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Transrectal Ultrasound Guided Prostate Fiducial Marker Placement for Image-guided Radiotherapy in Prostate Cancer: Safety and Efficacy from a Single Centre Experience

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Introduction

Use of fiducial markers to guide accurate prostate localization during image-guided radiotherapy (IGRT) is now standard practice. Transrectal ultrasound (TRUS) guided placement of prostate fiducial markers is performed by interventional radiologists at many centres.

Objectives

We aim to evaluate the technique, efficacy and safety of TRUS guided prostate fiducial marker placement at our institution.

Methodology

We retrieved the medical records of patients who underwent TRUS guided prostate fiducial marker placement in a tertiary hospital from 2009-2015. Three gold markers (IZI Medical Products, Baltimore, MD) were placed, two on the right side (apex and base) and one on the left (base). Post procedure US was used to document marker position in all patients and in 78 patients, post procedure CT or MRI was available to confirm the markers were in-situ. Complications of marker placement were recorded.

Result

133 men with mean age 70.5 years (range 55-79) underwent prostate fiducial marker placement and 131 men proceeded to external beam radiotherapy (RT). One patient did not undergo RT due to discovery of bony metastasis and another patient died of pneumonia before RT. Mean PSA was 10.8 (range 1.1-27.7), mean Gleason score 6.1 (range 5-7) and clinical stage ranged from T1b-T3b. History of prior TURP was present in 11 men (8%). Mean prostate volume was 44.8ml (range 10.6-144.0). 120 patients (92%) subsequently underwent intensity modulated radiotherapy using IGRT and 11 patients (8%) underwent stereotactic body radiotherapy. All patients received a sedative-analgesic premedication (pethidine 50mg IM) as protocol.

Procedure was well tolerated and all patients were successfully discharged on the same day. Malposition of 1 marker was suspected at US in 2 patients, leading to additional marker placement in 1 patient; but subsequent MRI confirmed that all markers were in-situ in both patients. All markers were confirmed to be in-situ in the remaining 131 patients either by US, CT or MRI. No patients required additional prostate localization at RT. Post procedure culture-positive urinary tract infection requiring oral antibiotics occurred in 1 (0.8%) and urosepsis requiring admission and IV antibiotics occurred in 6 (4.5%). Minor complications, i.e. mild hematuria/ per rectal bleeding and acute urinary retention occurred in 11 and 3 patients respectively. TRUS-guided prostate fiducial marker placement is a safe and effective procedure which can facilitate accurate prostate localization for IGRT in the treatment of prostate cancer.