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后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛 对肩关节镜手术患者的应用效果*

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摘要 目的:探讨后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛对肩关节镜手术患者的应用效果。**方法:**选取 2020 年 1 月到 2023 年 1 月收治的 80 例肩关节镜手术患者,分为 A、B、C 三组,A 组 25 例、B 组 25 例、C 组 30 例。A 组采取常规静脉麻醉,B 组采取常规静脉麻醉联合后路连续肌间沟臂丛神经阻滞组,C 组患者采取后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛。对比三组患者入室时(T₁),手术 10 min(T₂),手术 30 min(T₃),手术结束即刻(T₄)心率、血氧及血压水平变化,皮质醇(COR)、去甲肾上腺素(NE)相关应激反应指标水平变化,对比三组患者不良反应发生率,最后对所有患者进行 6 个月门诊复查随访,分别在术前、术后 1 个月、3 个月、6 个月采用 Constant-Murley 评分评价三组患者肩关节功能情况。**结果:**三组患者 T₁、T₄ 时间三组患者心率、血氧饱和度、收缩压及舒张压对比无明显差异($P>0.05$),C 组患者 T₂、T₃ 时间心率、血氧饱和度、收缩压及舒张压水平明显低于 A 组和 B 组($P<0.05$),且 T₁ 到 T₄ 时间处于相对稳定状态;T₁ 时间三组患者皮质醇(cortisol, COR)、去甲肾上腺素(norepinephrine, NE)表达水平对比无差异($P>0.05$),T₂、T₃ 时间三组患者 COR、NE 表达水平升高,且 C 组患者 T₂、T₃、T₄ 时间 COR、NE 表达水平低于 A 组及 B 组($P<0.05$);A、B、C 三组患者不良反应发生率对比无差异($P>0.05$);三组患者术前 Constant-Murley 评分对比无差异,术后 1 个月、3 个月、6 个月三组患者 Constant-Murley 评分均升高,且 C 组高于 A 组和 B 组($P<0.05$)。**结论:**针对肩关节镜手术患者术中采取后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛,可稳定患者术中血氧饱和度、心率及血压水平,降低患者术中应激反应,且安全性较高,同时还可进一步辅助患者改善远期肩关节功能。

关键词:后路连续肌间沟臂丛神经阻滞;帕瑞昔布钠;超前镇痛;肩关节镜;应激反应;肩关节功能

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The Application Effect of Posterior Continuous Intermuscular Groove Brachial Plexus Block Combined with Parexib Sodium for Preemptive Analgesia in Patients Undergoing Shoulder Arthroscopic Surgery*

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ABSTRACT Objective: To explore the application effect of posterior continuous intermuscular groove brachial plexus block combined with parecoxib sodium preemptive analgesia on patients undergoing shoulder arthroscopic surgery. **Methods:** 80 patients who underwent shoulder arthroscopic surgery from January 2020 to January 2023 were selected. They were randomly divided into three groups: A, B, and C, with 25 cases in Group A, 25 cases in Group B, and 30 cases in Group C. Group A received routine intravenous anesthesia, Group B received routine intravenous anesthesia combined with posterior continuous intermuscular sulcus brachial plexus block group, and Group C received posterior continuous intermuscular sulcus brachial plexus block combined with parecoxib sodium for preemptive analgesia. Compare the changes in heart rate, blood oxygen, and blood pressure levels, as well as changes in stress response indicators related to cortisol (COR) and norepinephrine (NE), among the three groups of patients at entry (T₁), 10 minutes of surgery (T₂), 30 minutes of surgery (T₃), and immediately after surgery (T₄). Compare the incidence of adverse reactions among the three groups of patients. Finally, conduct a 6-month outpatient follow-up for all patients, at preoperative and postoperative 1 month and 3 months, respectively The Constant Murley score was used to evaluate the shoulder joint function of three groups of patients at 6 months. **Results:** There was no difference in heart rate, blood oxygen saturation, systolic and diastolic blood pressure among the three groups of patients at T₁ and T₄ time ($P>0.05$). The heart rate, blood oxygen saturation, systolic and diastolic blood pressure levels of Group C were lower than those of Group A and Group B at T₂ and T₃ time ($P<0.05$), and the T₁ to T₄ time was relatively stable; There was no difference in the expression levels of COR and NE among the three groups of patients at T₁ time ($P>0.05$), while the expression levels of COR and NE were increased in the

