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Original article

Preoperative hydronephrosis as an indicator of survival after radical cystectomy

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Abstract

Objective: We determined the prognostic significance of preoperative hydronephrosis in patients with transitional cell carcinoma (TCC) of the bladder undergoing radical cystectomy.

Materials and Methods: We performed a retrospective review of all patients undergoing radical cystectomy at a single institution from 1996 to 2006. Exclusion criteria included diagnosis other than TCC, upper tract TCC, incomplete medical records, or obstructing stones. Hydronephrosis was confirmed by radiographic imaging. Survival was determined by date of death or last clinic visit.

Results: Three hundred eight patients fulfilled the inclusion criteria; 203 (66%) had normal upper tracts, 82 (27%) had unilateral hydronephrosis, and 23 (7%) had bilateral hydronephrosis. Median overall survival of the study population was 34.3 months. There was a statistically significant difference in median survival between those without hydronephrosis (46.3 months), and those with unilateral (18.6 months, $P = 0.004$) or bilateral (13.4 months, $P < 0.001$) hydronephrosis. Preoperative hydronephrosis was significantly associated with higher pT stage ($P < 0.001$) as well postoperative positive margins ($P = 0.039$), but not with positive lymph nodes ($P = 0.086$). Preoperative hydronephrosis had no significant effect on survival in patients with pT0-3a, N0, surgical margin negative tumors, but was significantly correlated with decreased survival in patients with pT3b or greater, or N+, or surgical margin positive tumors (median survival 12.8 months vs. 23.4 months, $P = 0.011$). On multivariate analysis, preoperative hydronephrosis was a significant predictor of decreased survival.

Conclusions: Preoperative hydronephrosis is an important and independent prognostic variable in patients with TCC of the bladder treated with radical cystectomy.

Keywords: Carcinoma; Transitional cell; Urinary bladder; Cystectomy; Hydronephrosis; Prognosis; Survival

1. Introduction

Multiple factors have been assessed for prognostic significance in patients who undergo radical cystectomy for transitional cell carcinoma (TCC) of the bladder. Factors reported to be predictive of survival include clinical and pathologic T stage, nodal involvement, hydronephrosis, and lymphovascular invasion (LVI) [1–3]. The significance of pathologic TNM staging as well as LVI have been confirmed in multivariate analyses [1–3].

The significance of preoperative hydronephrosis on oncologic outcome has been evaluated, with conflicting results [1,4–8,13,14]. Multiple studies have confirmed that preoperative hydronephrosis is associated with advanced pT stage and decreased survival, but some have noted that on multivariate analysis, preoperative hydronephrosis loses its significance [4,5,8,13,14]. Because of the variation in the literature, we investigated the association between preoperative hydronephrosis and overall survival at our institution. Evidence is presented in this paper, which confirms the adverse prognostic implication of preoperative hydronephrosis on survival in patients who undergo radical cystectomy.

2. Materials and methods

A retrospective review of all patients who underwent radical cystectomy at a single institution from 1996 through 2006 was performed. Patients were excluded if their cys-

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Table 1
Postoperative pathologic findings by upper tract status

	Hydronephrosis			Total (%)
	Normal upper tracts	Unilateral	Bilateral	
pT stage				
1 or less	78	12	0	90 (29.2)
2	35	16	10	61 (19.8)
3a	33	11	4	48 (15.6)
3b	29	20	3	52 (16.9)
4	28	23	6	57 (18.5)
pN stage				
0	154	56	14	224 (72.7)
1–3	49	26	9	84 (27.3)
Margins				
Negative	183	68	18	269 (87.3)
Positive	20	14	5	39 (12.7)
pT0-3a, N0, Margin-	122	32	10	164 (53.2)
>pT3a or N+ or margin+	81	50	13	144 (46.8)

tectomy was not performed for TCC, if they also had the diagnosis of upper tract TCC, if they had obstructing stones, or if their medical records were not complete enough to determine preoperative status of the upper tracts or postoperative pathologic stage.

