

# 胸前区体表定位腋静脉穿刺置管临床研究

刘仁杰<sup>1</sup> 常双喜<sup>1</sup> 闫圣杰<sup>1</sup> 邢伟<sup>1</sup>

**[摘要]** **目的:**探讨胸前区体表定位腋静脉穿刺置管方法的安全性和可行性,为临床提供更多深静脉穿刺的选择。**方法:**收集2017-03—2019-12期间我院呼吸与危重症医学科(RICU)行中心静脉穿刺置管的126例患者,根据不同的穿刺置管方法分为A组(42例,胸前区体表定位腋静脉穿刺)、B组(44例,锁骨下静脉穿刺)和C组(40例,颈内静脉穿刺),分别比较一次穿刺成功率,二次穿刺成功率,三次穿刺成功率,穿刺总成功率,穿刺过程中并发症发生率,对可行性和安全性进行比较。**结果:**A组一次穿刺成功18例(42.86%),二次穿刺成功12例(28.57%),三次穿刺成功7例(16.67%),穿刺失败5例,穿刺总成功37例(88.10%);B组一次穿刺成功21例(47.73%),二次穿刺成功15例(34.09%),三次穿刺成功5例(11.36%),穿刺失败3例,穿刺总成功41例(93.18%);C组一次穿刺成功20例(50.00%),二次穿刺成功14例(35.00%),三次穿刺成功4例(10.00%),穿刺失败2例,穿刺总成功38例(95.00%);3组间比较一次穿刺成功率( $\chi^2=0.442, P=0.813$ )、二次穿刺成功率( $\chi^2=0.578, P=0.790$ )、三次穿刺成功率( $\chi^2=0.930, P=0.633$ )、穿刺总成功率( $\chi^2=1.453, P=0.506$ )差异均无统计学意义。A组误穿动脉、气胸、导管异位分别为2例(4.76%)、0和1例(2.38%);B组误穿动脉、气胸、导管异位分别为4例(9.09%)、2例(4.55%)、2例(4.55%);C组误穿动脉、气胸、导管异位分别为4例(10.00%)、2例(5.00%)和0。3组间比较误穿动脉发生率( $\chi^2=0.893, P=0.710$ )、气胸发生率( $\chi^2=2.080, P=0.464$ )、导管异位发生率( $\chi^2=1.863, P=0.773$ )差异均无统计学意义。**结论:**熟练掌握胸前区解剖结构,应用胸前区体表标志定位法行经腋静脉穿刺置管术是安全可行的。其具有操作容易、成功率高、安全性好、并发症少等优点,对于危重患者有很高的临床应用价值,值得临床推广。

**[关键词]** 深静脉穿刺;腋静脉穿刺;锁骨下静脉穿刺;颈内静脉穿刺

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## Clinical study on positioning axillary vein catheterization in anterior thoracic region

LIU Renjie CHANG Shuangxi YAN Shengjie XING Wei

(Department of Pulmonary and Critical Care Medicine, Zhengzhou First People's Hospital, Zhengzhou, 450004, China)

Corresponding author: LIU Renjie, E-mail: liurenjie2010@126.com

**Abstract Objective:** In order to provide more clinical choices for deep venipuncture, the safety and feasibility of body surface positioning axillary venipuncture catheterization in anterior thoracic region were discussed. **Method:** The central vein catheterization of axillary venipuncture was performed by locating the body surface markers in the chest area. A total of 126 cases of central venipuncture and catheterization of RICU via axillary vein, subclavian vein and internal jugular vein in our hospital from March 2017 to December 2019 were collected. Divided into axillary venipuncture group A(42 patients), subclavian venipuncture group B(44 patients), and internal jugular venipuncture group C(40 patients), the success rate of the first puncture, the success rate of the second puncture, the success rate of the third puncture, the total success rate of the puncture, the incidence of complications during the puncture, and the safety were compared. **Result:** In group A, 18 patients(42.86%) were successful in one puncture, 12 patients(28.57%) in the second puncture, 7 patients(16.67%) in the third puncture, 5 patients(11.36%) in the third puncture, and 37 patients(88.10%) in the total. In group B, there were 21 patients(47.73%) who succeeded in the first puncture, 15 patients(34.09%) who succeeded in the second puncture, 5 patients(11.36%) who succeeded in the third puncture, and 3 patients(93.18%) who failed in the third puncture. In group C, there were 20 patients(50.00%) with one puncture success, 14 patients(35.00%) with two puncture success, 4 patients(10.00%) with three puncture success, 2 patients with puncture failure, and 38 patients(95.00%) with total puncture success. There was no statistically significant difference between the three groups

