

Negative predictive value of Prostate HistoScanning (computer-aided tissue characterisation for detection of prostate cancer) - Preliminary Results

Introduction:

Recently a new imaging method (Prostate HistoScanning) was introduced with promising results regarding specificity and sensitivity in diagnosing prostate cancer. It analyses ultrasound raw data to distinguish suspicious from other prostate tissue. Therefore special algorithms were established. To define the negative predictive value of this new technique we performed a study on patients scheduled for radical cystoprostatectomy.

Methods:

Between January 2009 and March 2011 we examined 38 patients (average age: 61,3 a, median: 60 a) scheduled for radical cystoprostatectomy due to muscle-invasive urothelial carcinoma. None of these patients was suspected to have prostate cancer. Prior to surgery we performed HistoScanning of the prostate. HistoScanning results were obtained preoperatively and assigned in a three-section model (apex, left and right) of the prostate, not known to the performing surgeon. Presence of a lesion was defined as a HistoScanning positive volume bigger than 0.1 ccm. The pathologist prepared 3 mm step sections of the prostate. Localisation and size of prostate cancer lesions were determined and assigned in the same three-section prostate model. The results were compared regarding presence and size of tumor.

Results:

HistoScanning findings showed 21 patients with signals greater than 0.1 ccm. Histopathology findings showed 17 patients with prostate cancer. The average HistoScanning positive volume was 0.38 ccm (min/max: 0,14 ccm/3,28 ccm; median: 0,37 ccm), the average size of tumor in pathology was 0,22 ccm (min/max: 0,005 ccm/1,26 ccm; median: 0,11 ccm). The prediction of presence of tumor was correct in 11/21 cases. Regarding the absence of tumor it was as high as 11/17. Hence the negative predictive value results in 0,65 (see table 1).

Discussion:

Due to the thickness of the whole mount sections in the pathology work-up there is a limitation of detecting all lesions < 3mm. In comparison to the contemporary standard of prostate cancer imaging methods MRI-based studies showed a negative predictive value of approximately 85 %. In other imaging techniques based upon ultrasound such as elastography negative predictive values are calculated with a range from 59 % to 95%. In order to increase the reliability of the negative predictive value of Prostate HistoScanning we raise patient numbers.

Conclusion:

HistoScanning may prove useful in patients with rising PSA and > 1 previous negative biopsies and still are suspected to have prostate cancer. Certainly a greater number of patients is needed to confirm these preliminary results. Therefore this pilot study should be continued in a multi-centre setting to gather valid data. A well-defined standard of histopathology work-up is as important as the clearly defined workflow of ProstateHistoScanning examination.

N=30	P+	P-	
HS+	11	10	21
HS-	6	11	17
	17	21	38
	Sens	Spez	
	0,65	0,52	

PPV 0,52
 NPV 0,65

Table 1: crosstabulation