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彩色多普勒超声定位锁骨上臂丛神经阻滞在上肢骨科手术的应用*

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摘要 目的:探讨彩色多普勒超声定位锁骨上臂丛神经阻滞在上肢骨科手术的应用价值。**方法:**选择 2012 年 5 月-2013 年 12 月行锁骨上臂丛神经阻滞麻醉的上肢骨科手术患者 120 例,根据锁骨上臂丛定位方法的不同分为对照组和观察组,每组 60 例,观察组选择彩色多普勒超声定位锁骨上臂丛神经,对照组选择和传统手法解剖学定位,比较两组患者麻醉操作时间、麻醉显效时间、持续时间,麻醉优良率及并发症情况。**结果:**①观察组操作时间、麻醉显效时间分别为(192.5±23.86)s, (10.45±2.39)min,较对照组的(227.75±26.18)s, (15.36±4.85)min 短,两组比较差异有统计学意义($t_1=48.34, P_1=0.015; t_2=6.28, P_2=0.022$);②观察组麻醉优良率为 100%,明显高于对照组的 86.67%,两组比较差异有统计学意义($\chi^2=9.12, P=0.041$);③观察组患者无并发症发生,对照组 2 例并发皮下血肿,1 例药物毒性反应,1 例交感神经阻滞,并发症发生率为 8.33%,两组比较并发症发生率差异有统计学意义($\chi^2=8.34, P=0.049$)。**结论:**彩色多普勒超声定位锁骨上臂丛神经阻滞操作时间短、显效快、持续时间长,麻醉优良率高,安全性高,值得临床推广应用。

关键词:彩色多普勒;超声定位;臂丛神经阻滞;上肢骨科手术

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The Applications of Color Doppler Ultrasound in Locating the Infraclavicular Brachial Plexus Block in Upper Extremity Orthopedic Surgery*

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ABSTRACT Objective: To investigate the value of the color Doppler ultrasound in locating infraclavicular brachial plexus block in the upper extremity orthopedic surgery. **Methods:** 120 patients subjected to supraclavicular brachial plexus block anesthesia of the upper extremity orthopedic surgery from May 2012 to December 2013 were chosen and were divided into the control group (n=60) and observation group (n=60) depending on the supraclavicular brachial positioning methods. The observation group used color Doppler ultrasound to locate the brachial plexus nerves clavicle while the control group was given traditional practices anatomical location. The operating hours, anesthesia onset time, duration, and complications of anesthesia excellent rate between the two groups were compared. **Results:** ① The operating time, effective time of anesthesia of the observation group were (192.5±23.86) s, (10.45±2.39) min, shorter than (227.75±26.18) s, (15.36±4.85) min in the control group, and the difference was statistically significant ($t_1=48.34, P_1=0.015; t_2=6.28, P_2=0.022$); ② Excellent and good rate of the observation group was 100%, significantly higher than that of the control group(86.67%), the difference was statistically significant ($\chi^2=9.12, P=0.041$); ③ The patients in the observation group had no complications, but there were 2 cases of hematoma, one case of drug toxicity, one case of sympathetic block in the control group, with a complication rate of 8.33%. The complications incidence had significant difference between the two groups ($\chi^2=8.34, P=0.049$). **Conclusion:** Collarbone brachial plexus block on the base of color Doppler ultrasound location presents short operation time, markedly faster, longer duration of anesthesia and higher excellent rate, which proves that it is safe and worth to be applied in clinic.

Key words: Color Doppler; Ultrasound; Brachial plexus; Upper extremity orthopedic surgery

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前言

臂丛神经阻滞是针对上肢外科手术的一项传统麻醉方法^[1],临床多采用解剖学定位的方法确定进针部位进行臂丛神经阻滞,但这种方法由于定位缺乏直观性,很多情况下阻滞效果

难以满足手术的需要,另外较高的并发症发生率也给麻醉师带来极大的困扰^[2,3]。近年来,随着超声技术应用领域的不断拓宽,部分学者开始将超声定位技术应用于臂丛神经阻滞中,为麻醉师确定穿刺位置提供了有力的影像学帮助^[4],笔者自 2012 年开始研究彩色多普勒超声定位锁骨上臂丛神经阻滞在上肢骨科

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手术中的应用价值,现将总结报道如下:

1 资料与方法

1.1 一般资料

2012年5月-2013年12月在我院行锁骨上臂丛神经阻滞麻醉的上肢骨科手术患者120例,根据锁骨上臂丛神经定位方法的不同分为观察组和对照组,每组60例,观察组:男36例,女24例,年龄19-64岁,体重45-65公斤,平均其中肱骨干骨折11例,尺桡骨骨折19例,掌指骨骨折17例,上肢软组织病变手术13例,采用彩色多普勒超声定位锁骨上臂丛神经阻滞;对照组:男34例,女26例,年龄17-65岁,体重46-67公斤,其中肱骨干骨折9例,尺桡骨骨折22例,掌指骨骨折20例,上肢软组织病变手术9例,采用传统手法解剖学定位锁骨上臂丛神经阻滞,比较两组一般资料差异,无统计学意义($P>0.05$),具有可比性。

1.2 方法

1.2.1 仪器设备与麻醉药物 ①飞利浦彩色多普勒超声诊断仪,高频线阵探头频率为7-10MHz;②日本贝朗公司生产的20G神经阻滞穿刺针;③深圳迈瑞生物医疗电子股份有限公司生产的T5型多功能心电监护仪;④0.375%盐酸罗哌卡因(江苏恒瑞医药股份有限公司,批号H20060137)。

1.2.2 麻醉方法 两组患者麻醉侧的肩下垫薄枕,头偏向对侧。观察组:颈肩部皮肤消毒、铺无菌巾,用无菌手套将涂有超声耦合剂的超声探头包起,使用飞利浦彩色多普勒超声诊断仪,高频线阵探头频率为7~10MHz。探头平行置于锁骨中点上缘。首先根据超声图像确认锁骨下动脉和第一肋,在锁骨下动脉的外侧缘与第一肋的上方确认锁骨上臂丛神经(呈团簇状或椭圆形的低回声区),调整探头位置,使锁骨上臂丛神经与探头垂

直。从探头外侧进针,针头与超声束的长轴保持在同一直线上。在超声显像观察下调整进针的深度和方向,直至针尖到达臂丛神经,确认针尖位置回抽无血后,注入局麻药物。注药的同时对针尖的位置进行调整,直至局麻药包绕在臂丛神经周围均匀地扩散。对照组:嘱患者放松后,在麻醉侧锁骨中点上方手法触摸到锁骨下动脉,选择锁骨下动脉外侧0.5~1cm作为穿刺点,缓慢进针,方向略朝向同侧脚,出现异感后注入局麻药物。两组患者均给予等量0.375%盐酸罗哌卡因,剂量按0.4 ml/kg计算。

1.3 观察指标

①操作时间、麻醉显效时间、镇痛持续时间;②麻醉优良率,麻醉效果评价^[9]:优秀:切皮时无痛,感觉舒适;良好:切皮时轻微疼痛,追加舒芬太尼10 μ g可完成手术;无效:麻醉效果不能开展手术,或切皮时明显疼痛,静脉追加麻醉药物无效,需改全麻;③血肿、气胸、毒性反应及交感神经阻滞等并发症发生情况。

1.4 统计学方法

研究所得数据应用医学统计软件SPSS17.0进行统计,计量资料用均数 $\pm$ 标准差($\bar{x} \pm S$)表示,采用t检验;计数资料应用 χ^2 检验, $P<0.05$ 则表示差异有统计学意义。

2 结果

2.1 两组患者操作时间、麻醉显效时间、镇痛持续时间比较

观察组操作时间、麻醉显效时间分别为(192.5 ± 23.86)s, (10.45 ± 2.39)min, 较对照组的 (227.75 ± 26.18)s, (15.36 ± 4.85)min短, 两组比较差异有统计学意义($t_1=48.34, P_1=0.015, t_2=6.28, P_2=0.022$), 观察组镇痛持续时间为(11.45 ± 2.39)h, 对照组为(10.98 ± 2.83)h, 两组比较差异无统计学意义($t=5.72, P=0.143$),详见表1。

表1 两组患者操作时间、麻醉显效时间、镇痛持续时间比较

Table 1 Comparison of operating time, the effective time of anesthesia and duration of analgesia between the two groups

