PURPOSE: To compare three MRI coil systems in terms of image quality, delineation of prostate cancer, and tumor staging. MATERIALS AND METHODS: 49 patients with prostate cancer underwent MRI at 1.5 Tesla using a combination of an endorectal coil with a phased-array body coil (combination coil) prior to radical prostatectomy. Images were reconstructed from the data sets acquired with the endorectal coil alone and from those acquired with the combined coil. In addition, 19 patients of the study patients were examined with the body phased-array coil alone without the endorectal coil. The prostate was imaged at a slice thickness of 3 mm using axial and coronal T2-weighted sequences and an axial T1-weighted sequence. Preoperative analysis of all images acquired was done to determine the accuracy of MRI in local staging of prostate cancer. An additional retrospective analysis served to compare the different coil systems in terms of overall image quality, delineation and localization of the tumor, and criteria for local staging of prostate cancer. RESULTS: Preoperative analysis showed MRI to have an accuracy of 59% in local tumor staging. Retrospective coil-by-coil analysis demonstrated image quality and tumor delineation to be best for the combination coil and the endorectal coil. Regarding the staging criteria for transcapsular tumor extension and infiltration of adjacent organs, a significant advantage of the
combination coil compared to the endorectal coil was identified only for the criterion of smooth bulging. In addition, the endorectal coil and the combination coil were found to be superior to the body phased-array coil in assessing 15 of 17 criteria for local tumor staging but the differences were not significant. CONCLUSION: In view of the achieved superior image quality, the combination coil or the endorectal coil is the preferred method for staging prostate cancer.