.2 方法

两组均行脑外科手术,根据检测中心静脉压数值控制输血量,术中采用全身麻醉诱导。其中对照组给予异体输血治疗,即根据患者失血量,取库存血进行输血灌注。研究组则给予贮存式自体输血治疗,研究组患者在术前 5~7d 行血常规、凝血功能、全身各脏器功能检查,待检查符合采血标准后,根据患者病情预估术中情况确定采血量,每次采血量控制为 200 mL 左右,总采血量 <600 mL,每超过 3d 采血一次,所采血液做好标记,于 4℃ 储血冰箱保存备用。

1.3 观察指标

(1)于术前、术后 5d 抽取患者肘静脉血 4 mL,经离心处理(3500 r/min 离心 12 min,离心半径 14 cm)后分离上清液,置于 -30℃ 冰箱中待测。选用上海基免生物科技有限公司试剂盒,遵守试剂盒说明书步骤,采用酶联免疫吸附试验检测炎症因子水平:包括白介素 -6(Interleukin -6, IL-6)、肿瘤坏死因子 - α (Tumor necrosis factor- α , TNF- α)、C 反应蛋白(C reactive protein, CRP)。采用日本 OLYMPUS-AU600 型全自动生化分析仪检测 T 淋巴细胞亚群:包括 CD3⁺、CD4⁺、CD8⁺,并计算 CD4⁺/CD8⁺。(2)观察两组围术期指标情况,包括:术前住院时间、术后住院时间、术中出血量、术中输血量、术前血红蛋白、术后血红蛋白。(3)记录输血不良反应。

1.4 统计学方法

数据分析软件为 SPSS 23.0,所获得的计数资料以例数(%)表示,组间比较采用 χ^2 检验;计量资料以均数 $\pm$ 标准差表示,采用 t 检验。以 $P<0.05$ 为差异具有统计学意义。

2 结果

2.1 围术期指标比较

两组术前住院时间、术前血红蛋白比较无差异($P>0.05$);研究组术后住院时间短于对照组,术中出血量、术中输血量少于对照组,术后血红蛋白多于对照组($P<0.05$);详见表 1。

表 1 围术期指标比较($\bar{x}\pm s$)

Table 1 Comparison of perioperative indexes($\bar{x}\pm s$)

Groups	Preoperative hospital stay(d)	Postoperative hospital stay(d)	Intraoperative hemorrhage(mL)	Intraoperative blood transfusion volume (mL)	Preoperative hemoglobin(g/L)	Hemoglobin after operation(g/L)
Control group (n=75)	13.56 $\pm$ 2.04	16.38 $\pm$ 1.64	536.58 $\pm$ 87.94	630.34 $\pm$ 95.18	133.05 $\pm$ 13.37	112.53 $\pm$ 12.49
Study group(n=75)	13.21 $\pm$ 2.41	9.26 $\pm$ 1.25	424.28 $\pm$ 76.37	548.12 $\pm$ 91.28	131.37 $\pm$ 16.41	126.32 $\pm$ 13.24
t	0.960	29.903	8.350	5.399	0.687	6.561
P	0.339	0.000	0.000	0.000	0.493	0.000

2.2 炎症因子水平比较

两组术前 IL-6、CRP、TNF- α 比较无差异($P>0.05$);两组术后 5d 的 IL-6、CRP、TNF- α 均升高,但研究组低于对照组($P<0.05$);详见表 2。

2.3 两组 T 淋巴细胞亚群比较

两组患者术前 CD3⁺、CD4⁺/CD8⁺、CD8⁺、CD4⁺ 比较差异无统计学意义($P>0.05$);两组患者术后 5d CD3⁺、CD4⁺/CD8⁺、CD4⁺ 均降低,但研究组高于对照组($P<0.05$);两组患者术后 5d CD8⁺ 升高,但研究组低于对照组($P<0.05$);详见表 3。

2.4 两组输血不良反应发生率比较

对照组治疗期间出现 7 例发热,6 例过敏,输血不良反应发生率为 17.33%(13/75),研究组出现 2 例发热,2 例过敏,输血不良反应发生率为 5.33%(4/75),研究组输血不良反应发生率低于对照组($\chi^2=5.374, P=0.020$)。

表 2 炎症因子水平比较($\bar{x}\pm s$)
Table 2 Comparison of inflammatory factors ($\bar{x}\pm s$)

Groups	IL-6(pg/mL)		CRP(mg/L)		TNF- α (pg/mL)	
	Before operation	5d after operation	Before operation	5d after operation	Before operation	5d after operation
Control group (n=75)	12.24 $\pm$ 1.23	18.15 $\pm$ 1.27*	41.98 $\pm$ 4.31	58.64 $\pm$ 6.87*	23.82 $\pm$ 2.43	32.24 $\pm$ 2.31*
Study group(n=75)	12.01 $\pm$ 1.34	15.24 $\pm$ 1.95*	42.22 $\pm$ 5.04	48.27 $\pm$ 5.91*	24.07 $\pm$ 2.59	27.85 $\pm$ 2.29*
t	1.095	10.829	0.313	9.910	0.610	11.688
P	0.275	0.000	0.754	0.000	0.543	0.000

Note: compared with that before operation,* $P<0.05$.

