Evaluation of a decision-support system for preoperative staging of prostate cancer.

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Abstract

The usefulness and effectiveness of a decision-support system for preoperative staging of prostate cancers (PCES) were evaluated. The study population consisted of 43 consecutive patients with the preoperative diagnosis of prostate cancer who underwent surgical operation. Results obtained using the PCES were compared with staging by four urology attending physicians and five urology residents. The effect of PCES consultation on the physicians' staging of prostate cancer was also evaluated. To confirm the usefulness of the clinical findings of prostate-specific antigen, prostate-specific antigen density, prostate volume, and abnormal Gleason score in the PCES, their receiver operating characteristic (ROC) curves for diagnosis of advanced prostate cancer were plotted. The values of the areas under the curves were 0.772, 0.800, 0.531, and 0.752. The stage of prostate cancer was correctly determined by the PCES for 38 of the 43 patients, yielding 88.4% preoperative diagnostic accuracy. The PCES was significantly more accurate than two of the attending physicians and all residents. PCES consultation improved the residents' staging accuracy to approximately that of the attending physicians. The effect of PCES consultation on the residents' staging was significantly ($p < 0.001$) greater than the effect on the physicians' staging. The PCES may be useful in the preoperative staging of prostate cancers, especially during residency. The system's accuracy in determining the stage of advanced prostate cancer may make it possible to avoid unneccesary surgical operations.