Published in final edited form as:

Urology. 2016 September ; 95: 128–131. doi:10.1016/j.urology.2016.05.014.

Pelvic lymph node dissection in patients treated for testis cancer: the Memorial Sloan Kettering Cancer Center experience

Shaheen R. Alanee, MD, MPH, MBA¹, Brett S. Carver, MD², Darren R. Feldman, MD³, Robert J. Motzer, MD³, George J. Bosl, MD³, and Joel Sheinfeld, MD²

¹Division of Urology, Southern Illinois University School of Medicine, Springfield, IL

²Urology Service at Memorial Sloan Kettering Cancer Center, New York, NY, USA

³Genitourinary Oncology Service at Memorial Sloan Kettering Cancer Center, New York, NY, USA

Keywords

testis cancer; retroperitoneal lymph node dissection; pelvic lymph node dissection

Introduction

Pelvic lymph node dissection (PLND) for the surgical management of testis cancer is not well characterized due to the low incidence of metastasis below the bifurcation of the common iliac vessels. Our objective was to describe the pathologic findings and clinical outcome data for patients undergoing PLND in the course of management of testicular tumors at our institution.

Patients and Methods

Following institutional review board approval, data on 2186 patients who underwent RPLND at the Urology Service at MSKCC between 1981 and 2011 were reviewed. From this cohort, we analyzed data for 44 (2%) patients who underwent PLND for suspicious findings on pre-operative imaging or abnormal intraoperative examination of the pelvic lymph nodes. Clinical and pathologic characteristics of patients undergoing PLND are reported. All patients had unilateral disease, and one patient presented with groin lymphadenopathy in addition to his pelvic disease. No staged procedures were performed on patients included in this study.

Results

Pelvic Lymph Node Dissection During Primary Retroperitoneal Pelvic Lymph Node Dissection

PLND was performed at the time of P-RPLND in 14 of 850 (1.6%) patients (Table 1). Three of the 14 patients had pelvic masses (2, 1, and 10 cm in size) on preoperative imaging. Following surgery, histology showed viable tumor (embryonal carcinoma) in 1/14 (7%), and

teratoma in 3/14 (22%) patients. All patients who underwent PLND in this cohort were alive with no evidence of disease recurrence at a median follow-up of 63 months after P-RPLND.

Pelvic Lymph Node Dissection During Post-Chemotherapy Retroperitoneal Pelvic Lymph Node Dissection

Twenty-one of 1235 (1.7%) patients underwent PLND at the time of PC-RPLND. Preoperative imaging showed suspicious masses in 16 of these patients. Median size of the masses was 5 cm (range: 2–11 cm). Pure teratoma was found in 7/21 (33%) patients, and two patients (10%) had mixed teratoma with yolk sac tumors. Median follow-up was 58 months after RPLND, and only one patient experienced recurrence in this cohort. This patient was diagnosed with testis cancer after he presented with a right testicular mass and elevated AFP and BHCG levels at the age of 19. The tissue from the orchiectomy showed mixed GCT with vascular invasion. The patient underwent four cycles of bleomycin, etoposide, platinum (BEP) chemotherapy followed by PC-RPLND including a dissection of suspicious para-iliac lymph nodes seen on preoperative computed tomography (CT) imaging. Pathology from the RPLND showed mature teratoma. The patient was disease free for 6.5 years until he had a relapse with elevated markers and pelvic recurrence on the contralateral side of the para-iliac lymph node dissection, but on the same side of his orchiectomy. The patient is now being treated for his pelvic disease at an outside institution and is still alive as of last follow-up.

Pelvic Lymph Node Dissection Performed During Treatment for Relapsed Disease or Incomplete Resection

