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Original article

Primary vs. post-chemotherapy retroperitoneal lymph node dissection (RPLND) in patients with presence of teratoma at orchiectomy

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Abstract

Objective: The presence of teratoma in the primary orchiectomy specimen creates controversies for subsequent management. Although predominant teratoma is less likely to metastasize, teratoma in the retroperitoneum may be less amenable to chemotherapy. In order to elucidate the issues about teratoma in the primary tumor, we reviewed differences between primary retroperitoneal lymph node dissection (P-RPLND) vs. post-chemotherapy RPLND (PC-RPLND) in patients with teratoma at orchiectomy.

Materials and methods: Patients who had undergone RPLND at our institution from 2001 to 2008 were identified, and clinical charts reviewed. Eighty-three patients with teratoma at orchiectomy were identified and perioperative data were obtained.

Results: Of the 83 patients with teratoma at orchiectomy who underwent RPLND, 44 (53%) and 39 (47%) underwent primary and PC-RPLND, respectively. Median follow-up was 1.4 years. Of the 83 patients with primary teratoma at orchiectomy, there were 7 (8%) patients with pure teratoma and 76 (92%) patients with mixed histology. Of the patients with mixed histology, 72 (87%) patients had embryonal carcinoma and 36 (43%) had LVI. There were 19 (43%) positive lymph nodes for P-RPLND, of which 13 (30%) contained teratoma. For the PC-RPLND group, 30 (77%) of lymph nodes were positive, of which 28 (72%) contained teratoma. There were 3 (4%) recurrences overall, all of which recurred in the PC-RPLND group. There were 11 (13%) perioperative complications total. There were no deaths in either group.

Conclusions: Patients with teratoma at orchiectomy were associated with other high risk features and are at significant risk for metastatic disease. Patients with post-chemotherapy retroperitoneal findings are at significant risk for viable GCT and/or teratoma and should undergo PC-RPLND.

Keywords: Retroperitoneal lymph node dissection; Testicular cancer; Teratoma

1. Introduction

Carcinoma of the testis more often has a favorable prognosis with the development of effective multimodal therapy and a rate of cure from approximately 60% in the 1970s to 98% in 2000 for a majority of cases. Physician and patient preference often dictate course of treatment options or surveillance, depending on risk factors and clinical stage. Retroperitoneal lymph node dissection (RPLND) remains an integral component in the treatment and cure for testicular cancer. This is especially true for patients with retroperitoneal disease and/or high risk features [1,2]. In addition, the morbidity with RPLND is minimal when performed at dedicated tertiary centers [1–3]. Although surveillance and primary chemotherapy have been advocated as treatment options, there are inherent risks associated with radiation exposure through repeat computer tomography (CT) scans and the added morbidity of chemotherapy induced cardiopulmonary toxicities and secondary malignancies [4–9]. The National Comprehensive Cancer Network (NCCN) guidelines for surveillance after primary chemotherapy for CS IA-B NSGCT include 6 to 7 abdominal CT scans over 5 years, with a CT scan as clinically indicated after 5 years [10]. Tarin et al. noted the relative risk of a secondary malignancy with surveillance compared with a single scan after RPLND to be approximately 15-fold [5]. This is in contrast to the post-RPLND NCCN guideline, which recommends one postoperative baseline abdominal CT scan.

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These results should be included when discussing management options with patients.

Teratoma is known to be resistant to chemotherapy and can undergo malignant transformation [11–14]. Prior studies have confirmed that teratoma may be present in the retroperitoneum, even in the absence of teratoma at orchiectomy. In addition, post-chemotherapy retroperitoneal masses in non-seminomatous patients with high risk features are often teratoma in up to 70% at RPLND [1,15]. We sought to discern treatment outcomes in patients with teratoma at orchiectomy managed with primary (P-RPLND) vs. post-chemotherapy RPLND (PC-RPLND).

2. Materials and methods

All patients undergoing RPLND through Brigham and Women's Hospital and Dana Farber Cancer Center from 2001 to 2008 were candidates for inclusion in this study. All patients with orchiectomy specimens greater than 5% teratoma were identified and perioperative data were obtained. We included patients managed with primary chemotherapy in order to compare primary RPLND patients with a known group of patients who have a greater likelihood of harboring teratoma in the retroperitoneum (PC-RPLND). Follow-up was conducted by chart review. These data were extracted from the Brigham and Women's Hospital RPLND computerized database and analyzed accordingly. This project was approved by the Institutional Review Board (IRB) at Brigham and Women's Hospital.

