

乳腺癌改良根治术后调强放疗与常规放疗疗效及对心肺的影响

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【摘要】目的:探讨乳腺癌改良根治术后调强放疗与常规放疗的疗效及对心肺的影响。**方法:**选择乳腺癌改良根治术患者60例,按照不同放疗方法分为观察组30例与对照组30例。观察组患者行调强放疗,对照组患者行常规放疗。比较两组近期,放疗前后心肌肌钙蛋白和肺功能变化,以及患侧肺和心脏受照剂量变化。**结果:**两组近期总有效率比较无显著差异($P>0.05$)。两组放疗后肌钙蛋白水平较放疗前升高($P<0.05$);观察组放疗后肌钙蛋白水平低于对照组($P<0.05$)。两组放疗后射血分数较放疗前降低,而LADs和LVDd较治疗前升高($P<0.05$);观察组放疗后射血分数高于对照组,而LADs和LVDd低于对照组($P<0.05$)。两组患侧肺脏指数 V_{95} 比较无显著差异($P>0.05$);观察组患侧肺脏指数 V_{105} 和 V_{110} 低于对照组($P<0.05$)。观察组心脏指数 V_{30} 、 V_{40} 和 V_{50} 低于对照组($P<0.05$)。**结论:**乳腺癌改良根治术后调强放疗与常规放疗疗效相当,而调强放疗对心脏和肺脏影响小,可减轻心脏和肺脏的放射性损伤。

【关键词】乳腺癌;改良根治术;调强放疗;常规放疗;心脏;肺脏

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Therapeutic effects of intensity-modulated radiotherapy and conventional radiotherapy on breast cancer after modified radical mastectomy and their effects on the heart and lungs

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Abstract: Objective To investigate the therapeutic effects of intensity-modulated radiotherapy (IMRT) and conventional radiotherapy (CRT) after modified radical mastectomy for breast cancer, and to study the effects of different radiotherapy modalities on the heart and lungs. **Methods** Sixty patients undergoing modified radical mastectomy for breast cancer were enrolled and divided into observation group (30 cases) and control group (30 cases) according to different radiotherapy modalities. The patients in observation group were treated with IMRT, while those in control group were treated with CRT. The short-term therapeutic effect, cardiac troponin and pulmonary function before and after radiotherapy, and the dosimetric indexes of the affected lung and the heart were compared between two groups. **Results** There was no significant difference in short-term therapeutic effect between two groups ($P>0.05$). The level of troponin in both two groups after radiotherapy was higher than that before radiotherapy ($P<0.05$), but the level of troponin in observation group after radiotherapy was lower than that in control group ($P<0.05$). After radiotherapy, the ejection fraction in both two groups was decreased, while LADs and LVDd were increased ($P<0.05$). Compared with those in control group, the ejection fraction in observation group after radiotherapy was higher, but LADs and LVDd were much lower ($P<0.05$). The difference between two groups in the V_{95} of the affected lung was insignificant ($P>0.05$), while the V_{105} and V_{110} of the affected lung in observation group were lower than those in control group ($P<0.05$). Moreover, the heart index V_{30} , V_{40} and V_{50} in observation group were lower than those in control group ($P<0.05$). **Conclusion** The therapeutic effects of IMRT and CRT for breast cancer after modified radical mastectomy are similar, and moreover, IMRT has trivial effects on the heart and lungs, thereby reducing radiation-induced damages to the heart and lungs.

Keywords: breast cancer; modified radical mastectomy; intensity-modulated radiotherapy; conventional radiotherapy; heart; lung

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前言

乳腺癌是女性常见的一种恶性肿瘤,且发病率呈不断上升及年轻化趋势,严重影响女性身心健康和生存质量^[1-2]。目前,针对乳腺癌仍以手术治疗为主,随着手术的不断改善,乳腺癌改良根治术成为乳

腺癌患者主要治疗手段^[3]。乳腺癌改良根治术后放射治疗是主要辅助方案,不同放疗方式在靶区剂量分布、治疗效果及心肺受量等均有不同^[4]。随着近年来放疗技术的不断改善,调强放疗不仅可改善剂量分布不均匀缺点,同时还可相对减少对临近脏器的损伤^[5-6]。本研究旨在探讨乳腺癌改良根治术后调强放疗与常规放疗的疗效及对心肺的影响。

