

透视引导儿童右锁骨下静脉穿刺置管方法

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【摘要】目的:回顾性分析儿童右侧锁骨下静脉(RSV)的解剖特点,探讨X线引导下儿童RSV穿刺置管方法,并评价其可行性和安全性。**方法:**50例患儿,经右手留置针行RSV X线造影,观察RSV X线解剖位置、走行及其与右侧锁骨头的关系。根据观察结果,临床上透视下按骨性标志行小儿RSV穿刺166例。统计穿刺成功率、穿刺次数、穿刺时间、X线计量、导管尖端位置及穿刺并发症。**结果:**RSV较固定地走行于锁骨头的胸锁关节面连线的中点及附近。X线引导下小儿右侧锁骨下静脉穿刺成功率100%;穿刺次数为:1.0±0.4,其中一次性穿刺成功160次,一次成功率96%;穿刺时间:(0.8±0.9) min;并发症5例,其中误入颈内静脉2例,局部血肿3例;X线计量为(1.5±2.4) mGy。**结论:**X线引导下按骨性标志行儿童RSV穿刺置管术是安全且一次穿刺成功率高的方法。

【关键词】儿童;X线造影;右锁骨下静脉;血管穿刺

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Fluoroscopy-guided children's right subclavian vein puncture and catheterization

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Abstract: Objective To discuss on the X-ray-guided children's right subclavian vein (RSV) puncture and catheterization, and evaluate its feasibility and safety by retrospectively analyzing the anatomical features of children's RSV. **Methods** Fifty children patients underwent catheterization through the right hand and RSV X-ray contrast to observe the RSV X-ray anatomical position, course and the relationship with RS head. The observations showed 166 cases were clinically fluoroscopy-guided RSV puncture following the bone marks. The puncture success rate, puncture frequency, puncture time, X-ray measurement, catheter tip position and puncture complications were statistically analyzed. **Results** RSV were basically around the midpoint of connection of sternoclavicular joint surface. The success rate of X-ray-guided RSV puncture was 100%, and puncture frequency was 1.0±0.4. Among them, 160 first punctures were successful, with success rate of 96%. The puncture time was (0.8±0.9) min. And complications were appeared in 5 cases, with 2 cases of internal jugular vein strayed and 3 cases of hematoma. X-ray measurement was (1.5±2.4) mGy. **Conclusion** X-ray-guided children's RSV puncture and catheterization following bone marks is a safe method with a high success rate of first puncture.

Key words: children; X-ray contrast; right subclavian vein; vessel puncture

锁骨下静脉穿刺置管作为一种中心静脉通路,可用于急救、静脉营养、交换输血、长期输注药物及监测中心静脉压等途径,已在临床上得到广泛应用,特别对危重病人^[1-3]。由于小儿解剖和生理学的特殊性^[4-5],尤其婴幼儿经皮锁骨下静脉穿刺置管难度较大,一旦出现并发症,其危险性更大。本研究探索X

线引导儿童右锁骨下静脉(RSV)穿刺置管方法,以提高穿刺成功率,减少穿刺并发症。

1 材料与方法

1.1 研究对象

1.1.1 第一部分 选择2012-02-01至2013-12-31期间南方医科大学南方医院住院并于介入诊疗科行透视下RSV穿刺置管术的患儿50例,男33例,女17例;年龄1.9岁~13.4岁,平均年龄5.7岁。经右手留置静脉留置针,并在留置针内行RSV造影,观察RSV X线的

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解剖位置。

1.1.2 第二部分 选择2012-02-01至2013-12-31期间南方医科大学南方医院住院并于介入诊疗科行透视下RSV穿刺置管术的患儿166例,其中男99例,女67例,年龄1.8岁~13.5岁,平均年龄(6.2±2.9)岁。

1.2 方法

1.2.1 数据测量方法 入选患儿穿刺肘正中静脉并行置入留置针,于留置针内用20 mL注射器手推碘海醇行RSV造影,术中观察RSV至上腔静脉的血管走行及其与锁骨的解剖关系。以患儿右侧锁骨头胸骨关节面上端为A点,下端为B点,锁骨下静脉的中点与锁骨头AB点连线的交点为C点(图1),应用MED Explorer DICOM测量AB、AC及BC数值,计算AC/AB比值及C点的频数图,推断C点位置,计算AC-BC差值,统计差值分布规律。测量RSV在C点内径。测量RSV于C点远心端,即RSV内1/3段与水平线夹角,测量右锁骨内1/3段与水平线的夹角,同时测量右锁骨中点下方和C点的连线与水平线的夹角,

