

## AB018. LA03. Technical advances of radiotherapy for thymic epithelial tumors

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**Abstract:** While radiotherapy (RT) plays an important role in the treatment of thymic tumors, it has been associated with several toxicities such as radiation pneumonitis, pericardial effusion, and esophagitis. Following two-dimensional conventional radiation, 5–15% rates of grade 3–4 toxicities have been reported. Three-dimensional conformal RT (3D-CRT) improves conformality and reduces dose to the surrounding critical structures such as heart, lung, esophagus, and spinal cord. Intensity-modulated radiotherapy (IMRT) provides more conformal dose distribution and potential to spare heart, esophagus, spinal cord locating posterior to the primary tumor bed

and/or adjacent lymphatics. Proton beam therapy (PBT) has characteristic “Bragg Peak” and thus could minimize dose to the normal structures. Compared with IMRT, PBT has been shown to reduce dose to the lung, heart, and esophagus. Accordingly, toxicities following PBT for thymic tumors have been limited to grade 1 or 2. Recently, one prospective series of PBT including 27 patients showed no grade  $\geq 3$  toxicity and achieved 100% local control. Given the long term-survival of patients with thymic malignancies, risk of late toxicities such as cardiac complication and secondary malignancies are also important issues regarding RT for thymic tumors. While reducing low scattered dose to surrounding normal tissue, PBT is expected to reduce the risk of late cardiac toxicities and secondary malignancies. Compared with IMRT, increase in risk of major cardiac events was shown to be lower with PBT. And predicted secondary malignancies in the lung, breast, esophagus, skin, and stomach were reduced by PBT. To maximize the dosimetric advantage of PBT, intensity-modulated proton therapy with aperture could be a useful option.

**Keywords:** Thymic epithelial tumor; radiation therapy; intensity-modulated radiotherapy; proton therapy

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