

· 临床研究 ·

经尿道前列腺电切术患者发生术后低体温的危险因素

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【摘要】目的 分析经尿道前列腺电切术(TURP)患者发生术后低体温的危险因素。**方法** 选取2008年1月至2021年3月于中国人民解放军总医院数据库内行TURP的患者1 193例,根据术后是否发生低体温,将患者分为2组。术后低体温组(H组)患者83,术后正常体温组(N组)患者1 110例。比较2组患者年龄、身高、体质量、体质量指数、术前及术后血红蛋白浓度、手术时间、麻醉方法、麻醉时间、输注晶体液量、输注胶体液量及冲洗液量情况。采用SPSS 22.0软件进行数据分析。根据数据类型,组间比较分别采用 t 检验、 χ^2 检验及秩和检验。采用logistic回归分析发生术后低体温的危险因素。**结果** 2组间年龄、麻醉时间、麻醉方法比较,差异均有统计学意义(均 $P<0.05$),其余各指标差异均无统计学意义(均 $P>0.05$)。使用logistic回归分析发现,老龄($OR=1.041$, 95% CI 1.009~1.074)和硬膜外阻滞($OR=2.829$, 95% CI 1.594~5.023)是TURP患者发生术后低体温的危险因素($P<0.05$)。**结论** 采用数据库大样本数据分析发现,老龄和硬膜外阻滞是TURP患者发生术后低体温的危险因素。

【关键词】 全身麻醉;硬膜外阻滞;前列腺电切术;体温

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Risk factors for postoperative hypothermia in patients after transurethral resection of prostate

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【Abstract】Objective To investigate the risk factors for postoperative hypothermia in patients after transurethral resection of the prostate (TURP). **Methods** A total of 1 193 patients who underwent TURP in our hospital from January 2008 to January 2021 were retrospectively recruited based on the clinical data from the medical database. According to the occurrence of postoperative hypothermia or not, they were divided into hypothermia group (group H, $n=83$) and normal group (group N, $n=1\,110$). Age, height, body mass, body mass index, preoperative and postoperative hemoglobin level, operation duration, anesthesia method, anesthesia duration, and infused volumes of crystalloid, colloidal fluid and irrigation fluid were compared between the 2 groups. SPSS statistics 22.0 was used for statistical analysis. Data comparison between two groups was performed using t test, χ^2 test or rank sum test depending on data type. Logistic regression analysis was used to study the risk factors of postoperative hypothermia. **Results** There were significant differences in age, anesthesia method and anesthesia duration between the 2 groups (all $P<0.05$), but no statistical differences were seen in other indicators (all $P>0.05$). Logistic regression analysis found that older age ($OR=1.041$, 95% CI 1.009–1.074) and epidural nerve block ($OR=2.829$, 95% CI 1.594–5.023) were risk factors for postoperative hypothermia in TURP patients (all $P<0.05$). **Conclusion** Analysis on the large samples from medical database indicates that the risk factors for postoperative hypothermia are older age and epidural nerve block in TURP patients.

【Key words】 general anesthesia; epidural nerve block; transurethral resection of the prostate; body temperature

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前列腺增生是一种常见的男性疾病,经尿道前列腺电切术(transurethral resection of the prostate, TURP)是治疗前列腺增生的常用方式,因创伤小、手术用时短及术后恢复快,既往多采用椎管内麻

醉^[1]。随着麻醉技术与设备的发展,以及患者对舒适化医疗的需求,全身麻醉使用越来越多。研究表明不同的麻醉药物和保温条件均会对患者的体温造成影响^[2],但是大多数研究均是基于小样本的病例

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数。本研究通过医院病历数据库,旨在探讨 TURP 患者发生术后低体温的危险因素。

1 对象与方法

1.1 研究对象

通过中国人民解放军总医院数据库,选取 2008 年 1 月至 2021 年 3 月行 TURP 手术治疗前列腺增生患者 1 193 例,年龄 37~93 岁。本研究已获本院医学伦理委员会批准,鉴于本研究为回顾性且所有患者的个人信息均未透露,无需获得知情同意书。