见图2,并对上述3个角度进行两两配对 t 检验。

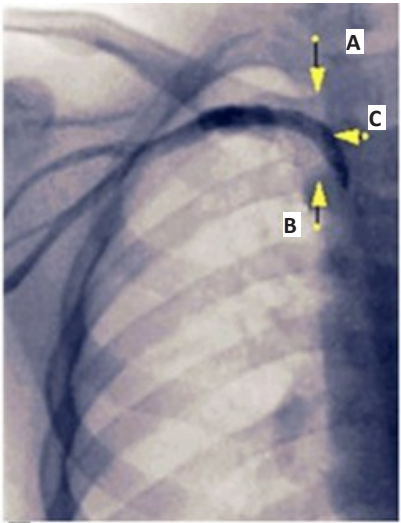


图1 点A、B、C的位置示意图

Fig.1 Positions of point A, B and C

Note: The upper end of sternal articular facet of children's right clavicle was taken as point A, the lower end as point B, and the connection of midpoint of subclavian vein with line AB was set as point C

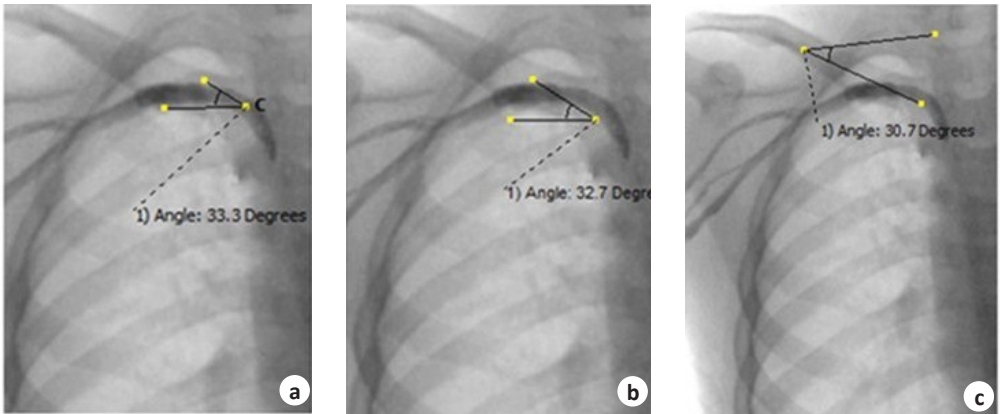


图2 3个角度的测量方法

Fig.2 Measurements for three angles

Note: a: Angle between right subclavian vein and horizontal line at point C; b: Angle between 1/3 segment of subclavian vein and the horizontal line; c: Angle between right clavicle midpoint and horizontal line

1.2.2 插管技术临床验证 根据上述X线解剖研究结果,对166例患儿在DSA机透视引导下行RSV穿刺插管。取右侧锁骨中点下方外<1 cm为穿刺点,穿刺针对准C点方向,紧贴锁骨后缘穿刺,负压进针,边抽吸边进针,回抽到暗红色血液,提示进入RSV。如不成功,可于C点上下约2 mm(<锁骨下静脉内径的1/2)范围内调整。穿刺RSV成功后,透视下引入导丝,顺利进入右上腔静脉,再引入Arrow导管头置于上腔静脉右心房的上方。如导丝进入右颈内静脉且难以

调整到右上腔静脉,则更换“J”形导丝,调整到上腔静脉右心房上方。置管成功后,经导管行造影,进一步明确导管头端位置。如不理想,则再调整导管头端位置。然后缝扎以及用3M敷料固定导管于皮肤(图3)。

1.3 统计学方法

应用SPSS19.0软件包建立数据库,进行统计学分析。计量资料采用均数±标准差表示,计数资料用百分比表示。求得RSV内1/3段与水平线夹角、右



图3 导管尖端位置

Fig.3 The position of catheter tip

锁骨内1/3段与水平线的夹角、右锁骨中点下方和C点的连线与水平线的夹角,并对上述3个角度度数分别两两配对行两样本配对 t 检验。 $P<0.05$ 为差异有统计学意义。

2 结果

2.1 第一部分

行RSV造影的50例患儿,测量AB距离为 (7.1 ± 0.8) mm,AC距离为 (3.6 ± 0.8) mm,BC距离为 (3.4 ± 0.9) mm,AC-BC差值距离为 (1.5 ± 0.1) mm,AC/AB值为 0.5 ± 0.1 ,RSV在C点内径为 (5.6 ± 0.8) mm。RSV经过C点时与水平线夹角为 $32.1^\circ\pm 1.9^\circ$,RSV内1/3段与水平线夹角为 $32.1^\circ\pm 1.8^\circ$,右锁骨中点下方与C点的连线平线的夹角为 $32.3^\circ\pm 1.7^\circ$ 。分别以两组夹角度数行两两配对 t 检验, $P>0.05$,无统计学差异。