<sup>1</sup>郑州市第一人民医院呼吸与危重症医学科(郑州,450004)  
通信作者:刘仁杰,E-mail:liurenjie2010@126.com

in the success rate of primary puncture( $\chi^2 = 0.442, P = 0.813$ ), the success rate of secondary puncture( $\chi^2 = 0.578, P = 0.790$ ), the success rate of tertiary puncture( $\chi^2 = 0.930, P = 0.633$ ), and the total success rate of puncture( $\chi^2 = 1.453, P = 0.506$ ). Two patients(4.76%), 0 and 1 patient(2.38%) were in group A with malocclusion of artery, pneumothorax and catheter respectively. In group B, 4 patients(9.09%), 2 patients(4.55%) and 2 patients(4.55%) were mistakenly perforated with ectopic pneumothorax and catheter, respectively. In group C, 4(10.00%), 2(5.00%), and 0 were treated with malocclusion of artery, pneumothorax, and catheter, respectively. There was no significant difference between the three groups in the incidence of artery mispassage( $\chi^2 = 0.893, P = 0.710$ ), the incidence of pneumothorax( $\chi^2 = 2.080, P = 0.464$ ) and the incidence of catheter ectopic( $\chi^2 = 1.863, P = 0.773$ ). **Conclusion:** It is safe and feasible to perform tranaxillary venipuncture and catheterization by locating body surface markers in the thoracic region. Tranthoracic axillary vein puncture catheterization is easy to operate, high success rate, good safety, fewer complications, good patient compliance, convenient nursing, it has a high clinical value for critical patients, worthy of clinical promotion.

**Key words** deep vein puncture; axillary vein puncture; subclavian vein puncture; internal jugular vein puncture

安全有效地开通快速静脉通路是提高抢救危重症患者成功率的重要基础,中心静脉穿刺置管已广泛应用于监测中心静脉压、快速补液、血管活性药物应用等。中心静脉置管临床上常选用锁骨下静脉、颈内静脉或股静脉进行穿刺,与锁骨下静脉、颈内静脉、股静脉相比,腋静脉的解剖特征对于快速建立静脉通道具有较大的优势<sup>[1]</sup>。由于腋静脉穿刺缺乏公认的技术方法和可靠的体表标志,操作难度较锁骨下静脉穿刺大<sup>[2]</sup>,因此,在急危重症救治中并未得到广泛应用。但对急危重症救治而言,腋静脉体表定位穿刺技术不需借助特殊设备,不失为紧急条件下可以选择的方法。本研究选用胸前区胸骨角、第一肋骨、第二肋骨、锁骨等作为腋静脉穿刺的基本体表标志经胸前区外侧入路,探讨腋静脉穿刺中心静脉置管应用于急危重症患者的可行性和安全性。

## 1 资料与方法

### 1.1 研究对象

收集 2017-03—2019-12 期间我院呼吸与危重症医学科(RICU)行中心静脉穿刺置管的 126 例患者,根据不同的穿刺置管方法分为 A 组(42 例,胸前区体表定位腋静脉穿刺)、B 组(44 例,锁骨下静脉穿刺)和 C 组(40 例,颈内静脉穿刺)。

### 1.2 穿刺方法

使用中美合资珠海福尼亚医疗设备有限公司生产的 CVC-2 7F 中心静脉导管套件穿刺包,所有操作由同一位技术熟练的临床医师完成。患者仰卧位,头转向穿刺对侧,常规消毒铺巾。

**1.2.1 腋静脉穿刺组** 穿刺侧上臂外展,以第二、三肋骨前胸壁与侧胸壁移行处 A 点为皮肤穿刺进针点;以穿刺侧锁骨中内 1/3 处即锁骨与第一肋骨交叉处 B 点为穿刺针腋静脉进针目标方向,常规消

毒、铺巾,5 mL 注射器抽取 2%利多卡因 3~5 mL 于皮肤穿刺进针点 A 局麻时可指向 B 点方向间断负压试探性穿刺腋静脉,见静脉血回抽后换用穿刺针按同一试穿穿刺进针点及方向与胸壁呈 30~45° 穿刺,保持负压,缓慢进针 3~6 cm(根据患者胖瘦程度),见有静脉回血示穿刺成功,常伴有落空感,置入导丝后沿导丝置入中心静脉导管深 13~15 cm。腋静脉体表定位穿刺可以先用麻醉针边注射麻药边试探性穿刺,如有静脉血回抽说明穿刺到腋静脉,这样就为后面用穿刺针穿刺指明了方向和深度。选定锁骨与第一肋骨交界处夹角为进针目标点,不超过锁骨下缘,即可穿刺到腋静脉,一般进针 3~6 cm 即可。