1.2 方法

依据术后发生低体温与否分为术后低体温组(H 组, $n=83$)与术后正常体温组(N 组, $n=1\,110$)。核心体温 $<36\text{ }^{\circ}\text{C}$ 定义为低体温^[3,4]。调查的患者指标包括年龄、身高、体质量、体质量指数(body mass index, BMI)、术前术后血红蛋白浓度、手术时间、麻醉方法、麻醉时间、输注晶体液量、输注胶体液量、冲洗液量、术前核心温度及术后回病房后即刻核心温度。术前及术后所有患者测量肛温。术中保温措施:(1) 维持室温在 $25\text{ }^{\circ}\text{C}$;(2) 所有输注的液体以

及冲洗液均加温到 $37\text{ }^{\circ}\text{C}$;(3) 患者躺至手术床后,消毒区域外的躯干以及双下肢均覆盖薄被。

1.3 统计学处理

采用 SPSS 22.0 统计软件进行数据分析。计数资料用例数(百分率)表示,采用 χ^2 检验。符合正态分布的计量资料用均值 $\pm$ 标准差($\bar{x}\pm s$)表示,采用 t 检验;若为非正态分布则转换为等级资料,采用秩和检验; $P<0.3$ 的指标则纳入 logistic 回归分析。logistic 回归变量筛选采用逐步回归法,变量纳入标准为 0.05,剔除标准为 0.10。 $P<0.05$ 为差异有统计学意义。

2 结 果

2.1 TURP 患者术后低体温的单因素分析

由于手术时间、麻醉时间、输晶体液量、输胶体液量及冲洗液量为非正态分布,转换为等级资料进行统计。H 组与 N 组患者年龄、麻醉方法及麻醉时间比较,差异均有统计学意义(均 $P<0.05$) ;其他指标比较,差异均无统计学意义($P>0.05$) ;且体质量、手术时间、晶体液量及冲洗液量差异 $P<0.3$ (表 1)。