PLND was performed at the time of surgery on 9/101 patients (9%) who had relapsed disease or incomplete resection. Preoperative imaging showed suspicious masses in the pelvis of all nine patients. The median size of these masses was 4 cm (range: 3–10 cm). On histologic examination, 5/9 (56%) patients had pure teratoma, one (11%) had teratoma mixed with yolk sac tumor, and one (11%) patient had sarcoma. In 7/9 patients (78%), viable tumor was found in the pelvic tissue, five of which were pure teratomas, one teratoma mixed with yolk sac, and one sarcoma. As of last follow-up, seven patients are disease free. Only two patients are living with disease after a median follow-up of 55 months following PLND. One of the two patients was originally diagnosed with testis cancer when he presented with a testicular mass and bulky retroperitoneal lymphadenopathy at the age of 23. He received chemotherapy and subsequently underwent PC-RPLND which revealed mature teratoma. The patient lived disease free for 28 years. He then developed lower left quadrant abdominal pain with a slightly elevated AFP. Work up with CT scan showed a 12 cm mass in the left pelvis that was diagnosed as a teratoma with somatic malignant transformation (adenocarcinoma). He also had other sites of metastasis and was treated with histology appropriate chemotherapy. This patient has been living with stable disease for the past 1.5 years. The second patient was diagnosed with testis cancer at the age of 13. Initially, he was thought to have testicular enlargement related to puberty and was observed for months. However, he developed chest pain and shortness of breath for which he was admitted to a local hospital and was found to have, in addition to the testicular mass, a pelvic mass, bulky retroperitoneal lymphadenopathy, and supraclavicular lymphadenopathy with elevated lactate dehydrogenase (LDH), BHCG, and AFP levels. The patient underwent orchiectomy

which revealed a mixed GCT with invasion of the spermatic cord and the tunica albuginea. He was treated with first-line and salvage chemotherapy followed by RPLND at an outside hospital. His AFP levels continued to be elevated and he was seen at MSKCC for consideration of high-dose chemotherapy vs. a second RPLND. He was diagnosed with growing teratoma syndrome and underwent RPLND with dissection of the pelvic masses. The patient recovered well from the RPLND. Later, he was diagnosed with a lung mass that was resected by thoracic surgery. His AFP level normalized after resection of his pulmonary nodule, and he was discharged to the care of his primary oncologists.

Discussion

Historically, in the absence of sensitive staging tools, treatment for testicular germ cell tumors (GCTs) included supraclavicular and mediastinal lymph nodes, and the lymph nodes of the retroperitoneum, pelvis and scrotum. This strategy of treating testis cancer remained the gold standard until the 1980s, when the introduction of effective platinum-based chemotherapy and developments in radiology, surgery, serum markers, and multidisciplinary care for testis cancer led to increased focus on reducing treatment intensity in an effort to reduce toxicity but maintain cure rates. Subsequently, attempts were made to limit radiation of the retroperitoneal lymph nodes¹, and surgical mapping studies allowed for the exclusion of pelvic lymph nodes when retroperitoneal lymph node dissection (RPLND) showing less than 5% incidence of pelvic lymph node involvement.^{2,3} In this paper we describe the Memorial Sloan Kettering Cancer Center (MSKCC) experience with pelvic lymph node dissection (PLND) for GCTs. In concordance with data from other institutions, pelvic lymph node involvement was rare in our large series of surgically treated patients. In an abstract submitted to the meeting of the American Urologic Association (2011) by the Department of Urology at Indiana University (IU), only 137 (5%) of 2722 patients treated with RPLND had pelvic metastasis. At the time of referral to IU, only 18 patients had elevated tumor markers. The pathology of the pelvic disease in that series showed teratoma in 54.7%, active cancer in 24.1%, sarcoma in 5.1%, and necrosis in 16.1%. At a mean follow up of 33 months, IU reported 75.2% of patients with pelvic metastasis alive without disease after treatment, 11.7% alive with disease, and 12.4% dead because of it.⁴ Pelvic lymph node metastasis has also been reported to be low (around 2%) in series of testicular cancer patients treated with radiation therapy. For example, Fossa et al. Randomized 478 men with testicular seminoma to para-aortic (PA) or dogleg (DL) radiation fields (PA, 236 patients; DL, 242 patients) and reported only 4 pelvic recurrences all in the PA treated group of patients.⁵

Multiple studies have examined tissue histology in patients treated with RPLND. Studies from our institution and others concluded that pathologic outcomes of P-RPLND performed for clinical stage IIA-B testis cancer included teratoma in 40% of the cases^{6,7}. Older reports for pathologic outcome of PC-RPLND showed an equal distribution between teratoma, necrosis/fibrosis, and malignant GCTs⁸. However, this distribution of pathology in PC-RPLND has been changing in recent years with a reduction in the proportion of patients with viable GCT (to around 10%) due to better patient selection and improved chemotherapy, with teratoma maintaining its presence in 30% of the patients⁹⁻¹². Following second-line salvage chemotherapy, pathologic findings of RPLND showed malignant GCTs in 50%, teratoma in 40%, and fibrosis and necrosis in 10% of patients¹³. We found a similar

distribution of histology in our series of GCT cases involving pelvic lymph nodes, with patients treated for relapses having the highest incidence of viable tumor tissue in the pathology specimen, with teratoma representing the predominant histology. This is not surprising as pelvic involvement with GCTs is a part of the systemic involvement of the lymphatic system with the disease.

