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乌司他丁对体外循环法洛四联症患儿围心脏手术期循环和呼吸功能的影响*

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摘要 目的:探讨乌司他丁对体外循环法洛四联症患儿围心脏手术期循环和呼吸功能的影响。**方法:**选取我院于收治的 60 例法洛四联症婴幼儿参与研究,并将其随机分为对照组和试验组两组,每组患儿 30 例。其中试验组患儿在体外循环前以及患儿进行手术后的三天内每天均给予 10000U/kg 乌司他丁,而对照组患儿则在相应的时间点给予等量的生理盐水。分析比较两组患儿的体外循环时间、心脏停搏时间、手术时间、在监护室治疗的时间以及患儿术后住院时间和患儿肺部感染发生例数等临床病理情况。**结果:**所有入选患儿均痊愈出院,在两组患儿的手术操作情况和治疗效果对比中,对照组患儿的手术时间、体外循环时间和心脏停搏时间均显著低于试验组患儿,但重症监护时间及术后住院时间则高于试验组患儿;在两组患儿治疗后的循环功能指标比较中,试验组患儿超滤后 CVP 和血管活性药物均低于对照组患儿而超滤后 MAP 则显著高于对照组患儿;在两组患儿治疗后的呼吸功能指标的比较中,试验组患儿的动脉血氧分压明显高于对照组患儿以及试验组患儿的术后机械通气时间和肺部感染例数均低于对照组患儿,两组患儿的数据比较差异除手术时间、体外循环时间和心脏停搏时间外均具有统计学意义(均 $P<0.05$)。**结论:**乌司他丁对体外循环法洛四联症患儿围心脏手术期的循环和呼吸功能具有较好的保护作用,值得在临床上加以广泛推广和运用。

关键词:乌司他丁;法洛四联症;婴幼儿

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Effects of Ulinastatin on Circulatory and Respiratory Function of Cardiopulmonary Bypass Children with Tetralogy of Fallot during Perioperative Cardiac Surgery*

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ABSTRACT Objective: To investigate the effects of ulinastatin on circulatory and respiratory function of children with tetralogy of Fallot in the perioperative period of cardiopulmonary bypass cardiac surgery. **Methods:** A total of 60 cases of tetralogy of Fallot infants and young children from our hospital were included in the study, and were randomly divided into control group and experimental group, with 30 cases in each group. The children in the experimental group were given 10000 U/kg Ulinastatin per day before CPB and within three days after surgery, while those in control group were given equal volume of normal saline at the corresponding time. Analyze and compare the clinical pathology indicators such as cardiopulmonary bypass time, time of cardiac arrest, operation time, ICU treatment time, postoperative hospitalization time and cases with pulmonary infection between the two groups. **Results:** All enrolled patients were cured and discharged. Patients in control group had significantly shorter surgery time, cardiopulmonary bypass time and cardiac arrest time than children in the experimental group, but longer intensive care time and postoperative hospitalization time than those in the experimental group. As for the circulatory function indexes after treatment, the levels of CVP and vasoactive drugs after ultrafiltration were lower in the experimental group than children in the control group, while the mean arterial pressure (MAP) after ultrafiltration was significantly higher than that of patients in the control group. In comparison of the respiratory function index, the arterial partial pressure of oxygen in the experimental group was significantly higher than in the control group. Patients in experimental group also had less postoperative mechanical ventilation time than those in the control group. There were less pulmonary infection cases in the experimental group, too. Differences between the two groups had statistical significance except the data of operation time, cardiopulmonary bypass time and cardiac arrest time (all $P<0.05$). **Conclusion:** Ulinastatin had good protective effect on the circulatory and respiratory function of cardiopulmonary bypass children with tetralogy of Fallot during cardiac surgery. It is deserved to be widely popularized and applied in clinic.

