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限制性输血与开放性输血对急性上消化道出血患者凝血功能、血液流变学及预后的影响*

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摘要 目的:探讨限制性输血与开放性输血对急性上消化道出血患者凝血功能、血液流变学及预后的影响。方法:选取 2018 年 1 月~2020 年 1 月期间我院收治的急性上消化道出血患者 80 例,根据随机数字表法分为对照组(n=40)和研究组(n=40),对照组患者输血方式采用开放性输血,研究组患者输血方式采用限制性输血,比较两组患者治疗 24 h 后、48 h 后、72 h 后的止血率。统计两组患者死亡率、疗效、再出血率和不良事件发生率。比较两组治疗前、治疗 72 h 后的 Blatchford 评分及凝血功能指标:凝血酶原时间(PT)、活化部分凝血活酶时间(APTT)以及血液流变学指标:全血黏度、血浆黏度、红细胞比容。结果:研究组治疗 24 h 后的止血率高于对照组 ($P<0.05$); 两组治疗 48 h 后、治疗 72 h 后的止血率组间比较差异无统计学意义 ($P>0.05$)。两组治疗 72 h 后 Blatchford 评分均下降,且研究组低于对照组($P<0.05$)。两组治疗 72 h 后 PT、APTT 均升高,且研究组高于对照组($P<0.05$)。两组死亡率比较差异无统计学意义($P>0.05$);研究组不良事件总发生率、再出血率均低于对照组($P<0.05$)。研究组治疗后的临床总有效率高于对照组($P<0.05$)。两组治疗 72 h 后全血黏度、血浆黏度、红细胞比容均升高,且研究组高于对照组($P<0.05$)。结论:与开放性输血相比,急性上消化道出血患者采用限制性输血,可迅速止血,有效防止患者凝血功能紊乱及血液流变学异常,同时还可减少不良事件总发生率、再出血率,可进一步改善患者预后。

关键词:限制性输血;开放性输血;急性上消化道出血;凝血功能;血液流变学;预后

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The Effect of Restrictive and Open Blood Transfusion on Coagulation, Hemorheology and Prognosis in Patients with Acute Upper Gastrointestinal Hemorrhage*

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ABSTRACT Objective: To explore the effect of restrictive and open blood transfusion on coagulation, hemorheology and prognosis in patients with acute upper gastrointestinal hemorrhage. **Methods:** 80 patients with acute upper gastrointestinal bleeding who were admitted to our hospital from January 2018 to January 2020 were selected, patients were divided into control group (n=40) and study group (n=40) according to the method of random number table. The open blood transfusion was used in the control group, and the restrictive blood transfusion was used in the study group. The mortality rate, curative effect, rebleeding rate and adverse events of the two groups were counted. The hemostasis rate of the two groups was compared at 24 hours, 48 hours and 72 hours after treatment. The Blatchford score and coagulation indexes: prothrombin time (PT) and activated partial thromboplastin time (APTT), Hemorheology indexes: whole blood viscosity, plasma viscosity, hematocrit of the two groups were compared before and 72 hours after treatment. **Results:** The hemostasis rate of the study group was higher than that of the control group ($P<0.05$), and there were no significant differences in hemostasis rate between the two groups at 48h and 72h after treatment ($P>0.05$). The Blatchford score of the two groups decreased at 72 hours after treatment, and that of the study group was lower than that of the control group ($P<0.05$). PT and APTT increased in the two groups 72 hours after treatment, and the study group was higher than the control group ($P<0.05$). There was no significant difference in mortality between the two groups ($P>0.05$). The total incidence of adverse events and rebleeding rate in the study group were lower than those in the control group ($P<0.05$). The total clinical effective rate of the study group was higher than that of the control group ($P<0.05$). After 72 hours of treatment, the whole blood viscosity, plasma viscosity and RBC specific volume of the two groups were all increased, and the study group was higher than the control group ($P<0.05$). **Conclusion:** Compared with the open blood transfusion, the restrictive blood transfusion in the patients with acute upper gastrointestinal hemorrhage can quickly stop bleeding, effectively prevent the disorder

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of coagulation function, reduce the total incidence of adverse events and rebleeding rate, and further improve the prognosis of the patients.

