



二维计算机辅助手术导航对双侧腰椎椎弓根螺钉置入一致性的影响

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Influence of the two-dimension computer-aided navigation system to the concordance of lumbar spine pedicle screw fixation on both sides

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摘要 目的 探讨二维计算机辅助手术导航对双侧腰椎椎弓根螺钉置入一致性的影响。方法 2004年1月至2009年12月,接受腰椎后路椎弓根螺钉内固定术患者1355例,男696例,女659例。应用二维计算机辅助手术导航辅助置钉(导航组)743例,X线透视辅助置钉(透视辅助组)612例。应用Image-pro plus 5.0软件对术后第7天内的标准腰椎正侧位X线片进行图像测量分析,比较两组L₁~S₁双侧椎弓根螺钉置入的一致性。在腰椎侧位X线片上测量双侧椎弓根螺钉轴线与所在椎体上终板的夹角(α 角),双侧椎弓根螺钉轴线的夹角(γ 角);在腰椎正位X线片上判定椎弓根螺钉是否在椎弓根内,计算椎弓根螺钉全在椎弓根内的准确率。结果 导航组左侧 α 角平均 $3.89^{\circ} \pm 0.47^{\circ}$ 、右侧 α 角平均 $3.94^{\circ} \pm 0.37^{\circ}$, L₁~S₁各节段双侧 α 角的差异均无统计学意义;透视辅助组左侧 α 角平均 $4.32^{\circ} \pm 1.47^{\circ}$ 、右侧 α 角平均 $4.37^{\circ} \pm 1.59^{\circ}$,其中L₂(左侧 $4.55^{\circ} \pm 1.27^{\circ}$,右侧 $5.12^{\circ} \pm 1.87^{\circ}$)和L₄(左侧 $4.22^{\circ} \pm 1.89^{\circ}$,右侧 $6.62^{\circ} \pm 1.97^{\circ}$)节段双侧 α 角的差异有统计学意义,其他节段双侧 α 角的差异均无统计学意义。导航组 γ 角($2.32^{\circ} \pm 0.27^{\circ}$)小于透视辅助组($3.32^{\circ} \pm 1.51^{\circ}$),差异有统计学意义。导航组置钉准确率91.5%(3604/3938),透视辅助组87.6%(2426/2768),差异有统计学意义。结论 二维计算机辅助手术导航椎弓根螺钉置钉的准确性高于X线透视辅助置钉,能提高双侧腰椎椎弓根螺钉置入的一致性。

关键词: 腰椎 外科手术 计算机辅助 内固定器

Abstract: Objective To investigate the influence of the two-dimension computer-aided surgery navigation system to the concordance of lumbar spine pedicle screw fixation on both sides. Methods 1355 patients were undergone lumbar spinal pedicle screw fixation during January 2004 to December 2009. All patients were divided into tow groups: the navigation group (743 cases) and the fluoroscopy assistant group (612 cases). All patients got standard A-P and lateral X-ray plate of lumbar spine within seven days after surgery. The X-ray images were analyzed by the software of Image-pro plus 5.0 to evaluate the concordance of lumbar spine pedicle screw fixation on both sides. The angle between axial line of pedicle screw and superior lamina terminals (α angle) and the angle between axial lines of pedicle screw on both sides (γ angle) were measured. The position of the pedicle screw was checked weather it was in the lumbar pedicle partially. Results There were no significant differences ($P>0.05$) between the α angle on both sides of L₁-S₅ vertebral body in navigation assistant group (L: $3.89^{\circ} \pm 0.47^{\circ}$, R: $3.94^{\circ} \pm 0.37^{\circ}$). The differences of the α angle on both sides of L₂ (L: $4.55^{\circ} \pm 1.27^{\circ}$, R: $5.12^{\circ} \pm 1.87^{\circ}$) and L₄ (L: $4.22^{\circ} \pm 1.89^{\circ}$, R: $6.62^{\circ} \pm 1.97^{\circ}$) vertebral body in the fluoroscopy assistant group had statistical significance ($P<0.05$). The γ angle in navigation assistant group ($2.32^{\circ} \pm 0.27^{\circ}$) was obviously smaller than fluoroscopy assistant group ($3.32^{\circ} \pm 1.51^{\circ}$), the differences had statistical significance ($P<0.05$). Accuracy of pedicle screw in navigation assistant group was 91.5% (3604/3938). Accuracy of pedicle screw in fluoroscopy assistant group was 87.6% (2426/2768). The difference in accuracy of pedicle screw in both groups had statistical significance ($\chi^2=26.913$, $P<0.0001$). Conclusion The accuracy of pedicle screw and the concordance of pedicle screw on both sides can be significantly improved using the two-dimension perspective computer-aided surgery navigation system.

Key words: Lumbar vertebrae Surgery, computer-assisted Internal fixators

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ZHANG Liang, XU Hong-bing, WANG Ying-min et al. Influence of the two-dimension computer-aided navigation system to the concordance of lumbar spine pedicle screw fixation on both sides[J]. Chin J Orthop, 2013, 33(12): 1190-1195.

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