表 3 两组 T 淋巴细胞亚群比较($\bar{x}\pm s$)
Table 3 Comparison of T lymphocyte subsets between the two groups($\bar{x}\pm s$)

Groups	CD3 ⁺ (%)		CD4 ⁺ (%)		CD8 ⁺ (%)		CD4 ⁺ /CD8 ⁺	
	Before operation	5d after operation	Before operation	5d after operation	Before operation	5d after operation	Before operation	5d after operation
Control group (n=75)	58.21 $\pm$ 5.59	42.15 $\pm$ 4.52*	42.17 $\pm$ 3.63	32.13 $\pm$ 4.62*	27.39 $\pm$ 2.05	36.27 $\pm$ 2.36*	1.54 $\pm$ 0.28	0.89 $\pm$ 0.19*
Study group (n=75)	57.83 $\pm$ 6.61	48.03 $\pm$ 3.54*	41.89 $\pm$ 4.69	37.06 $\pm$ 3.37*	27.76 $\pm$ 3.07	31.15 $\pm$ 2.82*	1.51 $\pm$ 0.21	1.19 $\pm$ 0.18*
t	0.380	8.870	0.409	7.466	0.868	12.058	0.742	9.927
P	0.704	0.000	0.683	0.000	0.387	0.000	0.459	0.000

Note: compared with that before operation,* $P<0.05$.

3 讨论

脑外科手术手术时间长,且通常伴随着较大的创伤,术中出血量较多,为了保障手术顺利进行,多需给予输血处理^[7-9]。由于老年群体随着年龄增长,各项机能逐渐减退,手术耐受性差,其输血可能性及其输血后风险明显高于普通人群^[10]。异体输血是临床常用的输血方式,可快速补充患者术中失去的血液,维持患者的血容量^[11,12],但异体输血一直存在交叉配血困难、血供紧张、免疫抑制以及输血排斥等诸多缺陷,给临床医师带来极大的安全挑战。既往张冬霞等学者研究结果显示^[13],异体输血会产生同种异型抗体,增加并发症发生风险。贮存式自体输血是指在一定时间内采集患者的全血或血液成分,并作相应保存,在患者治疗时再回输保存的血液^[14]。在欧美等发达国家,自体输血在外科手术中所占的比例达 80%~90%^[15],而在我国,国家卫生部门曾下发《医疗机构临床用血管理办法》,要求各医疗机构积极开展贮存式自体输血,此类输血方式已在骨科^[16]、胸外科^[17]等多种手术领域中取得了良好的效果。

本次研究结果表明,研究组术后住院时间、术中出血量、术中输血量、术后血红蛋白等情况均优于对照组,可见与异体输血相比,贮存式自体输血应用于老年脑外科手术患者,效果确切,可有效改善部分临床指标。由于自体输血通常在术前一段时间内采集,无需转运、配型及疾病检测,相比异体输血,红细胞的寿命、形态以及半衰期均接近人体正常红细胞状态,各项

指标均优于库存血液,加之自体输血的血液具有较好的携氧能力,可促进患者早日恢复^[18-20]。本研究中两组患者均存在不同程度的炎症应激、免疫抑制情况,但贮存式自体输血者的反应程度明显更轻。CD3⁺、CD4⁺、CD8⁺是机体发挥免疫应答的主要反映细胞,CD4⁺/CD8⁺比值下降常提示免疫功能紊乱,被视为疾病严重和预后不良的指标^[21,22]。IL-6、CRP、TNF- α 均是临床常见的炎症因子,IL-6是启动手术、创伤等炎症反应的关键细胞因子,TNF- α 具有多重生物学活性,可扩大炎症级联化;CRP是急性时相反应蛋白,当机体出现炎症反应时,其水平迅速上升^[23,24]。手术创伤可激发机体应激性炎症反应,异体输血可能通过输血排斥、产生同种异型抗体而导致免疫抑制,进一步加重炎症损伤^[25,26],而自体输血最大的优点就是可为患者提供完全相容的同型血液,杜绝了异体输血带来的诸多并发症,对细胞免疫功能可发挥正向调节作用,进而减轻对机体免疫功能的影响^[27-29]。另研究组输血不良反应发生率低于对照组,这与刘伟等人^[30]研究结果基本一致,可见贮存式自体输血安全可靠。值得注意的是,贮存式自体输血最大的问题在于血液采集、输血过程中的细菌污染,因此,临床需注意采用适当的技术和方法,尽可能的降低污染,提高自体输血的安全性。

综上所述,与异体输血相比,贮存式自体输血应用于老年脑外科手术患者可改善临床指标,降低免疫抑制和输血不良反应发生率,减轻炎症反应,临床应用价值较高。

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