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不同保温措施对患儿全身麻醉后体温的影响*

范文杰¹ 高建东² 邹鑫¹ 吴楠¹ 李生德^{1Δ}

(1 青岛市妇女儿童医院麻醉科 山东 青岛 266000; 2 烟台市烟台山医院麻醉科 山东 烟台 264001)

摘要 目的:探讨不同保温措施对患儿全身麻醉后体温的影响,以选择最佳的保温措施。**方法:**选择2016年1月-2017年6月我院300例择期需要手术的患儿,按照随机数字表法分为对照组(n=60)和实验组(n=240),实验组根据不同的保温措施分为输液输血加温组(A组)、身体包裹组(B组)、冲洗液加温组(C组)、加热毯组(D组),每组60例。所有患者术中均常规加盖棉被,室温控制在24~26℃,对照组不再采取另外的保温措施。观察并记录各组患儿在入室不同时间的鼻咽温和肛温。**结果:**A、C组鼻咽温和肛温随着时间的推移逐步下降,且入室90 min后较入室时明显降低,差异均有统计学意义(均 $P<0.05$);B组在入室后鼻咽温和肛温维持在比较稳定的水平(均 $P>0.05$);D组鼻咽温和肛温随着时间的推移逐步上升,在入室90 min后较入室时显著升高,差异具有统计学意义(均 $P<0.05$)。**结论:**首选加热毯保温能够维持全身麻醉的患儿体温正常,提高麻醉后的安全性,其次选身体包裹保温,必要时可联合应用多种保温措施。

关键词:保温措施;全身麻醉;体温;影响

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Effects of Different Insulation Measures on Body Temperature of Children after General Anesthesia*

FAN Wen-jie¹, GAO Jian-dong², ZOU Xin¹, WU Nan¹, LI Sheng-de^{1Δ}

(1 Department of Anesthesiology, Qingdao Women and Children's Hospital, Qingdao, Shandong, 266000, China;

2 Department of Anesthesiology, Yantai Shan Hospital of Yantai, Yantai, Shandong, 264001, China)

ABSTRACT Objective: To study the effect of different insulation measures on body temperature of children after general anesthesia, so as to select the best insulation measures. **Methods:** A total of 300 children who needed to be operated on in Yantai Shan Hospital of Yantai during January 2016 to June 2017, were selected and randomly divided into control group (n=60) and experimental group (n=240); the experimental group was further divided into infusion and transfusion heating group (group A, n=60), body package group (group B, n=60), flushing liquid heating group (group C, n=60) and heating blanket group (group D, n=60) according to different insulation measures. All children were routinely covered with a quilt, during the operation, room temperature was controlled at 24 to 26 degrees Celsius, the control group did not take additional insulation measures. The nasopharyngeal temperature and anal temperature of each group were observed and recorded at different time after entering into the room. **Results:** The nasopharyngeal temperature and anal temperature of group A and group C decreased gradually with the passage of time; 90 min after entering into the room, it was obviously lower than that at the beginning of entering into the room, the differences were statistically significant (all $P<0.05$). The nasopharyngeal temperature and anal temperature of group B remained stable after entering into the room (all $P>0.05$). The nasopharyngeal temperature and anal temperature of group D increased gradually with the passage of time, 90 min after entering into the room, it was obviously higher than that at the beginning of entering into the room, the differences were statistically significant (all $P<0.05$). **Conclusion:** Preferred heating blanket insulation can maintain children with general anesthesia in normal temperature, and improve the safety after anesthesia, followed by the selection of body wrapped insulation, when necessary, a variety of insulation measures can be combined to apply.