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three groups at T_2 and T_3 time. Moreover, the expression levels of COR and NE in Group C were lower than those in Group A and Group B at T_2 , T_3 , and T_4 time ($P<0.05$); There was no difference in the incidence of adverse reactions among patients in groups A, B and C ($P>0.05$); There was no difference in the preoperative Constant Murley scores among the three groups of patients. After 1 month, 3 months, and 6 months of surgery, the Constant Murley scores of the three groups of patients all increased, and Group C was significantly higher than Group A and Group B ($P<0.05$). **Conclusion:** For patients undergoing shoulder arthroscopic surgery, the combination of posterior continuous intermuscular groove brachial plexus block group and Parecoxib sodium for preemptive analgesia can stabilize intraoperative blood oxygen saturation, heart rate, and blood pressure levels, reduce intraoperative stress response, and have high safety. At the same time, it can further assist patients in improving long-term shoulder joint function.

Key words: Posterior continuous intermuscular groove brachial plexus block; Parecoxib sodium; Advanced analgesia; Shoulder arthroscopy; Stress response; Shoulder joint function

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前言

肩周炎作为临床上常见的一种疾病,影响患者肩关节功能、日常生活质量。肩关节镜手术作为肩关节类疾病的重要治疗方式,可弥补开放性手术对机体造成的严重创伤,改善患者肩关节功能^[1-3]。然而临床研究发现,肩关节镜手术过程中需进行肌腱缝合、使用冲洗液等,致使患者术后常伴随疼痛,影响疗效^[4]。此外,因肩关节镜手术患者多为老年群体,术中血压及心率水平波动较大,增加不良心血管事件发生风险。因此,针对肩关节镜手术患者实施科学的麻醉方案,稳定术中生命体征,持续产生术后镇痛效果,对于手术成功率的提升和患者预后提升具有重要价值^[5]。以往临床上针对肩关节镜手术多采取全身麻醉,患者术中血压及心率波动较大,研究发现^[6],对肩关节镜手术患者采取后路连续肌间沟臂丛神经阻滞,可减轻患者应激

反应水平,辅助提升手术成功率。另外,王雨辰等^[7]研究显示,对老年髋部骨折患者采取帕瑞昔布钠超前镇痛可提升术后镇痛持续时间,降低患者术后应激反应水平。因此,本研究选取我院80例肩关节镜手术患者作为研究对象,探讨后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛对肩关节镜手术患者的应用效果。

1 资料与方法

1.1 一般资料

选取2020年1月到2023年1月收治的80例肩关节镜手术患者,分为A、B、C三组,A组25例、B组25例、C组30例。本研究经我院伦理委员会批准。两组一般资料对比无差异($P>0.05$),如表1所示。

表1 一般资料

Table 1 General Information

Groups	n	Gender (male / female)	Age (year)	BMI(kg/m ²)	Time of surgery (min)	ASA classification (n,%)	
						I level	II level
Group A	25	14/11	67.32± 8.92	23.64± 4.34	126.68± 34.21	11	14
Group B	25	15/10	68.35± 8.89	23.95± 4.37	125.53± 23.68	13	11
Group C	30	18/12	67.35± 7.48	23.58± 3.57	125.74± 21.46	13	17
χ^2/F	-	0.201	0.231	0.971	0.464	0.352	
P	-	0.902	0.862	0.829	0.630	0.667	