1 资料与方法

1.1 病例资料

选择泰康仙林鼓楼医院 2014 年 1 月至 2020 年 1 月间行乳腺癌改良根治术的乳腺癌患者 60 例,按照不同放疗方法分为观察组 30 例与对照组 30 例。观察组患者年龄 27~73 岁,平均(52.13±6.57)岁;TNM 分期:I 期 3 例、II 期 15 例、III 期 12 例;病灶位置:左侧 17 例、右侧 13 例。对照组患者年龄 25~72 岁,平均(51.82±7.86)岁;TNM 分期:I 期 4 例、II 期 16 例、III 期 10 例;病灶位置:左侧 18 例、右侧 12 例。两组病例资料比较无显著差异($P>0.05$),具有可比性。

1.2 纳入和排除标准

纳入标准:①术后病理学证实为乳腺癌,均为单侧,且均行乳腺癌改良根治术;②TNM 分期 I~III 期;③既往无放化疗治疗史;④签订知情同意书。排除标准:①合并其他类型恶性肿瘤者;②合并纵膈淋巴结转移、肺转移、内乳淋巴结转移及其他远处转移者;③合并心肺、肝肾严重异常者;④精神疾病者;⑤手术或放疗禁忌者。

1.3 方法

两组患者均行仰卧位,抬举上肢固定体位,真空垫固定,螺旋 CT 定位扫描起自环状软骨终于肝脏下界面,利用三维治疗计划系统处理模拟 CT 图像,勾画临床靶区(CTV)和计划靶区(PTV)。其中 CTV 包括患侧胸壁及患侧锁骨上下淋巴结引流区,胸壁前界皮下 5 mm,后界为胸壁,内界为体中线,外界为腋中线。PTV 在 CTV 基础上头脚外放 1 cm,前界不变,其他各界延长 5 mm。4~6 野照射计划,6 MV-X 线 Synergy 加速器。观察组患者行调强放疗计划,对照组患者行常规放疗计划。PTV 最大剂量<处方剂量 105% 且肺部<处方剂量,心脏<30 Gy,常规单次剂量 2.0 Gy,靶区处方剂量 50 Gy。两组照射疗程均为 5 周。

1.4 疗效标准

依据世界卫生组织(WHO)实体瘤疗效评价标准:包括进展、稳定、部分缓解和完全缓解,其中总有效率=部分缓解率+完全缓解率。

1.5 观察指标

(1)观察两组放疗前后心肌酶肌钙蛋白水平变化,抽取患者 5 mL 外周静脉血,3 000 r/min 离心 10 min,取上清液血清标本,采用酶联免疫吸附法测定肌钙蛋白水平;(2)观察两组放疗前后心功能变化,采用超声心动图测定射血分数(EF)、左心室收缩末期内径(LADs)和左心室舒张末期内径(LVDd);(3)观察两组患侧肺脏指数 V_{95} 、 V_{105} 和 V_{110} 剂量学变化;(4)观察两组心脏受照剂量变化,包括心脏 V_{30} 、 V_{40} 和 V_{50} 。

1.6 统计学处理

采用 SPSS21.0 软件处理数据,计数资料采用 χ^2 检验,以%表示,计量资料采用 t 检验,以均数±标准差表示,检验水准设定为 $\alpha=0.05$,当 $P<0.05$ 时,差异具有统计学意义。

2 结果

2.1 两组近期疗效比较

所有患者均完成放疗。观察组完全缓解、部分缓解、稳定、进展分别为 9、17、3、1 例;对照组完全缓解、部分缓解、稳定、进展分别为 6、16、6、2 例。两组近期总有效率比较无显著差异(86.67% vs 73.33%, $\chi^2=1.667$, $P=0.224$)。

2.2 两组放疗前后肌钙蛋白变化比较

两组放疗前肌钙蛋白水平比较无显著差异($P>0.05$),两组放疗后肌钙蛋白水平较放疗前升高($P<0.05$),观察组放疗后肌钙蛋白水平低于对照组($P<0.05$)。见表 1。

表 1 两组放疗前后肌钙蛋白变化比较($\mu\text{g/L}$, $\bar{x} \pm s$)
Tab.1 Comparison of cardiac troponin before and after radiotherapy in two groups ($\mu\text{g/L}$, $\text{Mean} \pm \text{SD}$)

组别	<i>n</i>	放疗前	放疗后	<i>t</i> 值	<i>P</i> 值
观察组	30	54.24±16.52	97.42±25.27	7.834	<0.05
对照组	30	56.19±15.87	219.20±35.64	22.885	<0.05
<i>t</i> 值	-	0.466	15.267	-	-
<i>P</i> 值	-	0.643	<0.05	-	-

2.3 两组放疗前后心功能变化比较

两组放疗前 EF、LADs 和 LVDd 比较无显著差异($P>0.05$);两组放疗后 EF 较放疗前降低,而 LADs 和 LVDd 较放疗前升高($P<0.05$);观察组放疗后 EF 高于对照组,而 LADs 和 LVDd 低于对照组($P<0.05$)。见表 2。