**1.2.2 锁骨下静脉穿刺组** 患者使用传统穿刺方法,在锁骨中外 1/3 处下方 2 cm 处进针,针尖指向胸锁关节,保持负压,边进针边回抽,见静脉回血,表明穿刺针位于锁骨下静脉内。

**1.2.3 颈内静脉穿刺组** 患者平卧位,头低 20~30°或头过伸位,头转向对侧(一般多取右侧穿刺),取右侧胸锁乳突肌的锁骨头、胸骨头和锁骨三者所形成的三角区的顶部为穿刺点。如解剖部位不明显,可于平卧后将头抬起,以显露胸锁乳突肌的轮廓。穿刺方向呈 30~40°,向下稍向外进针,指向右侧乳头方向,边进针边抽吸,见静脉回血,表明穿刺针已进入颈内静脉。

### 1.3 穿刺过程评判标准

穿刺成功标准:导管在皮下无曲折,送入顺利,置管长度符合要求,能从导管顺利抽出血液,输液顺畅。对所有穿刺成功的患者进行评判,一次成功是指 1 针穿刺成功或皮下探测血管动作 2 次以下;二次成功是指另选进针点进行穿刺或调整进针方向 2 次或 2 次以上皮下探测血管动作;三次成功是

指 3 次选择进针点进行穿刺或调整进针方向 3 次或 3 次以上皮下探测血管动作。

### 1.4 观察指标

①穿刺次数;②穿刺置管一次成功率、二次成功率、三次成功率、总成功率;③穿刺并发症:误穿动脉,根据穿刺针内血液颜色、压力进行判断;气胸,根据患者呼吸状况变化判断或术后胸部 X 线片明确;置管异位可通过术后胸部 X 线片检查进行明确。

### 1.5 统计学方法

应用 SPSS 18.0 统计软件。计量资料以  $\bar{x} \pm s$  表示,组间比较采用方差分析(F 检验);计数资料组间比较采用  $\chi^2$  检验; $P < 0.05$  为差异有统计学意义。

## 2 结果

### 2.1 一般资料比较

3 组患者组间性别( $\chi^2 = 0.500, P = 0.806$ )、年龄( $F = 0.462, P = 0.631$ )、体质指数( $F = 0.715, P$

$= 0.491$ )比较均差异无统计学意义,具有可比性,见表 1。

表 1 3 组患者一般临床资料 例,  $\bar{x} \pm s$

组别	例数	性别		年龄/岁	体质指数
		男	女		
A 组	42	26	16	63.93±10.35	23.07±3.86
B 组	44	27	17	66.23±11.11	22.14±3.59
C 组	40	22	18	65.28±11.90	22.72±3.53

### 2.2 观察指标比较

3 组间比较一次穿刺成功率、二次穿刺成功率、三次穿刺成功率、穿刺总成功率差异均无统计学意义。3 组间比较误穿动脉发生率、气胸发生率、导管异位发生率差异均无统计学意义。3 组患者穿刺成功率及并发症发生率见表 2。

表 2 3 组患者穿刺成功率及并发症发生率比较 例(%)

组别	例数	穿刺成功				并发症		
		一次成功	二次成功	三次成功	总成功	误穿动脉	气胸	导管异位
A 组	42	18(42.86)	12(28.57)	7(16.67)	37(88.10)	2(4.76)	0(0)	1(2.38)
B 组	44	21(47.73)	15(34.09)	5(11.36)	41(93.18)	4(9.09)	2(4.55)	2(4.55)
C 组	40	20(50.00)	14(35.00)	4(10.00)	38(95.00)	4(10.00)	2(5.00)	0(0)
$\chi^2$		0.442	0.578	0.930	1.453	0.893	2.080	1.863
$P$		0.813	0.790	0.633	0.506	0.710	0.464	0.773

## 3 讨论

安全、准确、快速建立有效的静脉通路是提高抢救危重症患者成功率的重要基础。临床上常用的深静脉穿刺途径有锁骨下静脉、颈内静脉和股静脉,中心静脉穿刺主要风险是刺伤动脉、出血、血肿形成、气胸、神经损伤和感染<sup>[3]</sup>。误穿动脉是锁骨下静脉穿刺最常见的并发症,由于锁骨遮挡常不易止血,可造成出血不止、颈部血肿形成压迫气道出现窒息而危及生命。研究表明经颈内或锁骨下静脉穿刺气胸发生率为 0.5%~2.0%<sup>[4]</sup>。颈内静脉置管由于穿刺时头位转动大,不易固定,患者感觉不适;由于靠近颈部,限制了患者头颈部的运动,而且护理困难。股静脉则因腹股沟清洁度差,容易造成穿刺部位及导管相关性血流感染,而且患者下床活动不便,长期卧床也容易形成静脉血栓。上述穿刺途径都有一定的缺点,与其他深静脉比较,腋静脉的解剖特征对于快速建立静脉通道具有较大的