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前言

法洛四联症是婴儿中最常见的发绀型先天性心脏病,其主要由肺动脉狭窄、室间隔缺损和主动脉骑跨以及右心室肥厚四种畸形组成,临床上对于该类患儿均采取矫正或姑息手术治疗[1-4]。为使能在患儿心脏无血术野中进行直视下操作,术中通常会采取体外循环的方式,阻断血流经过心脏[5-7]。但是体外循环术后几乎所有患者的心肺功能都会受到影响,特别是承受力低下的患儿则更为严重,而肺脏的损伤又直接影响了患儿的术后恢复及预后情况,所以如何降低患儿经体外循环术后的心肺功能损伤是当前迫切需要解决的问题[8-10]。为此选取收治的 60 例法洛四联症婴幼儿进行研究,探讨乌司他丁能否对体外循环法洛四联症患儿围心脏手术期循环和呼吸功能取得有效保护作用。

1 资料和方法

1.1 一般资料

选取我院于收治的 60 例法洛四联症婴幼儿参与研究,其中男性患儿 39 例, 女性患儿 21 例, 所有患儿平均年龄为(16.87± 8.38)个月。将所有入选患儿随机分为对照组和试验组两组, 每组患儿 30 例。两组患儿临床情况差异均无统计学意义。

1.2 纳入标准

所有入选患儿均确诊为罹患法洛四联症;60 例患儿均为进行过急诊手术及其他重大手术;经我院医学伦理委员会开会讨论批准,并获得各位患儿家长的知情同意以及由各位家长签署相关知情同意书。

1.3 方法

由同一支医疗小组对两组患儿以同样的麻醉方式进行根治手术,其中试验组患儿在体外循环前以及患儿进行手术后的三天内每天均给予 10000 U/kg 乌司他丁, 而对照组患儿则在相应的时间点给予等量的生理盐水。术后所有患儿均入重症监护室进行监护,根据患儿的实际情况使用血管活性药物和利尿剂,在患儿苏醒后可逐渐减少呼吸辅助条件,确保患儿生命体征平稳、手术部位没有活动性出血和脏器功能不全的现象时转出重症监护室。

1.4 观察指标

观察统计两组患儿的体外循环时间、心脏停搏时间、临床手术时间、重症监护时间和术后住院时间,比较两组患儿主动脉开放后心脏自动复跳的情况以及术中血液超滤完成后两组患儿的平均动脉血压(MAP)和中心静脉压(CVP),记录两组患儿入监护室时的二氧化碳分压($PaCO_2$)、气道压力峰值(Peak)、动脉血氧分压(PaO_2)和术后机械通气时间以及肺部感染发生例数。

1.5 统计学处理

将我院对 60 例法洛四联症患儿临床观察所得数据用 SPSS19.0 软件进行统计学处理, 计数资料之间对比采用 X^2检验,以是否 $P<0.05$ 来比较差异是否具有统计学意义。

2 结果

2.1 两组患儿的手术操作情况和治疗效果比较

根据我院临床调查所得,两组共 60 例患儿均痊愈出院,无术中术后死亡病例出现。其中对照组的手术时间、体外循环时间和心脏停搏时间均显著低于试验组患儿,而重症监护时间及术后住院时间则显著高于试验组患儿,两组患儿数据仅重症监护时间比较差异具有统计学意义($P<0.05$)(表 1)。

表 1 两组患儿数据仅重症监护时间比较差(n=30,$\bar{x}\pm s$)

Table 1 The operation and treatment effect of the two groups(n=30,$\bar{x}\pm s$)

Group	Operation time(min)	Extracorporeal circulation time(min)	Cardiac arrest time (min)	Intensive care time(h)	Postoperative hospital stay(d)
Experimental group	153.2± 16.9	87.3± 12.9	51.9± 9.0	77± 37	9± 7
Control group	145.1± 25.2	83.9± 12.5	45.2± 14.1	98± 41	12± 7
The value of P	0.287	0.293	0.089	0.032	0.061

2.2 两组患儿治疗后的循环功能指标比较

根据我院对 60 例患儿的临床资料进行统计分析得出,两组患儿的主动脉开放后心脏自动复跳情况无明显差异,且试验组患儿超滤后 CVP 和血管活性药物均低于对照组患儿而超滤后 MAP 则显著高于对照组患儿, 两组患儿数据比较差异均具有统计学意义(均 $P<0.05$)(表 2)。

2.3 两组患儿治疗后的呼吸功能指标比较

根据我院对 60 例患儿的临床资料进行统计分析结果显示,两组患儿转入重症监护室的即时二氧化碳分压和气道压力峰值均无明显差异,而试验组患儿的动脉血氧分压明显高于对照组患儿以及试验组患儿的术后机械通气时间和肺部感染例数均低于对照组患儿,两组患儿的临床数据比较差异均具有统计学意义(均 $P<0.05$)(表 3)。

3 讨论

法洛四联症(TOF)是临床上一种常见的先天性心脏畸形,

表 2 两组患儿治疗后的循环功能指标比较(n=30,$\bar{x}\pm s$)