Key words: Restrictive blood transfusion; Open blood transfusion; Acute upper gastrointestinal hemorrhage; Coagulation; Hemorheology; Prognosis

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前言

急性上消化道出血是指屈氏韧带以上的食管、胃、十二指肠等部位病变引起的急性出血,该病临床主要表现为呕血、黑便、贫血等症状,若未能及时予以治疗,可发生失血性循环衰竭,危及患者性命^[1-3]。现临床针对该病的治疗主要为输血治疗,即根据患者出血量的多少,给予等量全血以纠正机体贫血状态^[4,5]。开放性输血是临床常见的输血方式,但近年来的实践表明不少急性上消化道出血患者经输血治疗后易出现再次出血的情况^[6,7]。限制性输血作为一种新兴的输血方式,在较低的血红蛋白(Hb)开始输血,补充的上限也有所不同,可有效节约血液资源,但有关其在急性上消化道出血的疗效尚存在一定的争议^[8,9]。鉴于此,本研究通过探讨不同输血方式对急性上消化道出血患者凝血功能、止血效果及预后的影响,以期临床急性上消化道出血的治疗提供数据支持,整理报道如下。

1 资料与方法

1.1 一般资料

选取2018年1月~2020年1月期间我院收治的急性上消化道出血患者80例,此次研究已通过我院伦理学委员会批准进行。患者纳入标准:(1)均为首次发病;(2)经胃镜检查确诊;(3)知情本研究且签署了同意书。排除标准:(1)合并严重心肝肾等脏器功能障碍者;(2)合并精神障碍无法正常沟通交流者;(3)近期有外科手术史者;(4)合并凝血功能障碍者;(5)妊娠或哺乳期手术者;(6)符合手术指征需立刻给予手术治疗者。上述患者根据随机数字表法分为对照组(n=40)和研究组(n=40),其中对照组男28例,女12例,年龄24~58岁,平均(39.67±4.52)岁;体质量指数21~26 kg/m²,平均(23.67±0.74) kg/m²。研究组男26例,女14例,年龄25~61岁,平均(40.19±5.27)岁;体质量指数22~26 kg/m²,平均(23.91±0.83) kg/m²。两组一般资料比较差异无统计学差异(P>0.05)。

1.2 方法

所有患者入院后均给予相关常规基础治疗,包括留置胃管、洗胃、禁食等、药物止血、护胃等。在此过程中,收缩压控制在80~90 mmHg,并开放静脉通路进行扩容。随后对照组给予

开放性输血方式,即当患者Hb<90 g/L时,输入全部失血量的红细胞悬液,输血目标为Hb上升至90~110 g/L。研究组行限制性输血方式,即当患者Hb<70 g/L开始输血,无需输入全部失血量的红细胞悬液,为失血量的30%~50%即可,输血目标为Hb上升至70~90 g/L。

1.3 观察指标

(1)记录两组患者治疗24 h后、48 h后、72 h后的止血率。(2)统计两组患者死亡率、再出血率和不良事件发生率,其中再出血指征为患者止血成功后再出现呕血、血容量不足、新鲜黑便情况。不良事件包括发热、输血反应、细菌感染、肺水肿等。(3)于治疗前、治疗72 h后采用Blatchford评分系统评价患者病情程度,Blatchford评分系统包括收缩压、血尿素氮、血红蛋白、黑便、脉率、晕厥、肝脏疾病、心力衰竭等项目组成,评分越高病情程度越严重,其中高危:≥6分,低危:<6分^[10]。(4)于治疗前、治疗72 h后抽取患者肘静脉血4 mL,以3000 r/min的速度离心15分钟,血清分离后在2h内进行检测,应用CA1500全自动血凝仪(日本希森美康公司)对患者的凝血功能指标凝血酶原时间(PT)、活化部分凝血活酶时间(APTT)进行检测。采用普利生LBY-N7500B型全自动血液流变仪检测全血黏度、血浆黏度、红细胞比容。(5)记录两组临床总有效率。疗效判定标准:痊愈:治疗24 h后出血停止,症状及体征基本消失,体温恢复至正常;好转:治疗48 h后出血停止,症状及体征基本消失,体温恢复至正常;无效:治疗72 h后出血未停止,症状及体征未见改善。总有效率=痊愈率+好转率。

1.4 统计学方法

采用SPSS25.0进行数据分析,计数资料以率表示,行卡方检验,计量资料以均值±标准差的形式表示,行t检验。检验标准设置为α=0.05。

2 结果

2.1 两组止血率比较

研究组治疗24 h后的止血率高于对照组(P<0.05);两组治疗48 h后、治疗72 h后的止血率组间比较差异无统计学意义(P>0.05);详见表1。

表1 两组止血率比较[例(%)]