Preoperative status of the upper tracts was determined radiographically. If retrograde urograms were performed at the time of transurethral resection, the status of the upper tracts as dictated by the operating surgeon was noted. If retrograde urograms were not performed, the dictated reports of preoperative CT scans, ultrasounds, MRIs, or intravenous urograms were used. Pathologic tumor and nodal stage as well as margin status, was recorded. The template of the node dissection varied by operating surgeon, with some patients receiving a dissection to the bifurcation of the iliacs, and some to the level of the aortic bifurcation. Overall survival was determined by using dates of death as listed in the Social Security Death Index (SSDI). Patients not listed in the SSDI were censored at the time of their last clinic visit. Adjuvant and neoadjuvant treatments were not recorded due to lack of complete medical records.

Statistical analysis was performed using SPSS. Kaplan-Meier plots were used to estimate survival, and the log-rank test was used to evaluate significance. The Pearson χ^2 test was used to evaluate associations between variables, and the Cox proportional hazard model was used for multivariate analysis. Institutional Review Board approval was obtained for the study.

3. Results

Radical cystectomy was performed on 441 patients from January 1, 1996 to December 31, 2006. Cystectomies were performed in 84 patients for reasons other than TCC of the bladder only. Either complete medical records were not available, upper tract TCC was present, or there were obstructing stones in 49 patients. The remaining 308 patients were included in the study.

The study group was composed of 236 men and 72 women. Mean age at cystectomy was 66.4 years (range 29.7–90.4). Preoperatively, 203 (66%) patients had normal upper tracts, 82 (27%) had unilateral hydronephrosis, and 23 (7%) had bilateral hydronephrosis. Postoperative pathologic findings are listed in Table 1.

Median overall survival of the study population was 34.3 months (95% CI: 26.6–42.0 months) by Kaplan-Meier analysis. There was no difference in survival between men and women ($P = 0.202$). When the study population was split into 3 groups according to hydronephrosis status, there was a statistically significant difference in median overall survival between those without hydronephrosis (46.3 months, 95% CI: 23.0–69.5), and those with unilateral (18.6 months, 95% CI: 8.2–28.9, $P = 0.004$) or bilateral (13.4 months, 95% CI: 0–26.8, $P < 0.001$) hydronephrosis by log-rank analysis (Fig. 1).

χ^2 analysis was then used to determine if there was a correlation between preoperative hydronephrosis and pathologic stage, nodal status, and positive margin rate. Preoperative hydronephrosis was significantly associated with higher pT stage ($P < 0.001$) as well postoperative positive margins ($P = 0.039$), but not with positive lymph nodes ($P = 0.086$) (Fig. 2).

Patients were then grouped into those who had pT0-3a, N0, surgical margin negative tumors, and those who did not. Median overall survival of patients with pT0-3a, N0, surgical margin negative tumors was 79 months (95% CI: 60.9–97.2), while those with pT3b or greater, or N+, or surgical margin positive tumors had a median survival of 16.1 months (95% CI: 12.4–19.8, $P < 0.001$) (Fig. 3).

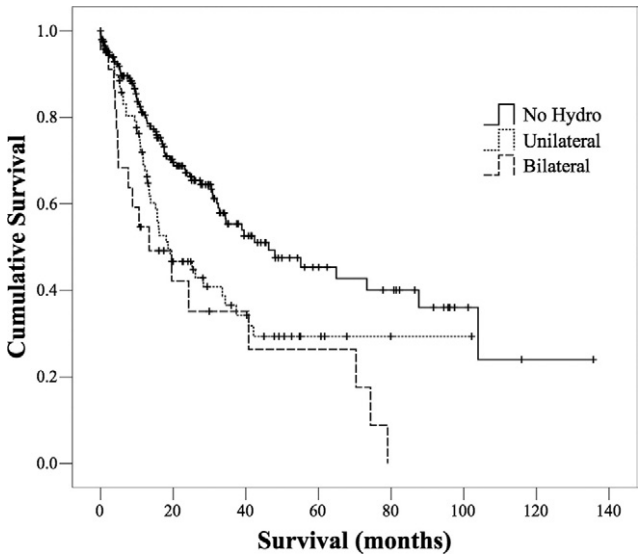

Fig. 1. Overall survival by upper tract status.