

## OCS6: FREE THEME

Moderator: Sandra Ventura (ESTSP.IPP)

### ***OC23: Apparent diffusion coefficient in the analysis of prostate cancer***

Nuno Adubeiro<sup>1</sup>, Luísa Nogueira<sup>1</sup>, Eduardo Ribeiro<sup>1</sup>, Sandra Alves<sup>1</sup>, Hugo Ferreira<sup>3</sup>, José La Fuente<sup>4</sup>

<sup>1</sup>Department of Radiology, School of Allied Health Technologies, Polytechnic Institute of Porto, Portugal

<sup>2</sup>Department of Biomathematics and biostatistics, School of Allied Health Technologies, Polytechnic Institute of Porto, Portugal

<sup>3</sup>Biophysics and Biomedical Engineering Institute, Faculty of Sciences, University of Lisbon, Portugal

<sup>4</sup>Instituto de Ciências Biomédicas Abel Salazar / Centro Hospitalar do Porto - Serviço de Urologia, Porto

Presenting author: [nca@eu.ipp.pt](mailto:nca@eu.ipp.pt)

**Introduction:** The multiparametric magnetic resonance imaging (MPMRI) approach, has allowed the diagnostic performance in the detection and characterization of prostate cancer (PCa). Diffusion-weighted imaging (DWI), is an important technique in the MPMRI, that provides qualitative and quantitative biological information regarding water diffusivity in a non-invasive manner. The apparent diffusion coefficient (ADC) measures water mobility and can be quantified from the signal intensity loss between two or more b-values. Different studies reported that ADC values are directly associated with microvessel density and cellularity. One of the main aspects that is in discussion is the b-values that must be used in the DWI sequence in order to compute ADC.

**Objectives:** In this study we analyzed different b-values combinations, with the purpose of determining which combination enables an optimal differentiation between normal and malignant tissues via the apparent diffusion coefficient (ADC) parameter.

**Materials and Methods:** This prospective study analyzed 43 patients with clinical indication to perform pelvic MPMRI, with symptoms highly suggestive of PCa or PCa already diagnosed.

**Results and Discussion:** ADC values derived from b50, 2000 s/mm<sup>2</sup> were for PCa, healthy peripheral zone tissue and healthy central gland tissue  $0.694 \pm 0.13 \times 10^{-3}$  mm<sup>2</sup>/s,  $1.016 \pm 0.135 \times 10^{-3}$  mm<sup>2</sup>/s and  $0.971 \pm 0.118 \times 10^{-3}$  mm<sup>2</sup>/s, respectively. Using this b-value pair combination and an ADC cutoff of  $0.891 \times 10^{-3}$  mm<sup>2</sup>/s we achieved a sensitivity of 95.5%, specificity of 93.2% and an accuracy of 94.4%.

**Conclusion:** The best combination of b-value to study the prostate cancer was b50,2000 s/mm<sup>2</sup>. Other b-values instead of b0 s/mm<sup>2</sup> should preferentially be included in ADC estimation.

## References

1. Bae H, Yoshida S, Matsuoka Y, et al. Apparent diffusion coefficient value as a biomarker reflecting morphological and biological features of prostate cancer. *Int Urol Nephrol* 2014;46:555.
2. Jagannathan, N. R. (2014). Prostate MR: current status, challenges and future directions. *NMR in Biomedicine*, 27(1), 1–2.