Table 1 Comparison of hemostasis rate between the two groups [n(%)]

Groups	24 hours after treatment	48 hours after treatment	72 hours after treatment
Control group(n=40)	4(10.00)	21(52.50)	33(82.50)
Study group(n=40)	14(35.00)	25(62.50)	37(92.50)
χ^2	7.168	0.818	1.829
P	0.007	0.366	0.176

2.2 两组 Blatchford 评分比较

对照组治疗前 Blatchford 评分为(6.19± 0.47)分,治疗 72 h 后 Blatchford 评分为(3.27± 0.38)分;研究组治疗前 Blatchford 评分为(6.25± 0.41)分,治疗 72 h 后 Blatchford 评分为(1.96± 0.37)分;两组治疗 72 h 后 Blatchford 评分均下降(t 对照组

=30.555, $P=0.000$; t 研究组 =49.869, $P=0.000$),且研究组低于对照组($t=12.861$, $P=0.000$)。

2.3 两组凝血功能指标比较

两组治疗前 PT、APTT 比较无差异($P>0.05$);两组治疗 72 h 后 PT、APTT 均升高,且研究组高于对照组($P<0.05$);详见表2。

表 2 两组凝血功能指标比较($\bar{x} \pm s$)

Table 2 Comparison of coagulation indexes between the two groups($\bar{x} \pm s$)

Groups	PT(s)		APTT(s)	
	Before treatment	72 hours after treatment	Before treatment	72 hours after treatment
Control group(n=40)	11.90± 1.13	14.03± 1.34*	28.29± 3.47	31.83± 3.24*
Study group(n=40)	11.72± 1.26	16.52± 1.47*	27.91± 4.52	35.32± 3.51*
t	0.673	7.917	0.422	4.621
P	0.503	0.000	0.674	0.000

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

2.4 两组预后指标比较

两组死亡率比较差异无统计学意义($P>0.05$);研究组不良

事件总发生率、再出血率均低于对照组($P<0.05$);详见表 3。

表 3 两组预后指标比较 例(%)

Table 3 Comparison of prognostic indexes between the two groups n(%)

Groups	Adverse events					Mortality rate	Rebleeding rate
	Fever	Transfusion reaction	Bacterial infection	Pulmonary edema	Total incidence rate		
Control group(n=40)	2(5.00)	6(15.00)	4(10.00)	3(7.50)	15(37.50)	2(5.00)	18(45.00)
Study group(n=40)	1(2.50)	1(2.50)	1(2.50)	1(2.50)	4(10.00)	1(2.50)	7(17.50)
χ^2	8.352	0.346					7.040
P	0.004	0.556					0.008

2.5 两组总有效率比较

研究组治疗后的临床总有效率高于对照组($P<0.05$);详见

表 4。

表 4 两组总有效率比较 例(%)

Table 4 Comparison of total effective rate between the two groups n(%)

Groups	Recovery	Better	Invalid	Total efficiency
Control group(n=40)	9(22.50)	19(47.50)	12(30.00)	28(70.00)
Study group(n=40)	14(35.00)	23(57.50)	3(7.50)	37(92.50)
χ^2				6.646
P				0.010

2.6 两组血液流变学指标比较

两组治疗前全血黏度、血浆黏度、红细胞比容比较无差异($P>0.05$);两组治疗 72 h 后全血黏度、血浆黏度、红细胞比容均升高,且研究组高于对照组($P<0.05$);详见表 2。

3 讨论

急性上消化道出血主要由肝硬化引起的食管胃底静脉曲张破裂、消化性溃疡、糜烂性出血性胃炎以及恶性肿瘤等引起^[11,12]。该病发病急骤,病情进展迅速,短期内即可引起患者血

压下降、凝血功能紊乱,进而出现休克或猝死等不良事件^[13-15]。据以往报道统计^[16],急性上消化道大出血的死亡率可高达 10%,60 岁以上老人出血死亡率可高达 30%~50%。为了有效纠正贫血以及失血,输血疗法是临床治疗急性上消化道出血的有效急救方法^[17],但现阶段,临床对于输血治疗的具体时机及方法,仍存在一定的争议。以往情况下,临床认为急性失血时 Hb 低于 90 g/L 的患者进行及时的输血就能够起到治疗的效果^[18,19],但大量的输血又会导致体积扩容量不足,产生一定的不良反应,同时不必要的输血会增加各种疾病的传播,反而影响输血

