

论著

左侧乳腺癌两种调强放射治疗计划剂量学比较

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摘要:

目的: 比较左侧乳腺癌保乳术后两种调强放疗计划的剂量学差异, 评价两种计划的剂量学特点, 为临床治疗方法的优选提供依据。方法: 选择8例左侧乳腺癌保乳术后患者, 利用三维治疗计划系统为每例患者分别设计调强放射治疗计划(IMRT)和混合调强放射治疗计划(Hybrid IMRT)。在剂量体积直方图(DVH)上比较靶区和正常组织器官照射剂量、不均匀指数和适形指数。结果: 在具有相同覆盖率($V_{95\%}$)的情况下, Hybrid IMRT的靶区剂量均匀度优于IMRT。两种计划的适形指数, $V_{105\%}$, $V_{110\%}$, 最大剂量(D_{max}), 最小剂量(D_{min}), 平均剂量(D_{mean})均无显著差异。Hybrid IMRT和IMRT相比, 同侧肺接受13 Gy的体积(V_{13})由27.66%降至20.7%, 对侧肺 V_5 由8.01%降至2.25%; 心脏 V_{10} , V_{20} 分别由35.23%, 16.77%降至19.22%, 10.6%; 对侧乳腺 V_5 , V_{10} 分别由35%, 10.39%降至20.38%, 5.7%, 差异均具有统计学意义($P < 0.05$); 而对于同侧肺 V_{30} , V_{40} 及心脏 V_{40} , 分别升高了1.28%, 1.48%, 2.48%, 差异有统计学意义($P < 0.05$)。结论: 在乳腺癌患者放疗体位重复性不太好和(或)摆位精确性不能保证的情况下, 混合调强放疗技术是更好的选择。

关键词: 乳腺肿瘤 调强放射治疗 混合调强放射治疗 剂量分布

Dosimetric comparison of left-side whole breast irradiation with IMRT and hybrid IMRT

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Abstract:

Objective: To evaluate the potential dosimetric benefits and optimal indications of intensity modulated radiation therapy (IMRT) and hybrid intensity modulated radiation therapy (Hybrid IMRT) for the left side breast cancer patients after breast-conservation therapy.

Methods: Eight patients with left breast carcinoma who received breast-conservation surgery were selected for this study. Two plans were designed in 3-dimensional treatment planning system. The dose distributions of target volume and normal tissues, conformal index (CI) and heterogeneous index (HI) were analyzed by dose-volume histogram (DVH).

Results: The PTV coverage was the same in the two radiotherapy plans. A better dose uniformity throughout the whole breast in Hybrid IMRT plan was achieved. The CI, the percentage of PTV receiving more than 105% prescribed dose ($V_{105\%}$), the percentage of PTV receiving more than 110% prescribed dose ($V_{110\%}$), and the D_{max} , D_{min} and D_{mean} of PTV were similar in the two plans. We compared the Hybrid IMRT with IMRT: V_{13} of the ipsilateral lung decreased from 27.66% to 20.7%, V_5 of the contralateral lung decreased from 8.01% to 2.25%, V_{10} and V_{20} of the heart decreased from 35.23% and 16.77% to 19.22% and 10.6% respectively, V_5 and V_{10} of the contralateral breast decreased from 35% and 10.39% to 20.38% and 5.7% respectively, all with significant difference. V_{30} and V_{40} of the ipsilateral lung and V_{40} of the heart increased by 1.28%, 1.48%, and 2.48%, with significant difference.

Conclusion: Hybrid IMRT is a better choice for patients whose treatment position is inaccurate or cannot be repeated well.

Keywords: breast neoplasm intensity modulated radiation therapy hybrid intensity modulated radiation therapy dose distribution

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