Purpose or Objective: To assess and validate the incorporation of the multiparametric magnetic resonance imaging (mpMRI) tumor stage (mT-stage) to the conventional clinical tumor stage (cT-stage), in order to guide the radiotherapy (RT) treatment decisions in prostate cancer. In addition, to identify the clinical factors associated to the technique reliability.

Material and Methods: mpMRI was performed in 274 prostate cancer patients in order to refine the treatment decisions according to PSA, Gleason Score (GS) and cT-stage. Comparisons between the cT and mT-stage were performed, as well as the impact on the RT treatment prescription (target volume, doses and hormonal therapy [HT]) independently if it was finally performed. Changes in HT indication for intermediate risk with unfavourable factors were also analyzed. Until 2014, the unfavourable factors according to the initial criteria were a GS of 7 (4+3), or three unfavourable intermediate risk factors (T2b+PSA 10-20 ng/mL + GS 3-4), or T2c by digital rectal exam (DRE)/transrectal ultrasound (TRUS); more recently, unfavourable risk factors have been established according to Memorial Sloan Kettering Cancer Center (MSKCC) criteria: GS 4+3, or at least two intermediate-risk factors, or at least one intermediate-risk factor and a positive prostate biopsies (ppb) percentage greater than 50%; mpMRI validation was performed with pathological staging (n=90 patients finally decided to join surgery). To analyse the relationship between the reliability of mpMRI and the clinical variables, a univariate and multivariate logistic regression analysis was performed.

Results: The mpMRI upstaging range was 86-94% for any PSA value or GS. Following mpMRI, 32.8% of the patients (90/274) were assigned to a different risk group. Compared to cT-stage, mpMRI identified more intermediate-risk (46.4% vs. 59.5%) and high-risk (19.0% vs. 28.8%) prostate cancer patients. This resulted in a higher indication (p<0.05) of seminal vesicle irradiation (63.5% vs. 70.1%), inclusion of any extracapsular disease (T3-T4) within the target volume (1.8% vs. 18.2%), higher doses (65.3% vs. 88.3%) and more indication of HT associated to RT (45.6% vs. 62.4%), Table 1. Finally, decisions concerning RT were changed in 43.8% (initial criteria) or 52.5% (MSKCC criteria) of the patients, depending on the criteria applied to indicate HT in intermediate-risk patients. Global reliability of T-staging with mpMRI was 8.8% (8/90), while it was 71.1% (64/90) for mpMRI. cT-stage was associated to a greater occurrence (p<0.05) of indication of inadequate RT treatments. mpMRI reliability was independent of PSA or GS or ppb percentage.

Conclusion: mpMRI tumor staging significantly improved the RT treatment decisions in all prostate cancer risk groups. The magnitude of the impact on final RT treatment decisions will depend on the institution’s clinical protocol for prostate cancer management.