Table 2 Comparison of circulatory function indexes after treatment between two groups(n=30,$\bar{x}\pm s$)

Group	Automatic double jump (cases)	MAP(mmHg)	CVP(mmHg)	Vasoactive drugs μg/(kg?min)
Experimental group	15	75.4± 7.9	10.8± 2.9	3.8± 1.7
Control group	19	65.7± 9.4	12.7± 3.2	5.2± 2.1
The value of P	0.291	0.019	0.036	0.029

表 3 两组患儿治疗后的呼吸功能指标比较(n=30,$\bar{x}\pm s$)

Table 3 Comparison of respiratory function indexes after treatment between two groups(n=30,$\bar{x}\pm s$)

Group	PaO_2(mmHg)	$PaCO_2$(mmHg)	Peak(cmH_2O)	Mechanical ventilation time(h)	Pulmonary infection (cases)
Experimental group	290.2± 60.1	39.1± 7.1	22.3± 6.9	27.1± 10.9	3
Control group	230.1± 82.9	38.2± 6.9	29.1± 8.2	41.9± 24.6	9
The value of P	0.011	0.293	0.025	0.019	0.021

其基本病理为肺动脉狭窄、室间隔缺损、右心室肥厚和主动脉骑跨[11]。在儿童发绀型心脏畸形中法洛四联症居世界首位,罹患该病的患儿预后主要取决于患儿的侧支循环情况和肺动脉狭窄程度。重症者十之八九都会因为慢性缺氧和红细胞增多使得患者出现继发性心肌肥大和心力衰竭而夭折,所以目前医学界均认为确诊为法洛四联症的患儿应及早进行手术治疗[12-15]。临床上治疗法洛四联症的手术主要有矫正术和姑息术两种,前者是对患儿的心脏内的室间隔缺损进行修补以及解除右室流出道梗阻,而后者则是根据患儿的年龄大小和肺动脉狭小程度或采取锁骨下动脉 - 肺动脉吻合术,或采取右心室流出道补片加宽术,或采取升主动脉 - 肺动脉吻合术,或采取中心分流术等[16]。而不管采取何种手术方法对患儿进行治疗,其体外循环和心脏手术的打击都会对承受力极弱的婴幼儿造成巨大的伤害和打击,尤其是围术期患儿的心肺功能不全极大地影响了患儿的病情恢复,使得患儿的术后恢复时间和住院时间均大大延长,肺部感染例数随之增加,患儿机械通气时间也大大延长[17,18]。

乌司他丁属于广谱酶抑制剂的是从健康的成年男性新鲜尿液中分离纯化出来的一种糖蛋白,临床上广泛运用于急性胰腺炎和慢性复发性胰腺炎以及急性循环衰竭等情况,对于术中体外循环具有良好的心肺保护功能[19]。经我院对 60 例法洛四联症患儿的临床资料进行统计分析结果显示,所有入选患儿均痊愈出院, 在两组患儿的手术操作情况和治疗效果对比中,对照组患儿的手术时间、体外循环时间和心脏停搏时间均显著低于试验组患儿,但重症监护时间及术后住院时间则高于试验组患儿;在两组患儿治疗后的循环功能指标比较中,试验组患儿超滤后 CVP 和血管活性药物均低于对照组患儿而超滤后 MAP 则显著高于对照组患儿; 在两组患儿治疗后的呼吸功能指标的比较中,试验组患儿的动脉血氧分压明显高于对照组患儿以及试验组患儿的术后机械通气时间和肺部感染例数均低于对照组患儿,两组患儿的数据比较差异除手术时间、体外循环时间和心脏停搏时间外均具有统计学意义(均 $P<0.05$)。对此,我院开会讨论后认为乌司他丁确实对患儿的心肺功能具有较好的保护作用,乌司他丁能够从多个方面尽可能地降低体外循环中的各个因素对患儿心肺的损坏,并且很好地抑制了促炎细胞因子肿瘤坏死因子和白介素的产生,通过抗氧化和抑制蛋白水解酶以及对微循环的改善等多方面作用使得抗炎介质的表达下调,从而较好地保护了患儿的肺功能。此外,乌司他丁还能够有效地改善患儿的氧合功能,缩短了辅助呼吸的时间和降低了肺部感染的发生率等。

综上所述,乌司他丁对体外循环法洛四联症患儿围心脏手术期的循环和呼吸功能确实具有较好的保护作用,值得在临床上加以广泛推广和运用。

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