

عنوان مقاله:

Impact of the Delineation Accuracy of Lumpectomy Cavity on Planning Target Volume in Partial-Breast Irradiation Using Brachytherapy and External-Beam Radiotherapy

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خلاصه مقاله:

Background: In partial-breast irradiation (PBI), an accurate target volume delineation based on the lumpectomy cavity (LC) has been reported to remain difficult due to uncertain LC identification. However, the impact of accurate LC delineation on the planning target volume (PTV) has not been investigated. Material and methods: Between September ۲۰۱۸ and April ۲۰۲۰, ۱۵۹ patients receiving perioperative PBI with multicatheter-interstitial brachytherapy were evaluated. While LC delineation using implanted catheters as fiducial markers was used as a reference, conventional LC was virtually delineated on computed tomography with clips. PTV₁-cm margin and PTV₂-cm margin, which means ۱cm and ۲cm expansion from LC, were developed and assumed for brachytherapy and externalbeam PBI, respectively. The target accuracy and the impact of the delineation accuracy of LC on PTVs were evaluated. The geographic miss index (GMI) and normal tissue index (NTI) were used as accuracy indices and were defined as the percentage of under- and overestimating volume, respectively. Results: The PTV₁-cm margin and PTV₂-cm margin were significantly larger than the reference volume, ۵۷.۹cm^۳ vs. ۳۷.۹cm^۳ (P<۰.۰۰۱) and ۱۱۳.۲cm^۳ vs. ۹۳.۸cm^۳ (P<۰.۰۰۱), respectively. The GMI and NTI of LC were ۲۷.۳% and ۴۱.۲%, respectively. Although the GMI in the PTV₁-cm margin and PTV₂-cm margin was significantly reduced to ۹.۸% (P<۰.۰۰۰۱) and ۹.۹% (P<۰.۰۰۰۱), respectively, the NTI was not significantly improved in the PTV₁-cm margin, which was ۴۱.۸% (P=۰.۶۰) but was improved in PTV₂-cm margin, which was ۲۳.۱% (P<۰.۰۰۰۱). Conclusion: The GMI in PTV₁-cm margin was reduced to be as low as PTV₂-cm margin. Although PTV₂-cm margin was associated with lower NTI, the absolute volume was almost double with PTV₁-cm margin. Although further research is required, brachytherapy-based PBI may be a reasonable option to achieve tumor control and cosmesis .using the conventional delineation method

کلمات کلیدی:

breast cancer, lumpectomy, cavity, accuracy, radiotherapy, brachytherapy

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