The association of lymph node size and viable tumors in the tissue is well documented. The CT criteria for a suspicious lymph node size differ from center to center. Some institutions consider lymph node sizes <20 mm to be normal, while others consider lymph node sizes <15 mm or 10 mm to be normal ^{14–16}. However, even at these small sizes, multiple studies have shown that removed tissue contained viable GCTs. For example, Oldenburg et al. observed that 33% of lesions <20 mm in a group of 87 patients contained teratomas and viable GCTs ¹⁷. Toner et al. confirmed these findings showing 23% of patients with lesions <15 mm that were teratomas and viable GCTs ¹⁸. Finally, Steyerberg et al. found teratomas and viable GCTs in 29% of lesions between 0–10 mm and in 44% of lesions between 11–20 mm ¹⁹. Patients were selected for surgery in our series partly because of suspicious radiologic findings, thus, introducing selection bias and preventing us from testing if there was a significant association between lymph node size and pathologic findings in resected pelvic tissue. Considering the systemic nature of GCT involvement of the retroperitoneal lymph nodes, there is no reason to think that the predictive value of lymph node size obtained from examining lymph nodes above the crossing of the ureters and iliac vessels would not apply to the pelvic lymph nodes below that level.

Our practice at this point is to perform a PLND for patients with pelvic disease suspected on preoperative imaging, or intraoperative findings. We as well perform full PLND on patients with bulky retroperitoneal disease extending down into the pelvis. We think that patients with history of inguinal or scrotal surgery may be at an increased risk of pelvic lymph node metastasis, but we don't have data to support such hypothesis. Limitations of this study include small sample size and retrospective nature. Another limitation is the lack of data granularity that could help us differentiate between caudal extension of retroperitoneal bulky tumors and true pelvic metastasis. However, the purpose of this study is to describe findings of PLND in germ cell tumors, and not to describe the origin of the disease involving these lymph nodes. We also lack data on exact location of positive pelvic lymph nodes. Yet, to our knowledge; this is the largest series to date describing pelvic lymph node involvement in patients with germ cell tumors. The goal of this paper is just to describe our experience with a rare presentation of germ cell tumors, and to share our practice in selecting patients who receive PLND at our institution.

Conclusions

Pelvic lymph node involvement with GCT is rare in our series and pathologic characteristics of this disease presentation are similar to the characteristics of involvement of retroperitoneal lymph nodes.

Acknowledgments

Funding and Acknowledgments: Supported by the Sidney Kimmel Center for Prostate and Urologic Cancers, the Richard E Capri Foundation, and the NIH/NCI Cancer Center Support Grant, award number P30 CA008748.