Key words: Insulation measures; General anesthesia; Body temperature; Effect

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前言

体温恒定是人体正常新陈代谢及身体机能维持稳定的基础,人的正常体温范围在36.5~37.5℃^[1]。术中低温在临床发生

概率较大,约50%~70%,通常认为轻度低体温范围在34~36.4℃之间^[2]。大量临床试验表明,术中低温的出现可能导致血红蛋白释放氧能力下降、麻醉苏醒时间延长、凝血功能下降等严重后果,最终产生各种并发症^[3,4]。年龄是导致手术中低体温

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作者简介:范文杰(1977-),男,硕士,副主任医师,从事新生儿麻醉方面的研究,E-mail: kwegio@163.com

Δ 通讯作者:李生德(1966-),男,本科,主任医师,从事心血管麻醉方面的研究,E-mail: poyyrl@163.com

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发生的重要因素之一。婴幼儿体表面积/体重的值远高于成人,并且皮下的血管丰富,因此热传导性更强,同时婴幼儿的体温中枢发育不全,体温调节能力差,周围环境温度对婴幼儿的体温影响大^[5,6]。因此,采用各种保温措施维持其体温的正常对手术患儿极其重要。输液输血加温、身体包裹、冲洗液加温、加热毯等是临床常见的保温方式^[7]。为研究何种保温措施效果最佳,本研究选取 300 例择期需手术的患儿,分别采用不同的保温手段对患儿进行保温,并分析其手术过程的体温变化,为临床术中患儿的保温护理提供依据。现报道如下。

1 资料与方法

1.1 一般资料

表 1 各组患儿一般资料比较

Table 1 Comparison of general data of children in each group

Groups	n	Age(years old)	Weight(kg)	Operation time(min)	Indoor temperature(℃)
Control group	60	5.12± 0.96	20.12± 3.36	127.47± 54.42	24.25± 0.50
Group A	60	5.24± 1.27	22.14± 4.14	127.25± 53.37	25.27± 0.20
Group B	60	5.36± 0.88	21.16± 3.23	126.76± 52.92	24.23± 0.30
Group C	60	5.25± 0.74	23.18± 2.45	126.84± 50.91	24.21± 0.70
Group D	60	5.49± 0.63	20.13± 1.98	125.73± 52.65	24.29± 0.90
F	-	0.06	0.006	0.445	0.561
P	-	0.91	0.996	0.956	0.443

1.2 方法

1.2.1 临床试验分组 300 例患儿用信封法进行随机分组,随机方案采用盲法,即由一个人通过抽取信封进行分组,根据信封里的分组情况实施不同的保温措施,五组分别为对照组、输液输血加温(A 组)、身体包裹(B 组)、冲洗液加温(C 组)、加热毯组(D 组)。

1.2.2 麻醉及保温方法 五组患儿麻醉均采用气管内插管全麻,麻醉后送至麻醉复苏室(室温在 24~26℃ 范围内,相对湿度在 50%~60%范围内)进行麻醉苏醒。所有患者术中均常规加盖棉被,对照组不再采取另外的保温措施,实验组(A、B、C、D 组)分别采用不同的保温措施。① A 组:输液前利用恒温箱(北京福意电器有限公司生产,型号 INCUBATOR)将液体加温到 37℃,再给患儿输入;库血用恒温水槽(上海上海比朗有限公司,型号 BILON-HW-10S)加温到 37℃,然后给患儿输入。② B 组:患儿的上肢、大腿、足部以及肩颈利用棉垫包裹。③ C 组:冲洗液用电热恒温箱加温至 37℃,用于患儿手术部位冲洗。④ D 组:患儿入室前将电热加热毯(合肥贝基科医疗器械有限公司生产,型号:3M Bair Hugger505 型充气式升温仪)铺于床上,为了防止漏电加上铺单,温度为 38.5℃,将患儿置于床上。

1.2.3 监测方法及指标 分别在四个时间点(入室时、入室后 30 min、60 min、90 min)检测患儿的鼻咽温和肛温,并分析其变化趋势。监测方法:将鼻咽温探头和肛温探头与生命体征监护仪(深圳市纽泰克电子有限公司生产,型号 BeneViewT8)连接,内侧鼻翼距离耳垂为鼻咽温探头深度,肛温探头深度约为 6 cm。