表 1 TURP 患者术后低体温的单因素分析

Table 1 Univariate analysis of postoperative hypothermia in TURP patients

Item	Total ($n=1\,193$)	Ggroup H ($n=83$)	Group N ($n=1\,110$)	<i>P</i> value
Age(years, $\bar{x}\pm s$)	68.94 $\pm$ 7.49	70.8 $\pm$ 7.2	68.8 $\pm$ 7.5	0.016
Body mass (kg, $\bar{x}\pm s$)	70.70 $\pm$ 10.62	69.4 $\pm$ 9.7	70.8 $\pm$ 10.7	0.264
Height(cm, $\bar{x}\pm s$)	170.33 $\pm$ 18.82	168.5 $\pm$ 4.8	170.5 $\pm$ 19.5	0.357
BMI(kg/m ² , $\bar{x}\pm s$)	24.56 $\pm$ 5.13	24.41 $\pm$ 2.84	24.57 $\pm$ 5.27	0.777
Hb(g/L, $\bar{x}\pm s$)				
Preoperative	137.81 $\pm$ 15.88	138.91 $\pm$ 16.46	137.71 $\pm$ 15.83	0.564
Postoperative	127.59 $\pm$ 16.83	127.54 $\pm$ 18.42	127.60 $\pm$ 16.68	0.982
Operation duration[$n(\%)$]				0.219
0 min<operation duration $\leq$ 60 min	238(19.9)	15(18.07)	223(20.09)	
60 min<operation duration $\leq$ 120 min	684(57.3)	42(50.60)	642(57.84)	
120 min<operation duration $\leq$ 180 min	230(19.3)	24(28.92)	206(18.56)	
181 min<operation duration $\leq$ 240 min	34(2.8)	2(2.41)	32(2.88)	
240 min<operation duration $\leq$ 300 min	7(0.6)	0(0)	7(0.63)	
General anesthesia/epidural anesthesia(n/n)	434/759	15/68	419/691	0.000
Anesthesia duration[$n(\%)$]				0.021
0 min<anesthesia duration $\leq$ 60 min	61(5.1)	2(2.41)	59(5.32)	
60 min<anesthesia duration $\leq$ 120 min	542(45.4)	27(32.53)	515(46.4)	
120 min<anesthesia duration $\leq$ 180 min	467(39.1)	43(51.81)	424(38.2)	
180 min<anesthesia duration $\leq$ 240 min	96(8.0)	11(13.25)	85(7.66)	
240 min<anesthesia duration $\leq$ 360 min	27(2.3)	0(0)	27(2.43)	
Crystalloid solution[$n(\%)$]				0.152
0 ml<crystalloid solution $\leq$ 1 000 ml	751(63.0)	60(72.29)	691(62.25)	
1 000 ml<crystalloid solution $\leq$ 3 000 ml	442(37.0)	23(27.71)	419(37.75)	
Colloidal solution[$n(\%)$]				0.445
0 ml<colloidal solution $\leq$ 500 ml	1 186(99.4)	82(98.80)	1 104(99.46)	
500 ml<colloidal solution $\leq$ 1 000 ml	7(0.6)	1(1.20)	6(0.54)	
Irrigation solutions[$n(\%)$]				0.089
0 ml<irrigation solutions $\leq$ 30 000 ml	224(18.8)	12(14.46)	212(19.10)	
30 000 ml<irrigation solutions $\leq$ 60 000 ml	691(57.9)	43(51.81)	648(58.38)	
60 000 ml<irrigation solutions $\leq$ 90 000 ml	236(19.8)	26(31.33)	210(18.92)	
90 000 ml<irrigation solutions $\leq$ 150 000 ml	42(3.5)	2(2.41)	40(3.60)	
Preoperative morning temperature($^{\circ}\text{C}$, $\bar{x}\pm s$)	36.2 $\pm$ 0.3	36.2 $\pm$ 2.2	36.2 $\pm$ 0.3	0.878

TURP: transurethral resection of prostate; BMI: body mass index; Hb: hemoglobin; H: hypothermia; N: normal.

2.2 患者发生术后低体温的危险因素分析

将年龄、体质量、手术时间、麻醉方法、麻醉时间、晶体液量及冲洗液量作为协变量,术后低体温作为因变量,进行 logistic 回归分析,结果发现,年龄和麻醉方法为术后低体温的危险因素。年龄越大,发生术后低体温风险性越高 ($OR = 1.041$, $95\% CI 1.009 \sim 1.074$, $P = 0.011$); 而麻醉方法中,硬膜外阻滞是术后发生低体温的危险因素 ($OR = 2.829$, $95\% CI 1.594 \sim 5.023$, $P < 0.001$)。

3 讨论

术后低体温是围术期常见并发症,可影响患者预后。研究显示,低体温可影响凝血功能,增加围术期出血风险:(1)导致麻醉药物代谢缓慢而延长患者麻醉苏醒时间;(2)引起术后寒战及躁动,增加机体耗氧量,并影响伤口愈合;(3)导致患者免疫力降低而增加术后感染率;(4)导致术后认知功能受损,甚至导致肿瘤术后复发^[5-8]。因而,预防及处理术后低体温至关重要。但在国内,对于围术期的体温监测及保护的重视程度严重不足^[9]。有研究进行了 TURP 患者术后低体温因素的探索,但均是基于小样本的临床研究^[10,11],而本研究首次采用大数据分析 TURP 患者发生术后低体温的危险因素。