References

1. Fossa SD, Horwich A, Russell JM, et al. Optimal planning target volume for stage I testicular seminoma: A medical research council randomized trial. *Journal of Clinical Oncology*. 1999; 17:1146–1154. [PubMed: 10561173]
2. Ray B, Hajdu SI, Whitmore WF Jr. Proceedings: Distribution of retroperitoneal lymph node metastases in testicular germinal tumors. *Cancer*. 1974; 33:340–8. [PubMed: 4855872]
3. Donohue JP, Zachary JM, Maynard BR. Distribution of nodal metastases in nonseminomatous testis cancer. *J Urol*. 1982; 128:315–20. [PubMed: 7109099]
4. Mehan R, Beck S, Masterson T, et al. PELVIC METASTASES AMONG PATIENTS UNDERGOING RETROPERITONEAL LYMPH NODE DISSECTION FOR TESTICULAR CANCER. *The Journal of Urology*. 185:e391–e392. 970.
5. Van Poppel H, Da Pozzo L, Albrecht W, et al. A prospective randomized EORTC intergroup phase 3 study comparing the complications of elective nephron-sparing surgery and radical nephrectomy for low-stage renal cell carcinoma. *Eur Urol*. 2007; 51:1606–15. [PubMed: 17140723]
6. Stephenson AJ, Bosl GJ, Motzer RJ, et al. Nonrandomized comparison of primary chemotherapy and retroperitoneal lymph node dissection for clinical stage IIA and IIB nonseminomatous germ cell testicular cancer. *Journal of Clinical Oncology*. 2007; 25:5597–5602. [PubMed: 18065732]
7. Foster RS, Baniel J, Leibovitch I, et al. Teratoma in the orchiectomy specimen and volume of metastasis are predictors of retroperitoneal teratoma in low stage nonseminomatous testis cancer. *Journal of Urology*. 1996; 155:1943–1945. [PubMed: 8618293]
8. Donohue JP, Einhorn LH, Williams SD. Cytoreductive Surgery for Metastatic Testis Cancer - Considerations of Timing and Extent. *Journal of Urology*. 1980; 123:876–880. [PubMed: 6155479]
9. Fossa SD, Qvist H, Stenwig AE, et al. Is Postchemotherapy Retroperitoneal Surgery Necessary in Patients with Nonseminomatous Testicular Cancer and Minimal Residual Tumor Masses. *Journal of Clinical Oncology*. 1992; 10:569–573. [PubMed: 1312586]
10. Donohue JP, Leviovitch I, Foster RS, et al. Integration of surgery and systemic therapy: results and principles of integration. *Semin Urol Oncol*. 1998; 16:65–71. [PubMed: 9649229]
11. Stenning SP, Parkinson MC, Fisher C, et al. Postchemotherapy residual masses in germ cell tumor patients: content, clinical features, and prognosis. Medical Research Council Testicular Tumour Working Party. *Cancer*. 1998; 83:1409–19. [PubMed: 9762943]
12. Patel MI, Beck S, Bosl GJ, et al. Histology of good risk non-seminomatous germ cell tumor (NSGCT) patients following retroperitoneal lymph node dissection (PC-RPLND) after four cycles of etoposide and cisplatin (EPX4). *Journal of Urology*. 2003; 169:176–177.
13. Fox EP, Weathers TD, Williams SD, et al. Outcome Analysis for Patients with Persistent Nonteratomatous Germ-Cell Tumor in Postchemotherapy Retroperitoneal Lymph-Node Dissections. *Journal of Clinical Oncology*. 1993; 11:1294–1299. [PubMed: 8391067]
14. Richie JP, Garnick MB, Finberg H. Computerized tomography: how accurate for abdominal staging of testis tumors? *J Urol*. 1982; 127:715–7. [PubMed: 7069838]
15. Debono DJ, Heilman DK, Einhorn LH, et al. Decision analysis for avoiding postchemotherapy surgery in patients with disseminated nonseminomatous germ cell tumors. *J Clin Oncol*. 1997; 15:1455–64. [PubMed: 9193340]
16. Rabbani F, Goldenberg SL, Gleave ME, et al. Retroperitoneal lymphadenectomy for post-chemotherapy residual masses: is a modified dissection and resection of residual masses sufficient? *Br J Urol*. 1998; 81:295–300. [PubMed: 9488075]
17. Oldenburg J, Alfsen GC, Lien HH, et al. Postchemotherapy retroperitoneal surgery remains necessary in patients with nonseminomatous testicular cancer and minimal residual tumor masses. *J Clin Oncol*. 2003; 21:3310–7. [PubMed: 12947067]

18. Toner GC, Panicek DM, Heelan RT, et al. Adjunctive surgery after chemotherapy for nonseminomatous germ cell tumors: recommendations for patient selection. *J Clin Oncol.* 1990; 8:1683–94. [PubMed: 2170590]
19. Steyerberg EW, Marshall PB, Keizer HJ, et al. Resection of small, residual retroperitoneal masses after chemotherapy for nonseminomatous testicular cancer: a decision analysis. *Cancer.* 1999; 85:1331–41. [PubMed: 10189139]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Figure 1.
 Computed tomography (CT) scan of a patient with a germ cell tumor and pelvic involvement
 on the left side of the true pelvis

Table 1

Patient and disease characteristics of males affected by testicular germ cell tumors treated with pelvic lymph node dissection during retroperitoneal lymph node dissection.

	During Primary RPLND N=850, (%)	During Post-Chemotherapy RPLND N=1235, (%)	During RPLND Performed for Relapse or Incomplete Resection N=101, (%)
Number of PLND	19(2)	21(2)	9(9)
Positive radiologic findings before PLND	3(16)	16(76)	9(100)
Viable GCT or teratoma after PLND	4(21)	9(43)	3(33)
Elevated AFP at PLND	0	6(29)	0
Elevated HCG at PLND	0	4(19)	1(11)
Median follow-up after PLND (mo)	63	58	55
Patients alive with disease	0	1(5)	2(22)

Abbreviations: RPLND, retroperitoneal lymph node dissection; PLND, pelvic lymph node dissection; GCT, germ cell tumor; AFP, alpha feto protein; HCG, human chorionic gonadotropin