1.2 纳排标准

纳入标准:符合《肩关节周围炎》^[8]中关于肩周炎的诊断标准,且符合肩关节镜手术治疗指征;年龄 ≥ 18 岁;ASA分级为I~II级^[9];对本研究知情同意。

排除标准:合并凝血功能障碍者;有肩关节手术史的患者;合并类风湿性关节炎的患者;合并精神障碍不能配合相关调查评价者;合并恶性肿瘤的患者;合并自身免疫类疾病者;肩部存在外伤者;对本研究所用药物过敏者。

1.3 方法

所有患者入室后开放静脉通道,监测器生命体征,采取持续低流量吸氧,可根据患者实际情况采取1~2 mg咪达唑仑镇静处理。

A组:实施全身麻醉,应用0.3 $\mu\text{g}/\text{kg}$ 舒芬太尼(宜昌人福药业;H20054172)+0.03 mg/kg咪达唑仑(江苏恩华药业;H10980025)+0.3 mg/kg依托咪酯(江苏恩华药业;H20020511)+0.2 mg/kg顺式阿曲库铵(江苏恒瑞医药;H20060869)静脉注射,等到患者意识消失且无眨眼发生之后进行置管,行机械通气。

B组:患肢朝上,采取健侧卧位,常规铺巾消毒后应用彩色多普勒超声,探头频率为6~13 HMz,定位肌间沟臂丛神经,利用18G穿刺针平面内穿刺,在肩胛提肌与斜方肌之间从后向前进针,回抽无血后,缓慢注射3 mL生理盐水,超声影像下观察注射液,放置连续神经阻滞导管,导管深度需超出针尖2~4 cm距离,连接过滤器和导管,在超声引导下注入20 mL 0.2%罗哌

卡因(广东华润顺峰药业;H20050325),通过超声下观察药物在神经周围扩散情况,待术肢针刺痛感、感觉及温度感受消失时可认定为神经阻滞完全,随后进行全身麻醉诱导,方法同上。C组:采取后路连续肌间沟臂丛神经阻滞组,随后进行全身麻醉诱导,方法同上,并在在麻醉诱导前 30 min 及手术结束前 30 min 静脉注射 40 mg 帕瑞昔布钠,将其应用生理盐水稀释为 10 mg/mL。

所有患者术后采取 4~9 mg/kg·h 丙泊酚与 0.1 μg/kg·h 瑞芬太尼持续泵注,手术前 10 min 停止泵注,并持续泵注 0.1 mg/kg·h 顺阿曲库铵维持肌松,术前 30 min 停止泵注。

1.4 观察指标

(1)观察并记录两组患者入室时(T₁),手术 10 min(T₂),手术 30 min(T₃),手术结束即刻(T₄)的心率、血氧饱和度、收缩压及舒张压变化。

(2)分别在三组患者入室时(T₁),手术 10 min(T₂),手术 30 min(T₃),手术结束即刻(T₄)抽取其静脉血留存待检,留存完毕后,取血液标本进行离心处理,取上层清液,采取酶联免疫吸

附法检测皮质醇(COR)、去甲肾上腺素(NE)表达水平。

(3)观察并记录两组患者头痛、低血压、头晕、嗜睡、恶心等不良反应发生情况。

(4)分别在三组患者术前、术后 1 个月、3 个月、6 个月采用 Constant-Murley^[10]评分进行评价,其中包括关节活动度、肌力、疼痛、日常生活活动 4 项内容,总分为 100 分,得分与肩关节功能成正比。

1.5 统计学方法

采取 SPSS 23.0,计数资料以(n%)表示,x² 检验;计量资料用均(±s)表示,F 检验;以 P<0.05 为差异有统计学意义。

2 结果

2.1 术中心率、血氧及血压对比

三组患者 T₁、T₄ 时间三组患者心率、血氧饱和度、收缩压及舒张压对比无明显差异 (P>0.05),C 组患者 T₂、T₃ 时间心率、血氧饱和度、收缩压及舒张压水平明显低于 A 组和 B 组 (P<0.05),且 T₁ 到 T₄ 时间处于相对稳定状态,如表 2 所示。