表2 两组放疗前后心功能变化比较($\bar{x} \pm s$)

Tab.2 Comparison of heart function before and after radiotherapy in two groups (Mean±SD)

组别	n	EF/%		LADs/mm		LVDd/mm	
		放疗前	放疗后	放疗前	放疗后	放疗前	放疗后
观察组	30	65.37±1.83	63.02±1.54*	31.23±2.18	33.48±1.97*	46.89±1.65	51.39±2.43*
对照组	30	65.83±1.45	59.83±1.29*	31.75±2.45	37.86±1.83*	47.32±1.78	54.78±2.01*
t值	-	1.079	8.697	0.869	8.922	0.970	5.888
P值	-	0.285	<0.05	0.389	<0.05	0.336	<0.05

*表示与放疗前比较,P<0.05

2.4 两组患侧肺脏受照剂量比较

两组患侧肺脏指数V₉₅比较无显著差异(P>0.05),观察组患侧肺脏指数V₁₀₅和V₁₁₀低于对照组(P<0.05)。见表3。

表3 两组患侧肺脏受照剂量比较(%, $\bar{x} \pm s$)

Tab.3 Comparison of the dosimetric indexes of the affected lung between two groups (%, Mean±SD)

组别	n	V ₉₅	V ₁₀₅	V ₁₁₀
观察组	30	98.96±1.03	4.35±1.09	1.10±0.23
对照组	30	99.02±0.84	9.85±2.65	2.34±0.56
t值	-	0.247	10.513	11.219
P值	-	0.806	<0.05	<0.05

2.5 两组心脏受照剂量比较

观察组心脏指数V₃₀、V₄₀和V₅₀低于对照组(P<0.05)。见表4。

表4 两组心脏受照剂量比较(%, $\bar{x} \pm s$)

Tab.4 Comparison of the dosimetric indexes of the heart between two groups (%, Mean±SD)

组别	n	V ₃₀	V ₄₀	V ₅₀
观察组	30	9.23±1.28	1.43±0.46	0.39±0.07
对照组	30	10.45±1.51	2.85±0.72	0.95±0.18
t值	-	4.012	9.103	15.882
P值	-	<0.05	<0.05	<0.05

3 讨论

目前,我国对乳腺癌的首选治疗为乳腺癌改良根治术,术后配合放疗可以有效降低局部复发率,且能够提高患者总生存率^[7-9]。由于乳房结构特殊,不同部位照射源皮距存在差异,因此常规放疗难以确

保靶区内剂量的均匀性,并且以标准的切线野放疗会在一定程度上增大重要器官的照射剂量与靶区周围正常组织,尤其在使用含心脏毒性的放化疗药物时,会诱发心肌损害的风险^[10-14]。

调强放疗的特点主要在于可将辐射野划分为线束,并且对野内每一线束可优化布置配备,治疗计划更精准,剂量分布更精确^[15-17]。调强放疗可达到生物学和物理学对靶区边缘和靶区内对剂量强度的要求,可将瘤旁器官接受的照射剂量体积调在限定范围,同时还能够使对肿瘤的照射剂量达至最大,且可将射野内正常组织接受的辐射剂量调至更低,治疗合理,精度提高,降低放射性损伤,从而有助于正常组织器官的保护^[18-19]。乳腺癌放疗造成的心肺受损使患者生存质量受到严重影响。心肌钙蛋白属一种心脏特异性抗原,在放射性心肌损伤的诊断中具有较高灵敏度和特异度。本文研究表明,观察组放疗后肌钙蛋白水平低于对照组,提示调强放疗相比于常规放疗对心肌酶影响小,其原因可能是由于调强放疗在限制心肺照射剂量与体积的同时,还能够有利于抑制肌钙蛋白含量升高,从而保护心脏功能。本文研究表明,观察组放疗后EF高于对照组而LADs和LVDd低于对照组,提示调强放疗相比于常规放疗对心功能影响小;观察组患侧肺脏指数V₁₀₅和V₁₁₀低于对照组,提示调强放疗相比于常规放疗可减轻肺脏的放射性损伤;观察组心脏指数V₃₀、V₄₀和V₅₀低于对照组,提示调强放疗相比于常规放疗可减轻心脏放射性损伤。

综上所述,乳腺癌改良根治术后调强放疗与常规放疗疗效相当,而调强放疗对心脏和肺脏影响小,可减轻心脏和肺脏的放射性损伤。

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