1.2.4 统计处理 研究中所有数据在 SPSS 19.0 上运行分析,

选择 2016 年 1 月-2017 年 6 月我院 300 例择期需要手术的患儿为研究对象,其中,男 150 例,女 150 例;年龄 3~10 岁,平均年龄(5.62± 1.36)岁。纳入标准:(1)需做全身麻醉手术的患儿;(2)术前体温正常、手术时间大于 1.5 h;(3)全身麻醉方法一致;(4)患儿术前均无明显的凝血系统、免疫系统、心血管系统异常;(5)所有患儿家属均知情同意。排除标准:重要脏器(肝、肺、脑、心、肾)功能不全者;术前因各种原因(如感染等)体温异常者;因各种原因(如智力障碍等)无自主意识者。各组患儿术前体温正常、且年龄、体重、麻醉手术时间,室内温度等一般资料差异比较无统计学意义($P>0.05$),具有可比性,见表 1。本研究符合我院伦理委员会相关规定,并已批准通过。

不同时间点的鼻咽温、肛温用均数± 标准差($\bar{x}\pm s$)表示,采用独立样本 t 检验,多组间比较采用单因素方差分析;绘制线图描述各组患儿全身麻醉后鼻咽温和肛温变化趋势, $P<0.05$ 表示差异有统计学意义。

2 结果

2.1 各组患儿鼻咽温变化

对照组鼻咽温下降最显著;A 组在入室后鼻咽温持续下降,90 min 时下降至 35.60± 0.79℃,与入室时比较差异均有统计学意义(均 $P<0.05$);B 组在入室后鼻咽温维持在比较稳定的水平;C 组持续下降,入室 90 min 时至 35.40± 0.79℃,与入室时比较差异均有统计学意义(均 $P<0.05$);D 组鼻咽温随着时间的推移逐步上升,在入室 90 min 后较入室时显著升高,差异具有统计学意义(均 $P<0.05$),具体见表 2,变化趋势见图 1。

2.2 各组患儿肛温变化

对照组肛温下降最显著;A 组在入室后肛温持续下降,90 min 时下降至 36.04± 0.67℃,与入室时比较差异均有统计学意义(均 $P<0.05$);B 组在入室后肛温维持在比较稳定的水平;C 组持续下降,入室 90 min 时下降至 36.20± 0.10℃,与入室时比较差异均有统计学意义(均 $P<0.05$);D 组肛温随着时间的推移逐步上升,在入室 90 min 后较入室时显著升高,差异具有统计学意义(均 $P<0.05$),具体见表 3,变化趋势见图 2。

3 讨论

体温是第五大基本生命体征之一,体温正常是机体各项生

表 2 各组患儿鼻咽温比较($\bar{x} \pm s$)Table 2 Comparison of nasopharynx temperature in each group($\bar{x} \pm s$)

Groups	n	Nasopharynx temperature(°C)				F	P
		0 min	30 min	60 min	90 min		
Control group	60	36.40± 0.35	35.40± 0.35	35.20± 0.35	35.00± 0.56	4.383	0.000
Group A	60	36.69± 0.53	36.00± 0.53	35.80± 0.53	35.60± 0.79	3.632	0.002
Group B	60	36.45± 0.23	36.40± 0.23	36.39± 0.23	36.38± 0.91	0.080	0.938
Group C	60	36.49± 0.39	36.30± 0.53	35.60± 0.53	35.40± 0.79	2.621	0.050
Group D	60	36.61± 0.43	36.71± 0.43	36.81± 0.43	37.00± 0.40	2.276	0.030

表 3 各组患儿肛温比较($\bar{x} \pm s$)Table 3 Comparison of anal temperature in each group($\bar{x} \pm s$)

Groups	n	Anal temperature(°C)				F	P
		0 min	30 min	60 min	90 min		
Control group	60	36.89± 0.37	36.40± 0.35	35.80± 0.35	35.60± 0.56	5.037	0.000
Group A	60	37.20± 0.26	36.60± 0.53	36.40± 0.53	36.04± 0.67	2.553	0.017
Group B	60	36.99± 0.19	36.95± 0.23	36.75± 0.23	36.74± 0.81	0.547	0.589
Group C	60	37.12± 0.10	36.70± 0.53	36.45± 0.53	36.20± 0.10	2.803	0.009
Group D	60	36.89± 0.48	36.94± 0.43	37.00± 0.43	37.25± 0.25	2.374	0.018