表 2 术中心率、血氧及血压对比(±s)

Table 2 Comparison of surgical center rate, blood oxygen and blood pressure(±s)

Groups	n	HR(second /min)				SPO ₂ (%)			
		T ₁	T ₂	T ₃	T ₄	T ₁	T ₂	T ₃	T ₄
Group A	25	84.68± 8.47	98.53± 6.84 ^a	112.57± 3.58 ^{ab}	84.68± 8.37 ^c	98.35± 1.64	93.52± 2.52 ^a	93.12± 1.53 ^{ab}	98.25± 1.84 ^{bc}
Group B	25	83.22± 11.84	93.28± 10.22 ^a	104.13± 12.94 ^{ab}	83.26± 11.74 ^c	98.42± 1.53	98.84± 1.67	98.95± 1.56	98.56± 1.63
Group C	30	84.46± 10.12	84.36± 9.27	85.18± 11.37	84.37± 12.35	98.42± 1.63	90.43± 2.63 ^a	90.53± 1.54 ^{ab}	98.53± 1.63 ^{bc}
F	-	0.179	4.385	8.851	0.316	0.242	13.631	20.667	0.977
P	-	0.858	<0.001	<0.001	0.753	0.809	<0.001	<0.001	0.331

续表 1

Continued Table 1

Groups	n	DBP(mmHg)				SBP(mmHg)			
		T ₁	T ₂	T ₃	T ₄	T ₁	T ₂	T ₃	T ₄
Group A	25	68.94± 9.33	60.35± 12.42 ^a	79.34± 9.45 ^{ab}	68.35± 8.34 ^c	122.52± 11.55	104.42± 7.87 ^a	142.44± 11.24 ^{ab}	120.45± 10.52 ^c
Group B	25	69.35± 10.22	61.84± 9.29 ^a	76.24± 8.38 ^{ab}	68.85± 10.20 ^{bc}	121.36± 11.38	108.33± 11.85 ^a	136.21± 12.42 ^{ab}	120.72± 11.22 ^{bc}
Group C	30	68.64± 11.83	57.22± 8.38	68.29± 12.33	68.74± 11.26	122.54± 14.21	101.04± 7.26 ^a	123.37± 12.52	120.39± 15.18
F	-	0.572	2.826	4.377	0.138	0.353	5.822	5.781	0.044
P	-	0.568	0.006	<0.001	0.890	0.725	<0.001	<0.001	0.965

Note: ^aP<0.05 versus T₁; ^bP<0.05 versus T₂; ^cP<0.05 versus T₃, the same below.

2.2 术中应激反应指标水平对比

T₁ 时间三组患者 COR、NE 表达水平对比无明显差异 (P>0.05),T₂、T₃ 时间三组患者 COR、NE 表达水平明显升高,且 C 组患者 T₂、T₃、T₄ 时间 COR、NE 表达水平明显低于 A 组及 B 组 (P<0.05),如表 3 所示。

2.3 不良反应对比

A、B、C 三组患者不良反应发生率对比无明显差异 (P>0.05),如表 4 所示。

2.4 肩关节功能对比

三组患者术前 Constant-Murley 评分对比无差异,术后 1 个月、3 个月、6 个月三组患者 Constant-Murley 评分均升高,且 C 组高于 A 组和 B 组 (P<0.05),如表 5 所示。

表 3 术中应激反应指标水平对比($\bar{x} \pm s$)

Table 3 Comparison of intraoperative stress response index levels($\bar{x} \pm s$)