优势<sup>[5]</sup>。Saijo 等<sup>[6]</sup>对 20 例患者经腋静脉穿刺置管,成功率达 100%,无出血、气胸、血栓形成等并发症。相关研究表明经腋静脉穿刺成功率较高<sup>[7]</sup>,并发症发生率低<sup>[8]</sup>,在临床是备受期待的穿刺途径<sup>[9]</sup>。

国内外学者在腋静脉穿刺方法探索过程中,通过尸体解剖、静脉造影<sup>[10]</sup>及超声引导<sup>[11]</sup>、X 线透视等手段对腋静脉解剖定位作了许多研究。不同的腋静脉穿刺方法各有利弊,超声引导下静脉穿刺成功率高,气胸、误伤动脉等并发症发生率低<sup>[12]</sup>;但其专业性强,并非每位医师都能驾驭,且需要特殊设备,大多数医院尚难以普及。X 线透视成功率相对较高,然而暴露于 X 射线下时间较长,限制了其在临床上推广应用。

腋静脉胸前区体表定位法不需要特殊设备、不用暴露 X 线以及无需造影剂,使之成为一种简单、方便、经济的深静脉穿刺技术,值得进一步研究,以

提高腋静脉穿刺成功率和安全性。与锁骨下静脉穿刺置管相似,胸前区体表定位腋静脉穿刺很大程度上依赖于体表标志<sup>[13]</sup>,对体表定位的准确性要求很高,在救治急危重症的紧急条件下,临床上更需要简单易掌握的体表标志和安全可行的穿刺方法。因此,如何通过明确的体表标志进行腋静脉准确定位是腋静脉穿刺研究的热点<sup>[14]</sup>。

腋静脉体表定位穿刺术均通过胸前区体表标志确定腋静脉走行位置,然后穿刺针在后前位上平行腋静脉并与胸壁成一定角度穿刺腋静脉。寻找锁骨和第一肋骨的交界处即腋静脉与锁骨下静脉的交界是腋静脉穿刺体表标志的关键,胸骨角、锁骨、第一肋骨、第二肋骨、胸三角沟和喙突等体表标志可以明确腋静脉的走行;研究发现上臂外展可以降低腋静脉穿刺导管异位的风险<sup>[15]</sup>。本研究选用胸骨角、第一肋骨、第二肋骨、锁骨作为腋静脉穿刺的基本体表标志定位穿刺腋静脉,以探讨经胸前区体表定位腋静脉穿刺置管应用于急危重症患者的可行性和安全性。锁骨下静脉穿刺成功的关键是正确选择穿刺点与进针方向,腋静脉穿刺亦如此。以第二、三肋骨前胸壁与侧胸壁移行处标记为 A 点<sup>[16]</sup>(皮肤穿刺进针点);锁骨与第一肋骨交叉处 B 点<sup>[17]</sup>(穿刺针腋静脉进针目标方向)为进针方向。本研究腋静脉穿刺、颈内静脉穿刺、股静脉穿刺三组间比较一次穿刺成功率、二次穿刺成功率、三次穿刺成功率、穿刺总成功率差异均无统计学意义,腋静脉穿刺、颈内静脉穿刺、股静脉穿刺三组间比较误穿动脉发生率、气胸发生率、导管异位发生率差异也均无统计学意义。本研究腋静脉穿刺总成功率 88.10%,与吴再涛等<sup>[18]</sup>新体表标志法腋静脉穿刺技术结果相近。

胸前区体表定位腋静脉穿刺置管操作容易,成功率高,并发症少,因其不需要超声设备、不用暴露于 X 线等优点为中心静脉穿刺置管开辟了新途径。本研究的胸前区体表定位腋静脉穿刺置管方法值得在临床上推广应用。

总之,对于腋静脉体表定位穿刺法的实施应在具有锁骨下静脉、颈内静脉、股静脉穿刺丰富经验的基础上开展,应对胸前区和腋静脉的解剖结构有充分的理解和认识。腋静脉体表定位法穿刺与其他深静脉穿刺方法相比是安全、有效的,在急危重症抢救过程中快速建立深静脉通路是行之有效的一种选择,临床上多种体表标志的综合运用,能够达到更高的穿刺成功率、降低穿刺并发症发生率。腋静脉穿刺明确、可靠的体表标志选择,还需更多临床研究进一步探讨。

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