Improving Selection Criteria for Early Cystectomy in High-Grade T1 Bladder Cancer: A Meta-Analysis of 15,215 Patients

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PURPOSE: High-grade T1 (HGT1) bladder cancer is the highest risk subtype of non-muscle-invasive bladder cancer, with highly variable prognosis, poorly understood risk factors, and considerable debate about the role of early cystectomy. We aimed to address these questions through a meta-analysis of outcomes and prognostic factors.

METHODS: PubMed, EMBASE, Cochrane Central Register of Controlled Trials, and American Society of Clinical Oncology abstracts were searched for cohort studies in HGT1. We pooled data on recurrence, progression, and cancer-specific survival from 73 studies.

RESULTS: Five-year rates of recurrence, progression, and cancer-specific survival were 42% (95% CI, 39% to 45%), 21% (95% CI, 18% to 23%), and 87% (95% CI, 85% to 89%), respectively (56 studies, n = 15,215). In the prognostic factor meta-analysis (33 studies, n = 8,880), the highest impact risk factor was depth of invasion (T1b/c) into lamina propria (progression: hazard ratio [HR], 3.34; P < .001; cancer-specific survival: HR, 2.02; P = .001). Several other previously proposed factors also predicted progression and cancer-specific survival (lymphovascular invasion, associated carcinoma in situ, nonuse of bacillus Calmette-Guérin, tumor size > 3 cm, and older age; HRs for progression between 1.32 and 2.88, P ≤ .002; HRs for cancer-specific survival between 1.28 and 2.08, P ≤ .02).

CONCLUSION: In this large analysis of outcomes and prognostic factors in HGT1 bladder cancer, deep lamina propria invasion had the largest negative impact, and other previously proposed prognostic factors were also confirmed. These factors should be used for prognostication and patient stratification in future clinical trials, and depth of invasion should be considered for inclusion in TNM staging criteria. This meta-analysis can also help define selection criteria for early cystectomy in HGT1 bladder cancer, particularly for patients with deep lamina propria invasion combined with other risk factors.