Groups	n	COR($\mu\text{g/L}$)				NE(mmol/L)			
		T ₁	T ₂	T ₃	T ₄	T ₁	T ₂	T ₃	T ₄
Group A	25	135.54±	167.84±	171.63±	172.75±	128.85±	146.75±	158.78±	159.89±
		16.36	6.84 ^a	11.85 ^{ab}	17.95 ^{ab}	8.57	15.74 ^a	15.85 ^{ab}	20.53 ^{ab}
Group B	25	135.26±	153.74±	162.78±	164.79±	127.34±	140.64±	146.96±	146.74±
		15.74	8.58 ^a	13.74 ^{ab}	13.64 ^{ab}	11.63	11.43 ^a	11.63 ^{ab}	13.52 ^{ab}
Group C	30	134.33±	148.95±	154.74±	154.87±	127.93±	138.85±	141.63±	141.64±
		19.36	6.94 ^a	15.94 ^{ab}	16.84 ^{ab}	15.78	9.43 ^a	12.53 ^{ab}	10.64 ^{ab}
F	-	0.037	45.930	9.814	29.289	0.478	68.763	41.860	17.378
P	-	0.964	<0.001	<0.001	<0.001	0.633	<0.001	<0.001	<0.001

表 4 不良反应对比(n,%)

Table 4 Comparison of Adverse Reactions (n,%)

Groups	n	Headache	Hypotension	Dizzy	Drowsiness	Nausea	Total
Group A	25	1(4.00)	0(0.00)	0(0.00)	0(0.00)	1(4.00)	2(8.00)
Group B	25	2(8.00)	0(0.00)	0(0.00)	1(4.00)	0(0.00)	3(12.00)
Group C	30	1(3.33)	1(3.33)	2(6.67)	1(3.33)	1(3.33)	6(20.00)
χ^2	-	-	-	-	-	-	1.750
P	-	-	-	-	-	-	0.417

表 5 肩关节功能对比($\bar{x} \pm s$,分)

Table 5 Comparison of shoulder joint function($\bar{x} \pm s$, portion)

Group	n	Preoperative	One month after surgery	3 months after surgery	6 months after surgery
Group A	25	43.87± 7.56	56.73± 4.12 ^a	65.85± 8.15 ^{ab}	75.12± 8.31 ^{abc}
Group B	25	43.21± 8.41	61.76± 7.46 ^a	76.71± 7.62 ^{ab}	84.13± 6.41 ^{abc}
Group C	30	43.04± 8.37	68.50± 5.52 ^a	82.25± 4.83 ^{ab}	89.62± 4.73 ^{abc}
F	-	0.381	28.176	39.198	33.771
P	-	0.705	<0.001	<0.001	<0.001

Note: ^aP<0.05 versus Preoperative; ^bP<0.05 versus One month after surgery; ^cP<0.05 versus 3 months after surgery.

3 讨论

肩关节镜手术作为肩关节疾病的首选治疗方案,疗效显著,且手术操作简单,手术创口小等特点^[11]。与传统手术相比,肩关节镜引导下手术虽然能够降低切口感染、三角肌功能受损等并发症发生率,但患者术后恢复速度较慢,影响患者生活质量^[12]。为了进一步确保手术质量,促进患者术后恢复,制定科学的麻醉方案具有重要价值。因此,借助以往肩关节手术患者麻醉经验及其他骨关节手术的超前镇痛方式,本研究对我院肩关节镜患者采取后路连续肌间沟臂丛神经阻滞联合帕瑞昔布超前镇痛麻醉,以期临床提供参考意见。

本研究结果表明,三组患者 T₁、T₄ 时间三组患者心率、血氧饱和度、收缩压及舒张压对比无明显差异(P>0.05),C 组患者 T₂、T₃ 时间心率、血氧饱和度、收缩压及舒张压水平明显低于 A 组和 B 组(P<0.05),且 T₁ 到 T₄ 时间处于相对稳定状态,