2.2 第二部分

166例患儿在DSA机透视引导下行RSV穿刺插管,技术成功率100%。穿刺次数为 1.0 ± 0.4 ,其中一次性穿刺成功160例次,一次成功率96%。穿刺时间 (0.8 ± 0.9) min。完成穿刺插管过程中,X线爆射量为 (1.5 ± 2.4) mGy。并发症5例,其中误入颈内静脉2例,局部血肿3例。

3 讨论

锁骨下静脉穿刺插管通常以体表的骨性标志为参考进行“盲穿”。一次穿刺成功率较低,多需反复穿刺,可以造成误穿动脉、气胸、纵隔血肿、损伤周围神经和继发感染等^[7-10]并发症。插管时可造成导管头端位置不满意,误插管入动脉或者其它非靶部位等并发症。超声引导下穿刺插管往往应用于经锁骨上

入路穿刺,容易造成气胸等并发症,并不是目前临床上常用的路径,且不能引导插管到右上腔静脉。本组资料研究在透视引导下行RSV穿刺和插管,以期提高一次穿刺成功率和插管到满意的靶部位,对儿童患者尤为重要。

本组资料通过50例患儿的RSV造影的影像分析显示:RSV较恒定的位于C点并汇入右头臂静脉,其内1/3段与右锁骨内1/3的走行方向,并与锁骨中点下方与C点的连线方向相近似。因此,本研究的皮肤进针点选择在右锁骨中点的下方,为顺利进入锁骨的后方,可偏外小于1 cm。此处锁骨和第一肋骨的间隙较大,有利于穿刺后沿锁骨的后方进针。沿锁骨内1/3的走行方向进针,血管穿刺的靶点为C点。解剖上锁骨下静脉属腋静脉的延续,在此处亦是前面紧贴锁骨走行,向内侧行至胸锁关节后方与颈内静脉汇合成头臂静脉。本研究显示锁骨下静脉在锁骨内1/3的走行方向较为固定,变异小。与王炎之等^[5]尸体解剖测量结果一致,故穿刺时进入锁骨下后于锁骨内1/3段走行方向平行穿刺,成功率更高。成功后,透视下引入导丝,调整并引导留置导管进入上腔静脉右心房的上方。如不成功,可于C点上下约2 mm(小于RSV血管半径,取整数),呈扇形调整。本组患儿166例,均成功。

本技术在透视监控下完成RSV穿刺插管,其优点有:(1)首次穿刺成功率高。本研究显示在透视下骨性标志C点位置较为恒定,锁骨下静脉内1/3的走行方向亦较为恒定,为首次成功穿刺提供了基础。透视引导下进针,可及时准确调整进针方向。本组完成166例患儿RSV穿刺,首次穿刺成功率达96%,穿刺时间仅为 (0.8 ± 0.9) min。超声也可实时引导锁骨下静脉穿刺^[11-12],但经锁骨下入路可受到肺尖气体的干扰,多不采用;(2)置管位置满意。术中X线实时监视下可确定导管尖端位置,必要时可造影进一步明确,避免误入其他血管分支或颈静脉,同时亦可避免导管尖端过浅容易滑脱或者过深进入右心房,损伤心内膜、导致心律失常发生;(3)并发症发生率低。本技术进针时,紧贴锁骨的后缘,不超出锁骨头上下端,以免误穿入锁骨下动脉或穿破胸膜引起气胸。本组仅发生5例并发症,且为穿刺到右颈内静脉2例和局部血肿3例,未对患儿造成不良影响。曾有学者行X线引导下以第一肋骨为骨性标志行锁骨下静脉穿刺置管术研究^[13],但此处的RSV位于锁骨、第一肋骨及前斜角肌之间,并由前斜角肌与锁骨下动

脉分开,因小儿的胸壁较薄,前斜角肌纤薄,易误穿锁骨下动脉,故未能得到推广应用。本技术的缺点为需要实时X线透视引导,增加了术者和患儿的X线曝射量,本组资料显示手术过程X线曝射量为 (1.5 ± 2.4) mGy,尽管很少,但手术野靠近甲状腺,故术中应尽量减少曝光时间,加强对甲状腺区域的防护^[14-16]。

总之,透视引导下儿童RSV穿刺置管术安全、成功率高,置管位置满意,为临床上提供了又一可供选择的方法。

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