大量研究显示,护理措施是影响 TURP 患者围术期体温的关键因素。由于手术间温度需要保持在 $22\text{ }^{\circ}\text{C} \sim 25\text{ }^{\circ}\text{C}$,对于麻醉状态下的患者仍为冷环境,特别是皮肤裸露时,皮肤与环境的温差易致患者热量丧失;术中输注的常温液体,以及使用大量未加温的冲洗液,均可导致患者出现低体温^[12,13]。我院手术护理规范,均采用被子覆盖患者身躯、液体加温及恒定室温等措施保护患者的体温。

术中大出血以及大量的输血输液亦是导致低体温的重要因素^[14]。当前的 TURP 术式成熟、创伤小、时间短,无特殊原因则不会发生大出血。由于 TURP 无法直接计算出血量,只能通过术前、术后的血红蛋白浓度间接推算术中出血量。本研究术中出血并不多,液体入量也不大,对患者体温影响不大。

前列腺增生患者大多是老年人,由于老年人的体温调节功能减退、基础代谢率降低,麻醉药物又能削弱机体温度调节的反应,因此老年患者在术后易出现低体温,从而导致一系列不良事件的发生,这与我们的研究结果相一致^[15,16]。

大量研究表明全身麻醉和硬膜外阻滞可通过不同体温调节机制影响术中体温的调节^[17]。在麻醉方法选择上,由于硬膜外阻滞具有操作简单及麻醉费用低等优势,早期 TURP 手术几乎是在椎管内麻

醉下实施。但是由于老年患者骨质增生,韧带钙化,常导致穿刺困难或者失败,而且多数患者术前使用抗凝药物,存在椎管内麻醉禁忌证,再加上当前人们对于舒适化医疗的需求,喉罩以及短效全身麻醉药物的应用,患者麻醉手术过程体验度高,全身麻醉的使用越来越多,但是,目前尚无不同麻醉方法对 TURP 患者体温影响的报道^[18]。本研究发现,采用硬膜外阻滞行 TURP 患者较全身麻醉对 TURP 患者术后低体温的发生率更高。由于当前 TUR 的手术技术较为成熟,因而 TURP 的手术时间较短;并且当前使用的全身麻醉药物,如丙泊酚、瑞芬太尼及七氟烷等,起效快、半衰期短、恢复快,停药后药物代谢快,人体的体温调节功能也可快速恢复。而硬膜外阻滞从阻滞起效到阻滞平面完全恢复,一般需要 $3 \sim 6\text{ h}$,在此期间,阻滞平面范围内的肢体血管扩张,始终处于散热状态。这可能是硬膜外阻滞下行 TURP 患者术后低体温发生率更高的原因^[19]。

为了减少患者术后低体温的发生,应进行精准的综合体温保护措施。首先,进行系统的术前访视,了解患者的年龄、心理状况、营养状况、手术方式及手术时间,充分评估患者术中发生低体温的危险因素和程度,制定相应的保温护理措施^[20]。其次,根据不同患者、不同麻醉方式,进行个性化处理。本研究发现,老年患者在硬膜外阻滞下行手术治疗,术后低体温的发生率较高,所以对于拟行硬膜外阻滞的患者尤其需要注意加强保暖,如维持合适室温、使用保温毯、加温冲洗液及输液加温等措施^[21,22]。对于高龄、营养状况差及心理焦虑的患者,需要加强心理疏导,术前给予营养支持,尽可能增加患者的体质量和脂肪^[23]。由于 TURP 常为截石位,臀部裸露在外,易引起体温下降,可为患者穿上裤套,同时需严密观察术野和冲洗液,避免弄湿被服^[24]。

本研究具有一定局限性。由于 TURP 术中持续冲洗导致无法计算准确的出血量和尿量,只能通过术前术后血红蛋白浓度来估算术中出血量。另外,由于本研究为回顾性研究,术中并未进行体温监测,导致本研究无术中体温数值。

综上,由于老年患者在硬膜外阻滞下行 TURP,较全身麻醉更易发生术后低体温,所以需要医护人员更加当心。但是针对不同情况采取何种保温措施,以避免围术期低体温,仍需要大量的研究。

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