At our institution, all patients are evaluated in a multidisciplinary clinic and are counseled regarding the options of active surveillance, surgery, and/or chemotherapy as previously described [1]. All cases were preoperatively staged with tumor markers (AFP, HCG, and LDH), CT of the abdomen-pelvis, and CT of the chest or chest X-ray. All orchiectomy and RPLND specimens were reviewed and reports confirmed by pathologists at Brigham and Women's Hospital. Clinical and pathologic stage were defined according to NCCN guidelines [10]. Primary chemotherapy patients with clinical stage I (CS I) underwent 2 cycles of a cisplatin-based chemotherapy, all others underwent 3 to 4 cycles depending on the extent of retroperitoneal clinical stage II (CS II) disease.

All P-RPLND patients underwent a modified template, nerve sparing procedure. All PC-RPLND underwent bilateral template and nerve sparing when deemed appropriate without compromising oncologic efficacy. Patients with retroperitoneal disease identified via CT of the abdomen and pelvis after primary chemotherapy underwent RPLND. Patients with high risk features who underwent primary chemotherapy with no retroperitoneal disease were counseled on the risk for retroperitoneal relapse and were offered RPLND.

Data were entered into a computerized database and analyzed. Differences between P-RPLND and PC-RPLND patients based on continuous variables were compared using the Student's *t*-test. All factors were considered simultaneously. No model selection algorithm was utilized.

Table 1
Patient demographic data for the 83 patients with teratoma at orchiectomy who underwent either primary (P-RPLND) or post-chemotherapy retroperitoneal lymph node dissection (PC-RPLND)

Characteristic	P-RPLND ($n = 44$)	PC-RPLND ($n = 39$)
Age, median (years)	28.5	28.6
Orchiectomy		
Pure teratoma	4 (9%)	3 (8%)
Mixed histology	40 (91%)	36 (92%)
Teratoma	44 (100%)	39 (100%)
Average percent teratoma	42%	39%
Embryonal carcinoma	38 (86%)	34 (87%)
Yolk Sac	19 (43%)	19 (49%)
Seminoma	10 (23%)	7 (18%)
Choriocarcinoma	4 (9%)	2 (5%)
LVI	17 (39%)	19 (49%)
F/U, median (years)	1.5	1.4

3. Results

A total of 83 patients with teratoma at orchiectomy who underwent RPLND at Brigham and Women's Hospital and Dana Farber Cancer Center between 2001 and 2008 were identified. Of the 83 patients with primary teratoma at orchiectomy, there were 7 (8%) patients with pure teratoma and 76 (92%) patients with mixed histology. Of the patients with mixed histology, 72 (87%) patients had embryonal carcinoma and 36 (43%) had LVI. There were no patients with pure teratoma at orchiectomy with combined LVI. A summary of pathology at orchiectomy can be found in Table 1. There were no perioperative deaths.

Forty-four (53%) patients underwent P-RPLND and 39 (47%) patients underwent PC-RPLND, with a majority receiving bleomycin, etoposide, and cisplatin. Comparisons between these 2 groups are summarized in Table 1. The average percent embryonal carcinoma between P-RPLND vs. PC-RPLND was 44% vs. 46%, respectively.

Clinical stage I (CS I) was noted in 28 (64%) and 7 (18%) of the P-RPLND and PC-RPLND cases, respectively ($P < 0.001$). Regarding clinical stage II (CS II), there were 16 (36%) and 32 (82%) cases, respectively ($P < 0.001$). P-RPLND and PC-RPLND had 25 (57%) and 9 (23%) pathologic stage I (PS I) cases, respectively ($P = 0.03$). Regarding pathologic stage II (PS II) disease, there were 19 (43%) and 30 (77%) cases, respectively (Table 2, $P = 0.03$). Of these, 13 (30%) and 28 (72%) had metastatic teratoma found during RPLND ($P = 0.04$). Metastatic embryonal tumor was found in 8 (18%) and 3 (8%) patients with positive lymph nodes ($P = 0.01$). Low volume disease (pN1) was found in 7 (16%) and 14 (36%) patients with