与 Sun Y 等^[13]、Paul RW 等^[14]研究结果相符。Sun Y 等研究表明,超声引导下肌间沟臂丛神经阻滞辅助全身麻醉可提升肩关节镜麻醉效果,减轻患者术中血压及心率波动。分析原因,采取后路连续肌间沟臂丛神经阻滞可弥补不足,将镇痛药物直接作用于手术部位周围神经,阻断疼痛刺激传入的同时,提升镇痛效果,避免手术疼痛所造成的血压、心率及血氧饱和度波动^[15,16]。Paul RW 等研究显示,帕瑞昔布超前镇痛安全性较高,稳定患者术中及术后生命体征。分析原因,达到治疗浓度后,帕瑞昔布钠可选择性抑制前列腺素的合成,但对 Cox-1 的抑制并无明显作用,因此可进一步稳定患者心率及血压水平^[17-19]。疼痛、手术、创伤等应激因素会直接导致 COR、NE 等应激指标水平升高,加剧全身应激反应的发生,对机体造成一定损害的同时,也会削弱患者的生理储备,延长术后康复时间^[20]。本研究结果显示,T₁ 时间三组患者 COR、NE 表达水平对比无明显差异(P>0.05),T₂、T₃ 时间三组患者 COR、NE 表达水平明显升

高,且C组患者T₂、T₃、T₄时间COR、NE表达水平明显低于A组及B组($P < 0.05$)。分析原因为,后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛可阻滞感觉神经和分离运动神经,阻断伤害性感受传递到神经中枢,加长镇痛效果的同时,减轻疼痛造成的应激反应现象,与Schmbi H等^[21]研究结果相符;A、B、C三组患者不良反应发生率对比无显著差异($P > 0.05$)。Schmbi H等研究显示,帕瑞昔布钠的超前镇痛作用效果优于吗啡,同时安全性较高。分析原因为,帕瑞昔布钠超前镇痛可镇痛及抗炎,并不会对肾脏、血小板及胃黏膜功能等产生影响,并对于循环和呼吸无明显抑制作用,所以不良发生率较低。此外,帕瑞昔布钠超前镇痛可减少中枢及外周PG产生,进而减弱中枢及外周敏感化,术后头痛情况发生率较低^[22,23]。另外本研究采取超声引导下后路连续肌间沟臂丛神经阻滞,虽然需持续进行局部阻滞,但在超声直视下可提升阻滞安全性及准确性,进一步降低不良反应发生风险^[24]。但有研究显示^[25],臂丛神经阻滞联合全身麻醉其不良反应发生率明显低于单纯全身麻醉,多与局部阻滞联合全身麻醉减少了术中丙泊酯用量相关。然而本研究发现,三组患者不良反应发生率并无显著差别,可能与本研究数据样本量较小有关,因此还需日后持续增加样本量进行深入研究;三组患者术前Constant-Murley评分对比无差异,术后1个月、3个月、6个月三组患者Constant-Murley评分均升高,且C组高于A组和B组($P < 0.05$),与Hurley ET等^[26]研究相符。Hurley ET等研究发现,对肩关节镜患者术后采取持续镇痛可辅助恢复远期肩关节功能。分析可知:后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛可产生术后持续镇痛效果,与快速康复理念相契合,通过有效的镇痛效果,促进患者进行早期床上被动康复运动,逐渐过渡到床下运动,促进肢体血液循环,降低术后压疮、静脉血栓、感染等并发症的同时,加快术后康复,辅助改善术后远期肩关节功能^[27,28]。另外,帕瑞昔布钠不仅具有镇痛效果,还可选择性抑制环氧合酶-1,达到抗炎效果,减轻术后早期患者机体炎症反应水平,改善肢体水肿程度,促进其早期进行康复锻炼^[29]。

综上所述,针对肩关节镜手术患者术中采取后路连续肌间沟臂丛神经阻滞联合帕瑞昔布钠超前镇痛,可稳定患者术中血氧饱和度、心率及血压水平,降低患者术中应激反应,且安全性较高,同时还可进一步辅助患者改善远期肩关节功能。

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