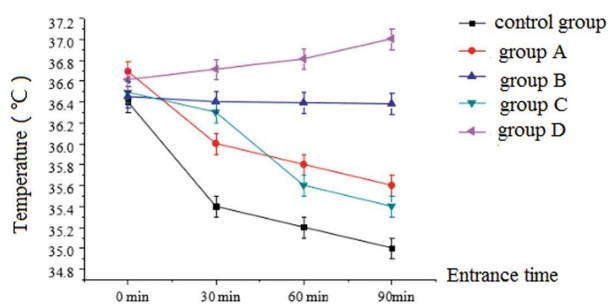


图 1 各组鼻咽温变化趋势

Fig.1 Trend of nasopharyngeal temperature changes in each group

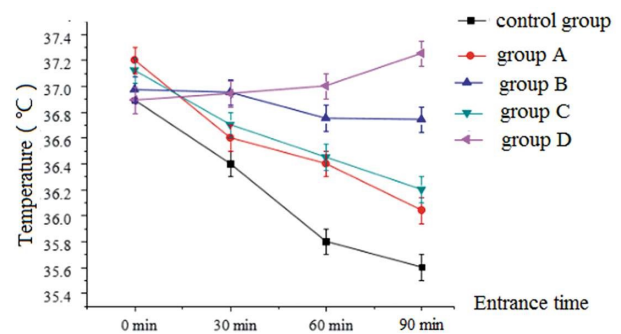


图 2 各组肛温变化趋势

Fig.2 Trend of anal temperature changes in each group

理功能正常运行的前提^[8]。相关研究证实,若常规手术中患者的核心温度低于 36 °C 将会出现免疫功能异常、出血时间延长等不良影响,减慢药物代谢速度,延长麻醉后清醒时间,损伤患儿心肺组织,提高病死率^[9-11];而采取各种保温措施维持体温的正常则可以降低手术的不良反应,对手术患儿极其重要^[12]。有研究报道保暖措施能维持手术过程的体温平稳,可以有效防止术中患者低体温事件的发生^[13-15],让术中患者的病情相对稳定,利于手术的顺利进行及患者的预后^[16,17]。充气毯加温可以让患者体温保持稳定,避免出现围手术期低体温;且可以减缓血浆皮质醇、血糖浓度、胰岛素尤其是降胰岛素上升速度,改善围手术期的应激反应^[18-20]。

研究结果显示,A、C 组鼻咽温和肛温随着时间的推移逐步下降,且入室 90 min 后较入室时明显降低,差异均有统计学意义(均 $P < 0.05$);B 组在入室后鼻咽温和肛温维持在比较稳定的水平(均 $P > 0.05$);D 组鼻咽温和肛温随着时间的推移逐步上升,与入室时相比,在入室 90 min 后显著升高,差异具有统计学意义(均 $P < 0.05$)。提示加热毯保温效果最好,B 组保温效果

次之,A 组和 C 组保温效果不佳。进一步分析其原因可能是在患儿手术过程中,手术部位暴露于低于体温的手术环境中,从而失去很多热量使体温降低,对手术部位的包裹可有效的阻止热量的散失^[21-23]。加热毯接触皮肤并对其加热以维持相对温度,在相对程度上可以补充丢失的热量从而使体温逐渐恢复^[24],B 组采用身体包裹方式,保持了患儿手术过程的热量散失,因此体温较为恒定,而输液和冲洗液虽然均会加热到 37 °C,但是在输送过程中热量损耗,导致保温效果均不理想,因此加热毯组的保温效果最好^[25]。提示临床在患儿全身麻醉期间,首选加热毯保温,最好是选智能化加热毯更为理想,因其能感知患儿体温并能调控温度从而更好的调控患儿体温,次选身体包裹保温。输液输血能补充散失的热量,同样是通过降低散热发挥保温作用,必要时多种保温措施联合应用可以达到更好的效果^[26-28]。采用多种保温措施以避免患儿体温骤降、产生一些严重并发症(如心动过缓等)^[29-30]。此外,本研究各组患儿例数不多,可能会影响研究的结果,需更大样本进一步完善。

综上所述,在患儿全身麻醉期间首选加热毯维持患儿的

体温平衡,其次选身体包裹保温,必要时可联合应用多种保温措施。

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