names, correctly (I believe) determined that most severely injured kidneys healed without the need for surgery. Even 6 patients with gunshot wound were given a trial of conservative therapy - all of them successfully. Only those who where actively bleeding to death (in the estimation of the attending general surgeon) had renal surgery, and that was a speedy nephrectomy in all cases. In this way, these surgeons have turned classic urologic trauma teaching on its head, reducing the operative rate over that reported in previous urologic series, and most importantly decreasing the rate of nephrectomy towards 0% for Grade I-IV injuries. This series mirrors the general trend towards conservative therapy in trauma, and reports like it must be closely followed by anyone with an interest in treating renal injury. Less is turning out to be more in the field of renal trauma. While it takes more courage to observe the patient than go to the operating room, it may ultimately turn out to be the best treatment in the majority of patients.

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PATHOLOGY

Multiple measures of carcinoma extent versus perineural invasion in prostate needle biopsy tissue in prediction of pathologic stage in a screening population

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The capacity of perineural invasion by carcinoma in prostate needle biopsy tissue to independently predict pathologic stage in radical prostatectomy tissues remains uncertain. We sought to determine, in a prostate specific antigen-based screening population, the ability of needle biopsy histologic grade, tumor extent, and perineural invasion to independently predict pathologic stage and margin status in the whole prostate gland. Perineural invasion, Gleason grade, percentage Gleason pattern 4/5 carcinoma, and multiple measures of needle biopsy tumor extent, including number of positive cores, percentage of positive cores, total percentage of carcinoma, greatest percentage of carcinoma in a single core, and total carcinoma length in millimeters, were captured for 215 men from a prostate specific antigen-based screening program diagnosed with prostate cancer in a median of six procured needle biopsy cores. Pathologic stage and surgical margin status were evaluated in corresponding completely embedded radical prostatectomy specimens. A logistic regression model was used to relate the endpoints of extraprostatic extension by carcinoma and/or positive margins to needle biopsy tissue findings. In univariate analyses, total percentage of carcinoma ($p = 0.003$), greatest percentage of carcinoma in a single core ($p = 0.004$), total tumor length in millimeters ($p = 0.009$), and fraction of positive cores ($p = 0.02$) were all significantly associated with extraprostatic (pT3) carcinoma, whereas all five measures of carcinoma extent in needle biopsy tissue were related to positive margins. Correlation coefficient determinations showed that all five measures of needle biopsy carcinoma extent were highly interrelated. In multivariate analyses, total percentage of carcinoma was significantly related to pathologic T stage ($p = 0.003$) and positive margins ($p = 0.0002$). In a multivariate model with the radical prostatectomy whole gland endpoint of either pT3 disease or positive margins, fraction of positive cores ($p = 0.00001$) was the only variable with significant predictive value. Perineural invasion by carcinoma in needle biopsy tissue was detected in 11% of cases. Neither presence

nor absence of perineural carcinoma nor number nor percentage of positive nerves related to pathologic stage in univariate or multivariate analyses. Amount of carcinoma in prostate needle biopsy tissue, using multiple measurements but not perineural invasion, is a significant histologic attribute predictive of pathologic stage and margin status for men with prostate specific antigen screening detected prostatic carcinoma. Reporting of several measures of carcinoma extent in needle biopsy tissue is recommended.

Editorial Comment

The significance of perineural invasion in needle biopsies is a controversial issue. Bastacky et al. (Am J Surg Pathol. 1993; 17: 336-41) from Johns Hopkins University found perineural invasion in 20% of needle biopsies with a specificity of 96% to predict extraprostatic extension. According to these authors, measuring perineural invasion on needle biopsy helps to identify extraprostatic extension and may help in planning nerve-sparing radical prostatectomy in the decision of whether to sacrifice part or all of the neurovascular bundle on the side of the biopsy. Based on this study, in 1994, the American College of Pathologists recommended to include this finding in the pathology report.

Egan & Bostwick (Am J Surg Pathol. 1993; 17: 336-41) from Mayo Clinic found perineural invasion in 36% of needle biopsies with a specificity of 70% to predict extraprostatic extension. However, in a multivariate analysis, only pre-operative PSA, extent of tumor in the biopsy and Gleason grading were statistically significant. The authors conclude that the finding of perineural invasion in needle biopsy of prostatic carcinoma has no independent predictive value for the presence of extraprostatic extension. Accordingly, they recommend no longer routinely evaluate this finding in biopsy specimens.

