Liquid fiducial marker performance during radiotherapy of locally advanced non small cell lung cancer - DTU Orbit (03/12/2018)

Liquid fiducial marker performance during radiotherapy of locally advanced non small cell lung cancer

We analysed the positional and structural stability of a long-term biodegradable liquid fiducial marker (BioXmark) for radiotherapy in patients with locally advanced lung cancer. Markers were injected via endoscopic- or endobronchial ultrasound in lymph nodes and reachable primary tumours. Marker volume and Hounsfield Units (HU) changing rates were estimated using breath-hold CBCT. Inter-fraction variation in marker position relative to gross tumour volume (GTV) position was established, as well as the inter-fraction variation in mediastinal marker registration relative to a carina registration through the treatment. Fifteen patients were included and 29 markers analysed. All markers that were in situ at planning were visible through the treatment. Mean HU was 902±165HU for lymph node and 991±219HU for tumour markers. Volume degradation rates were -5% in lymph nodes and -23% in primary tumours. Three-dimensional inter-fraction variation for marker position relative to the GTV position was -0.1±0.7mm in lymph nodes and -1.5±2.3mm in primary tumours. Inter-fraction variations in marker registration relative to carina registration were -0.4±1.2mm in left-right, 0.2±2.0mm in anterior-posterior and -0.5±2.0mm in cranio-caudal directions. The liquid fiducial markers were visible and stable in size and position throughout the treatment course.

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