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#### Purpose or Objective

After initial curative treatment of prostate cancer with radical prostatectomy (RP) and salvage radiotherapy (sRT), a substantial number of patients develop lymph node metastases. The standard of care for these patients is the initiation of androgen deprivation therapy (ADT). PSMA-ligand PET imaging allows for individualizing the treatment concept. Radiotherapy (RT) of lymph node metastases aims to delay the initiation of ADT by improving the PSA-progression free survival (PSA-PFS). This study assessed the impact of RT on the PSA-PFS for lymph node recurrences after RP and sRT.

#### Material and Methods

Based on a multi-institutional databank of 379 patients from six academic radiation oncology departments, we performed a subgroup analysis of 41 patients who developed an isolated lymph node relapse after RP and sRT. All patients had a PSMA-ligand PET imaging for staging purposes. Patients were treated between 04/2013 and 01/2018 in six academic centers with definitive radiotherapy of all PSMA-ligand positive lymph node metastases.

PSA-PFS was analyzed using Kaplan-Meier survival curves and factors influencing PSA-PFS with cox regression Analysis.

#### Results

Median age of patients was 70 (52-79) years, median PSA at PSMA-ligand PET was 2.12 (0.12-22.08) ng/ml and PSA-DT was 8.0 (0-27) months. A median of 1 (1-10) lymph node metastases per patient was irradiated. After a median follow-up of 12 (2-31) months, 21 (51.2%) patients had biochemically progressive disease and 19 (46.3%) patients had no PSA progression. One (2.4%) patient was lost to follow-up. The median PSA-PFS was 15.0 months (95% CI 11.8-18.2). The median PSA-level prior to RT decreased significantly from 2.12 ng/ml to a median PSA-Nadir of 0.45 (<0.00-12.25; p=0.02). In 11 of 40 patients (27.5%) the PSA level decreased to 0.07 ng/ml or less. In multivariate cox-regression analysis no predictive factors for PSA-PFS were found.

#### Conclusion

Radiotherapy as a metastasis-directed therapy for PSMA-ligand positive lymph node metastases after RP and sRT improved PSA-PFS and is a considerably option in well-selected patients. Prospective trials are warranted to investigate which patients will benefit the most from and which RT technique, dose and field size are needed.

#### EP-1564 Evaluation of Quality of Life in men with prostate cancer after radiation therapy

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#### Purpose or Objective

To evaluate health-related quality-of-life (QOL) outcomes in patients with prostate carcinoma after radiotherapy (RT) at a time-point during follow-up.

#### Material and Methods

QOL outcomes were assessed using the FACT-P QOL questionnaire administered during a whole month at a time-point during follow up. Mean scores of individual domains/scales were compared between different categories of patients (men in hormonal therapy or not, men who had undergone to radical prostatectomy and adjuvant RT or RT alone, men who had undergone to RT to pelvic nodes and men after RT to prostate or prostatic bed alone) using 't' test.

#### Results

60 patients (mean age 65.2 years) were included in the analysis. The median follow up was 46 months (range 3-134). 16 patients (25.8%) were taking hormonal therapy at the time of the examination, 26 patients (42.6%) underwent surgery before RT and 35 patients (57.4%) RT alone, and in 22 patients (36.1%) RT was delivered also to the pelvic lymph nodes. Several general (emotional functioning, role functioning, social contact) as well as prostate cancer-specific (sexuality, bowel and bladder function) QOL domains were analysed. Importantly, all the QOL domains were worse in patients in hormonal therapy, but only the functioning QOL domains in a significant way (p<0.05). Prostatectomy patients reported worse outcomes in bladder function and emotional well-being, but the difference wasn't statistically significant. There were no differences in the level of sexual activity between patients undergoing surgery and not, even if 16 patients (26.6%) didn't answer the question. Moreover, we didn't find QOL discrepancies between patients who had undergone to RT to pelvic nodes and men after RT to prostate or prostatic bed alone. There were no differences in all QOL domains in patients with > 75 years, even if emotional well being is worse in the younger group with a trend towards statistically significant. Patients with a follow up longer than 6 years didn't report worse QOL scores than those with a follow up of 6 years or less.