The paper of this editorial comment favors the findings of Egan & Bostwick. However, the controversy is far from being settled. More studies are needed for a clear significance of perineural invasion in needle biopsies.

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Comparisons of outcome and prognostic features among histologic subtypes of renal cell carcinoma

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Our objective was to compare cancer-specific survival and to examine associations with outcome among the histologic subtypes of renal cell carcinoma (RCC). We studied 2385 patients whose first surgery between 1970 and 2000 was a radical nephrectomy for sporadic, unilateral RCC. All RCC tumors were classified following the 1997 Union Internationale Contre le Cancer and American Joint Committee on Cancer guidelines. There were 1985 (83.2%) patients with clear cell, 270 (11.3%) with papillary, 102 (4.3%) with chromophobe, 6 (0.3%) with collecting duct, 5 (0.3%) with purely sarcomatoid RCC and no underlying histologic subtype, and 17 (0.7%) with RCC, not otherwise specified. Cancer-specific survival rates at 5 years for patients with clear cell, papillary, and chromophobe RCC were 68.9%, 87.4%, and 86.7%, respectively. Patients with clear cell RCC had a poorer prognosis compared with patients with papillary and chromophobe RCC ($p < 0.001$). This difference in outcome was observed even after stratifying by 1997 tumor stage and nuclear grade. There was no significant difference in cancer-specific survival between patients with papillary and chromophobe RCC (p =

0.918). The 1997 TNM stage, tumor size, presence of a sarcomatoid component, and nuclear grade were significantly associated with death from clear cell, papillary, and chromophobe RCC. Histologic tumor necrosis was significantly associated with death from clear cell and chromophobe RCC, but not with death from papillary RCC. Our results demonstrate that there are significant differences in outcome and associations with outcome for the different histologic subtypes of RCC, highlighting the need for accurate subtyping.

Editorial Comment

Molecular genetics had an impact on classification of renal cell tumors. The genetic alterations affect the biology of the tumor cells, in respect of proliferation, cell death, differentiation, and cell adhesion; these very properties play a role in determining both the morphology and the behavior of tumors. Most of the pathologists use classifications of renal tumors based on cytomorphologic and genetic characteristics. According to the Heidelberg classification (J Pathol. 1997; 183: 131-3) and the 1997 workshop held in Rochester, Minnesota, USA (Cancer 1997; 80: 987-9) the clasification of renal cell tumors is based on these characteristics. The benign tumors are papillary adenoma (must have < 5mm in greatest diameter), oncocitoma and metanephric adenoma and the malignant tumors are conventional (clear cell) renal carcinoma, papillary renal carcinoma, chromophobe renal carcinoma, collecting duct carcinoma and unclassified cell carcinoma. Sarcomatoid carcinoma is not a particular tumor. Sarcomatoid change has been found to arise in all of the types of carcinoma in this classification, as well as in urothelial carcinoma of the renal pelvic mucosa.

The paper of this editorial comment is a timely study to make valuable this classification for the urologists. The authors studied the prognostic features among the several histologic subtypes of renal cell carcinoma. Patients with clear cell renal cell carcinoma had a poorer prognosis compared with patients with papillary and chromophobe renal cell carcinoma with no significant difference in cancer-specific survival between patients with papillary and chromophobe renal cell carcinoma. The paper also disclosed the need and importance for reporting tumor size, sarcomatoid component, grading and tumor necrosis. Tumor size, presence of a sarcomatoid component, and nuclear grade were significantly asociated with death from clear cell, papillary, and chromophobe renal cell carcinoma. Histologic tumor necrosis was significantly associated with death from clear cell and chromophobe renal cell carcinoma, but not with death from papillary renal cell carcinoma.

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INVESTIGATIVE UROLOGY

Immune mechanisms in bacillus Calmette-Guerin immunotherapy for superficial bladder cancer

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Purpose: Of all medical disciplines it is exclusively in urology in which immunotherapy for cancer has an established position today with intravesical bacillus Calmette-Guerin (BCG) against superficial bladder carcinoma recurrences. BCG is regarded as the most successful immunotherapy to date. However, the mode of action has not yet been fully elucidated. We provide a thorough overview of this complex field of research.