疗效,降低患者预后效果^[20]。随着医疗研究的深入,限制性输血用于临床治疗中^[21,22]。理念被提出,现已受到不少患者及其医师的喜爱,逐渐广泛应

表 5 两组血液流变学指标比较($\bar{x} \pm s$)Table 5 Comparison of hemorheology indexes between the two groups ($\bar{x} \pm s$)

Groups	Whole blood viscosity(mPa/s)		Plasma viscosity(mPa/s)		Hematocrit(%)	
	Before treatment	72 hours after treatment	Before treatment	72 hours after treatment	Before treatment	72 hours after treatment
Control group(n=40)	3.28± 0.35	4.06± 0.28*	1.51± 0.25	2.03± 0.24*	36.16± 6.23	42.56± 5.65*
Study group(n=40)	3.32± 0.24	4.53± 0.25*	1.57± 0.19	2.69± 0.37*	36.09± 6.74	49.98± 7.17*
t	0.596	7.919	1.208	9.465	0.048	5.141
P	0.553	0.000	0.321	0.000	0.962	0.000

Note: Compared with before treatment, * $P < 0.05$.

本次研究结果显示,研究组治疗后的临床总有效率以及止血率高于对照组,提示急性上消化道出血患者采用限制性输血,早期止血率效果优于对照组,这主要是因为限制性输血在患者 $Hb < 70$ g/L 时才开始输血,可最大化激活患者的自我修复调节能力^[23,24]。研究组治疗 72 h 后的 Blatchford 评分低于对照组,可能是因为限制性输血的早期止血效果较好,且当患者止血成功后,医生可对患者具体出血情况进行再评估,实时更新治疗方案,有利于患者的病情改善^[25]。既往研究显示^[26],人体在早期活动性出血尚未彻底止血前,大量且快速的输入血液不仅不能保证重要器官的灌注,反而引起血压升高,并进一步抑制体内凝血因子的活性。从本研究的结果来看,急性上消化道出血患者采用限制性输血,可有效防止患者凝血功能紊乱。限制性输血通过相对少量且渐进的输血形式,在为机体及时的恢复组织器官供血、供氧的同时,还能有效减轻组织器官的负担和压力,使患者循环功能得到明显改善,选择性的收缩皮肤及肌肉血管,从而使血液重新分布^[27]。此外,研究组不良事件总发生率、再出血率均低于对照组,主要是因为限制性输血可以对出血或抢救治疗有更好的控制,进而减少再出血发生率。同时,限制性输血输入血量较少输血时间短,可减少外来血液的过多输入,降低外来血液对机体系统的过度影响,继而减少不良事件总发生率^[28]。急性上消化道出血时,首先引起体内体液分布发生紊乱和变化,当出血量超过一定量时,可引起毛细血管静脉端压力下降,组织间液和细胞外液顺压力向血管内转移,导致血液发生稀释,引起机体红细胞比容下降。而血浆粘度主要由所含的大分子物质纤维蛋白原和球蛋白的量所决定,急性上消化道出血时球蛋白升高,纤维蛋白原明显下降,综合平衡导致血浆粘度不升反降。全血粘度则受血浆粘度、红细胞比容所影响,随着它们的水平下降而下降^[29]。本研究中两组治疗 72 h 后全血粘度、血浆粘度、红细胞比容均升高,且研究组高于对照组,可见急性上消化道出血患者采用限制性输血可有效防止血液流变学异常,可能是因为限制性输血可通过提高少量鲜血增加血液粘度,降低红细胞脆性,改变红细胞能力,有效恢复机体供养环境,改善机体血液流变学状况^[30]。另两组死亡率方面比较未见差异,可能是两种输血方式均安全可靠,或许是本次研究样本量偏少,导致结果存在一定的偏倚,后续报道将扩大样本量以获取更为准确的结果。

综上所述,与开放性输血相比,急性上消化道出血患者采用限制性输血,可迅速止血,有效防止患者凝血功能紊乱、血液流变学异常,同时还可减少不良事件总发生率、再出血率,其效果令人满意,可进一步改善患者预后。

参考文献(References)