#### Conclusion

At a time point during follow up we didn't find significant discrepancies for all the QOL domains in the different categories of patients except for patients in hormonal therapy, who reported worse score in the functioning QOL domains. An analysis on a larger sample of patients is needed to confirm these preliminary data.

#### EP-1565 Quality of online information about radiotherapy for prostate cancer

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#### Purpose or Objective

Prostate cancer represents the most common cancer in men. Radiotherapy is a major treatment option. It can either be used curatively in localized disease, adjuvant after radical prostatectomy or as an effective option in palliative setting. As patients increasingly seek medical information on the Internet, our goal was to evaluate the quality of websites regarding radiotherapy for prostate cancer.

#### Material and Methods

A simulated patients' search for the terms "prostate cancer" and "radiotherapy" was carried out in a time-staggered manner using the three most popular search-engines Google, Bing and Yahoo. The first 20 search results of each were evaluated using the validated DISCERN Plus instrument, the HON code certification, the JAMA benchmark criteria and the ALEXA global traffic rank.

#### Results

The quality of information on websites about prostate cancer and radiotherapy was good, with a mean DISCERN Plus score of 55.1 ± 10.0, 51.8 ± 10.3 and 50.7 ± 10.1 for Google, Yahoo and Bing, respectively. The scores ranged from a minimum of 34 to a maximum of 74. 13% of all websites were rated as excellent, 31%, 48% and 8% as good, fair and poor, respectively. The overall quality of websites was neither dependent on the choice of search engines nor did we observe a significant temporal change in quality. The main categories of websites retrieved from

the first search were charity/NGO sites (46%), followed by sponsored medical news sites (28%), hospital/university sites (20%) and governmental sites (6%). Websites operated by charity organizations had significantly higher DISCERN Plus scores (mean score:  $55.5 \pm 9.3$ ) compared to hospital sites (mean score:  $47.3 \pm 9.6$ ,  $p < 0.042$ ) and medical news sites (mean score:  $46.1 \pm 6.1$ ,  $p < 0.009$ ), respectively. The JAMA benchmark criteria were fulfilled for all four sections in 13%, for three, two and one in 13%, 31% and 40%, respectively. Only 13% of all websites were HON code certified. All analyzed websites had a focus on curative teletherapy, 76%, 51% and 22% of all websites mentioned brachytherapy, active surveillance and palliative radiotherapy, respectively. In 57% the procedure of radiotherapy was described in detail. Special radiation techniques like “hypo-fractionation”, “Intensity modulated Radiotherapy (IMRT)”, “Image guided Radiotherapy (IGRT)” and “proton therapy” were mentioned in 37%, 72%, 27% and 31% of all analyzed websites, respectively.

#### Conclusion

The quality of websites on radiotherapy and prostate cancer directed at laypersons is promising. The fact that we were unable to find a simple strategy for the identification of high quality websites (i.e. HON code certification, JAMA benchmark criteria, ALEXA ranking or different search engines) emphasizes the responsibility of the treating physicians to interpret and rank the vast quantity of information and value of personal contact with the treating radio-oncologist in order to integrate and interpret the information found online.

#### EP-1566 MR-guided online adaptive radiotherapy: First experience in the UK

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#### Purpose or Objective

The Elekta Unity<sup>1</sup> (Elekta AB, Stockholm, Sweden) combines a linear accelerator and 1.5T magnetic resonance imaging (MRI) scanner, allowing daily and real-time imaging for online adaptive radiotherapy (RT)<sup>2</sup>. Here we describe the first experience of MR-guided RT in the United Kingdom (UK).