组别	例	操作时间(s)	麻醉显效时间(min)	镇痛持续时间(h)
Group	N	Operation time (s)	The effective time of anesthesia (min)	Duration of analgesia (h)
观察组	60	192.5 $\pm$ 23.86	10.45 $\pm$ 2.39	11.45 $\pm$ 2.39
Observation group				
对照组	60	227.75 $\pm$ 26.18	15.36 $\pm$ 4.85	10.98 $\pm$ 2.83
Control group				
T值	-	48.34	6.28	5.72
T values				
P值	-	0.015	0.022	0.143
P values				

2.2 两组患者麻醉优良率比较

观察组麻醉优良率为100%,明显高于对照组的86.67%,

两组比较差异有统计学意义($\chi^2=9.12, P=0.041$),详见表2。

表2 两组患者麻醉优良率比较

Table 2 Comparison of excellent and good rate of anesthesia between the two groups

组别	例	优秀	良好	无效	优良率
Group	N	Excellent	Good	Invalid	Excellent and good rate
观察组	60	45	15	0	100%
Observation group					
对照组	60	32	20	8	86.67%
Control group					

2.3 两组患者并发症发生率比较

观察组患者无并发症发生, 对照组 2 例并发皮下血肿, 1

例药物毒性反应, 1 例交感神经阻滞, 并发症发生率为 6.66%, 两组比较差异有统计学意义($\chi^2=8.34, P=0.049$), 详见表 3。

表 3 两组患者并发症发生率比较

Table 3 Comparison of the incidence of complications between the two groups

组别 Group	N	血肿 Hematoma	毒性反应 Toxicity	交感神经阻滞 Sympathetic block	发生率 Incidence
观察组 Observation group	60	0	0	0	0%
对照组 Control group	60	2	1	1	6.66%

3 讨论

臂丛神经是由 C5-8 神经腹支与 T1 神经分支组成周围神经丛, 部分人群接受 C4 与 T1 脊神经前支的小分支^[9], 其主要功能是支配整个手、上臂的运动和绝大部分感觉^[7], 该神经丛的成功阻滞是保证上肢手术顺利进行的可靠保证^[9]。以往, 臂丛神经定位只能通过解剖学体表手法定位, 一方面神经定位不准确, 导致麻醉药物误注, 达不到麻醉效果, 甚至诱发药物中毒, 损伤重要器官^[9,10]; 另一方面, 麻醉师为追求麻醉效果, 往往需要反复穿刺或调整针头位置, 不但增加了患者痛苦, 同时发生血肿、神经损伤、气胸等并发症的概率也大大增加^[11,12]。

彩色多普勒超声观察颈部血管、肌肉、神经及骨组织具有特异性^[13], 臂丛神经在声像图显示为低回声, 周围包绕强回声神经鞘, 与肌肉、骨组织强回声有截然不同的反差, 通过血流成像可以清晰鉴别锁骨下动、静脉^[14,15], 不仅可以为臂丛神经阻滞设计最佳穿刺点和穿刺路径, 判断穿刺深度, 避让重要组织, 还能指导麻醉师根据注射剂量调整针头角度及部位, 对上、中、下干进行逐个阻滞^[16]。

本研究应用彩色多普勒超声定位的患者操作时间由规定位的(227.75 ± 26.18)秒缩短到(192.5 ± 23.86)秒, 麻醉显效时间由(15.36 ± 4.85)分钟缩短到(10.45 ± 2.39)分钟, 麻醉优良率为 100%, 明显高于对照组的 86.67%, 常规定位 4 例患者出现皮下血肿, 药物毒性反应, 交感神经阻滞并发症, 超声定位无 1 例并发症发生, 与李挺^[17], 李景锋等^[18]研究结果基本趋于一致, 分析原因在于彩色多普勒超声引导技术可以为麻醉师提供臂丛神经阻滞影像学支持, 使穿刺点、径路、深度、目标部位精准无误, 并能做到即时的反馈纠正, 使麻醉药物均匀的扩散到神经丛的表面^[19], 达到起效迅速, 完全阻滞的效果。

综上所述, 彩色多普勒超声可以帮助定位锁骨上臂丛神经, 为上肢手术开展臂丛神经阻滞提供了有利的影像学技术支持, 具有操作时间短、显效快、镇痛持续时间长, 麻醉优良率高, 安全性高的优势, 但是彩色多普勒超声定位对于麻醉医师来说还是一项新技术, 需要麻醉医师熟悉超声断层解剖图像, 熟练掌握超声操作技能^[20]。

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