- [1] Lau JYW, Yu Y, Tang RSY, et al. Timing of Endoscopy for Acute Upper Gastrointestinal Bleeding[J]. N Engl J Med, 2020, 382(14):1299-1308
- [2] Bates D, Edwards J, Langevin A, et al. Rebleeding in Variceal and Nonvariceal Gastrointestinal Bleeds in Cirrhotic Patients Using Vitamin K1: The LIVER-K Study [J]. Can J Hosp Pharm, 2020, 73(1): 19-26
- [3] Tham J, Stanley A. Clinical utility of pre-endoscopy risk scores in upper gastrointestinal bleeding [J]. Expert Rev Gastroenterol Hepatol, 2019, 13(12): 1161-1167
- [4] Schmidt AR, Glaser N, Kuellmer A, et al. The Use of the Over the Scope Clip to Treat Upper Gastrointestinal Bleeding [J]. Gastrointest Endosc Clin N Am, 2020, 30(1): 1-11
- [5] Gupta K, Kably IM, Girotra M. Endoscopic Ultrasound-assisted Diagnosis of Obscure Gastrointestinal Bleeding [J]. Cureus, 2019, 11(9): e5581
- [6] Jairath V, Kahan BC, Gray A, et al. Restrictive versus liberal blood transfusion for acute upper gastrointestinal bleeding (TRIGGER): a pragmatic, open-label, cluster randomised feasibility trial [J]. Lancet, 2015, 386(9989): 137-144
- [7] Balegar V KK, Jayawardhana M, Martin AJ, et al. Association of Bolus Feeding With Splanchnic and Cerebral Oxygen Utilization Efficiency Among Premature Infants With Anemia and After Blood Transfusion[J]. JAMA Netw Open, 2020, 3(2): e200149
- [8] Fogagnolo A, Taccone FS, Vincent JL, et al. Using arterial-venous oxygen difference to guide red blood cell transfusion strategy [J]. Crit Care, 2020, 24(1): 160
- [9] Gerard Jansen AJ, van den Bosch J, Te Boekhorst PAW, et al. Results of the prematurely terminated TEMPLE randomized controlled trial in patients with myelodysplastic syndrome: liberal versus restrictive red blood cell transfusion threshold [J]. Transfusion, 2020, 60(4): 879-881
- [10] 邵赛丹, 张王琴, 邱晓娟, 等. Blatchford 风险评分系统联合分级护理在上消化道出血患者中的应用效果 [J]. 中华现代护理杂志,

