Introduction

Image quantitation facilitates its integration with other data. However, apparent diffusion coefficient value (ADCV) of prostate cancer (PC) is of limited usefulness because of the susceptibility to background signal, particularly in the transition zone (T2).

We reported that ADC ratio (ADCR) between tumor and nontumor has higher correlation with grade groups (GG) than ADCV and can be handled similarly in the TZ and the peripheral zone (AUA2019).

Prior to radical prostatectomy (RP), it is important to forecast postoperative biochemical recurrence (BCR), which is associated with adverse pathology and margin status. We examined roles of ADCR and developed a novel tool for predicting BCR after RP.

Materials and Methods

A total of 284 men with PC in cT≤2 on digital rectal examination who had undergone multiparametric MRI and had undergone radical prostatectomy were enrolled.

A region of interest (ROI) was drawn that outlined the index tumor on ADC map. Another sized ROI was drawn symmetrically in the contralateral lobe and adjusted to include equal area if necessary. ADCR was calculated by dividing the tumor ADCV by the contralateral ADCV.

BCR was defined as PSA >0.2 ng/ml and its prediction models were created using univariate analysis, c-index, and decision curve analysis were employed to assess internal validation, predictive accuracy, and clinical net benefit, respectively.

ADCV and ADCR

ROI of tumor ADCV

ROI of contralateral nontumor ADCV

ADCV = ADCR \times \text{Prostate volume, ml, median (IQR)}

Base model

ADCR model

Advanced ADCR model

4) BCR prediction models

5) advanced ADCR model for predicting BCR

6) Decision curve analysis

Conclusions

ADCR contributes to the risk stratification of postoperative BCR and is useful for decision making in surgical planning including meticulous dissection and patient counseling.