#### Material and Methods

A 65 year-old man with localised prostate cancer on androgen deprivation therapy was recruited to the PRISM trial (Prostate Radiotherapy Integrated with Simultaneous MRI) NCT03658525, a non-randomised R-IDEAL phase I/IIa study<sup>3</sup>, to receive radical RT to the prostate and seminal vesicles (SV).

A week prior to imaging for reference planning, three gold fiducial markers (FM) were implanted. Planning computed tomography (CT) and MRI (standard T2-weighted and T2\*-weighted for FM visualisation) were registered using FM. Rectal preparation with micro-enemas and bladder filling were used prior to simulation imaging and each treatment as per trial protocol.

RT was planned using Monaco 5.4 treatment planning system (Elekta) to a standard UK dose of 60 Gy in 20 fractions with 7-field intensity modulated RT. Clinical target volume 1 (CTV1) was defined as the prostate and proximal 1 cm SV, planning target volume 1 (PTV1) was created by addition of a 5 mm isotropic margin, except 3

mm posteriorly. CTV2 was defined as the prostate plus proximal 2 cm SV with a 5 mm isotropic margin for PTV2. PTV1 and PTV2 were covered by 95% and 77% of the prescription dose respectively. Organ at risk constraints were defined as per institutional guidelines.

For each fraction, a daily session T2W MRI was acquired. CTV1/2 were re-contoured by a clinician each day for the ‘adapt to shape’ (ATS) workflow, whereby a new daily online plan was created with reoptimisation based on the anatomy of the day. Following plan adaptation and checking, a verification MRI was acquired before treatment to assess whether any additional adaptation was required to adjust for patient movement.

#### Results

A clinically acceptable reference CT-based plan was generated that achieved all mandatory and optimal dose constraints. Patient-specific electron densities were extracted for the daily MR-based adapted plans. (Figure 1). The patient received his first treatment on 18<sup>th</sup> September 2018 and completed all 20 fractions on the MR-Linac using the ATS online workflow. Prostate motion was visually monitored during treatment delivery using cine-MR.

Time taken for each stage of the adaptive workflow is summarised in Table 1. Over the treatment course, toxicity was assessed using RTOG and CTCAE criteria. Highest genitourinary toxicity was Grade 2 urinary frequency and cystitis (CTCAE). Highest gastrointestinal toxicity was Grade 2 diarrhoea (RTOG). Treatment was tolerated without any unexpected toxicity compared to standard treatment delivery.

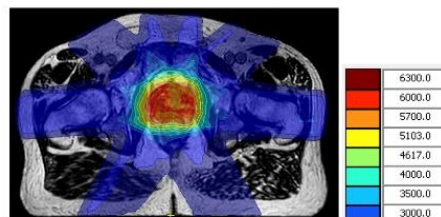


Figure 1: Example of a new daily online MR plan, 7-field IMRT prostate radiotherapy. This is created by adapting a CT-based reference plan, using the anatomy of the day. Red line- Prostate CTV.

Stage of online re-planning	Mean (standard deviation) time in minutes
Patient set-up time	4.9 (0.8)
Scan acquisition and image fusion	7.3 (1.4)
Clinician re-contouring	8.7 (0.8)
Plan adaptation	9.0 (1.2)
Physics checking	3.6 (0.9)
Verification imaging and review	7.3 (1.3)
Treatment delivery	5.1 (0.7)
<b>Total time from patient entering room to end of treatment delivery</b>	<b>45.9 (4.3)</b>

Table 1: Summary of the different stages of daily online adaptive radiotherapy for the prostate. Values reported here are for the first patient- mean (standard deviation) time in minutes over twenty fractions, reported to 1 decimal place.

#### Conclusion

Daily online adaptive RT for the prostate with MRI is feasible and well tolerated. The PRISM trial will recruit 30 patients, with a safety analysis after the first 10 patients.

#### EP-1567 Prospective longitudinal evaluation of quality of life after prostate cancer IMRT

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