- 2017, 23(35): 4494-4497
- [11] Sourabh S, Sharma N, Sharma R, et al. Clinical Profile, Severity and Outcome of Acute Upper Gastrointestinal Bleeding in Elderly Patients Compared to Non-elderly Patients: A Prospective Observational Study[J]. J Assoc Physicians India, 2019, 67(9): 30-32
- [12] Zia Ziabari SM, Rimaz S, Shafaghi A, et al. Blood Urea Nitrogen to Creatinine ratio in Differentiation of Upper and Lower Gastrointestinal Bleedings; a Diagnostic Accuracy Study [J]. Arch Acad Emerg Med, 2019, 7(1): e30
- [13] Ntola VC, Pillay TG, Ramklass S, et al. An audit of upper gastrointestinal endoscopy performed on patients at Prince Mshiyeni Memorial Hospital in Durban, KwaZulu-Natal[J]. S Afr J Surg, 2019, 57(3): 57
- [14] Brenner A, Afolabi A, Ahmad SM, et al. Tranexamic acid for acute gastrointestinal bleeding (the HALT-IT trial): statistical analysis plan for an international, randomised, double-blind, placebo-controlled trial [J]. Trials, 2019, 20(1): 467
- [15] Castillo L, Prachuaphunychart S, Hall M, et al. Antibiotic use in cirrhotic children with acute upper gastrointestinal bleeding: A retrospective study using the pediatric health information system (PHIS) database[J]. Medicine (Baltimore), 2019, 98(29): e16505
- [16] 查德义. 奥曲肽注射液联合云南白药粉剂治疗消化道大出血 20 例[J]. 中医药临床杂志, 2012, 24(7): 674
- [17] Pinilla-Gracia C, Martí n-Hernández C, Panisello Sebastián JJ, et al. Transfusion trend in total hip arthroplasty following the implementation of a Patient Blood Management protocol [J]. Rev Fac Cien Med Univ Nac Cordoba, 2020, 77(1): 39-44
- [18] Yao RQ, Ren C, Zhang ZC, et al. Is haemoglobin below 7.0 g/dL an optimal trigger for allogenic red blood cell transfusion in patients admitted to intensive care units? A meta-analysis and systematic review [J]. BMJ Open, 2020, 10(2): e030854
- [19] Burchard R, Daginnus A, Soost C, et al. Gender differences in blood transfusion strategy for patients with hip fractures - a retrospective analysis[J]. Int J Med Sci, 2020, 17(5): 620-625
- [20] 方静, 胡继军, 马春梅, 等. 急性上消化道出血患者不同输血策略的输血疗效评估[J]. 临床血液学杂志, 2019, 32(8): 641-644
- [21] Wilde L, Pan J. Restrictive Versus Liberal Transfusion Strategies in Myelodysplastic Syndrome and Beyond[J]. Clin Lymphoma Myeloma Leuk, 2019, 19(12): 758-762
- [22] Yoon BH, Lee BS, Won H, et al. Preoperative Iron Supplementation and Restrictive Transfusion Strategy in Hip Fracture Surgery [J]. Clin Orthop Surg, 2019, 11(3): 265-269
- [23] Doyle AJ, Richardson C, Sanderson B, et al. Restrictive Transfusion Practice in Adults Receiving Venovenous Extracorporeal Membrane Oxygenation: A Single-Center Experience[J]. Crit Care Explor, 2020, 2(1): e0077
- [24] Kashani HH, Lodewyckx C, Kavosh MS, et al. The effect of restrictive versus liberal transfusion strategies on longer-term outcomes after cardiac surgery: a systematic review and meta-analysis with trial sequential analysis[J]. Can J Anaesth, 2020, 67(5): 577-587
- [25] Jaime-Pérez JC, García-Salas G, Áncel-Rodríguez J, et al. Audit of red blood cell transfusion in patients with acute leukemia at a tertiary care university hospital[J]. Transfusion, 2020, 60(4): 724-730
- [26] 吴文静. 新鲜冰冻血浆联合冷沉淀输注对急性上消化道大出血患者凝血功能及细胞免疫功能的影响 [J]. 实用医院临床杂志, 2018, 15(3): 138-141
- [27] 梁静, 齐玲, 范娜, 等. 限制性输血联合高压氧预处理对 THA、TKA 围术期临床疗效的研究 [J]. 现代生物医学进展, 2017, 17(26): 5120-5123
- [28] Scheuzyger J, Zehnder A, Meier V, et al. Sublingual microcirculation does not reflect red blood cell transfusion thresholds in the intensive care unit-a prospective observational study in the intensive care unit [J]. Crit Care, 2020, 24(1): 18
- [29] 韦德芳. 生长抑素联合泮托拉唑对急性非静脉曲张性上消化道出血患者凝血功能及血液流变学的影响[J]. 国际消化病杂志, 2018, 38(2): 140-143
- [30] Odutayo A, Desborough MJ, Trivella M, et al. Restrictive versus liberal blood transfusion for gastrointestinal bleeding: a systematic review and meta-analysis of randomised controlled trials [J]. Lancet Gastroenterol Hepatol, 2017, 2(5): 354-360

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- [20] Wang Gang, Yu Lan, Zhou Xiao Ming, et al. Evaluation of cerebral hemodynamics by computed tomography perfusion imaging before and after cranioplasty in patients with brain injury[J]. Brain Inj, 2017, 31(3): 1-4
- [21] Huang Q, Xu H, Xiao Q S. Clinical research of different analgesia methods on perianesthetic pain of patients with moderate and severe craniocerebral injury who have emergency operation[J]. Eur Rev Med Pharmacol Sci, 2017, 21(3 Suppl): 88-92
- [22] Guo-Wen Zhao, Xing-Chang Zhao, Yong-Guo Cui, et al. Effect of volume expansion with 6% hydroxyethyl starch on perioperative hemodynamics and inflammatory factors in patients with traumatic brain injury[J]. J Hainan Med Univer, 2016, 22(24): 140-142
- [23] Ebru Tanrıç ı K ılıç ı, Gaye Aydın. Effects of dexmedetomidine infusion during spinal anesthesia on hemodynamics and sedation [J]. Libyan J Med, 2018, 13(1): 143-151