ORIGINAL PAPER

UROLOGICAL ONCOLOGY

Does anterior prostatic fat tissue removed during robotic radical prostatectomy contain any lymph nodes?

Ali Fuat Atmaca[1], Abdullah Erdem Canda[1], Murat Keske[2], Muhammed Ersagun Arslan[2], Davut Kamaci[2], Erdal Alkan[3], Mevlana Derya Balbay[3]

[1]*Yildirim Beyazit University, School of Medicine, Ankara Ataturk Training and Research Hospital, Department of Urology, Ankara, Turkey*
[2]*Ankara Ataturk Training and Research Hospital, Department of Urology, Ankara, Turkey*
[3]*Memorial Sisli Hospital, Department of Urology, Istanbul, Turkey*

Citation: Atmaca AF, Canda AE, Keske M, et al. Does anterior prostatic fat tissue removed during robotic radical prostatectomy contain any lymph nodes? Cent European J Urol. 2015; 68: 410-414.

Article history
Submitted: June 11, 2015
Accepted: Aug. 7, 2015
Published on-line: Dec. 21, 2015

Corresponding author
Abdullah Erdem Canda
Yildirim Beyazit University
School of Medicine
Ankara Ataturk Training
& Research Hospital
Department of Urology
Bilkent 06800, Ankara
Turkey
phone: +90 506 763 5466
erdemcanda@yahoo.com

Introduction We investigated whether anterior periprostatic fat (APPF) tissue removed during robotic radical prostatectomy (RARP) contains any lymph nodes (LNs).

Material and methods APPF tissues removed during RARP in 129 patients were evaluated histopathologically. Correlation with postoperative pathologic stage was made. Patients with a history of previous prostate or bladder surgery and radiation therapy were excluded.

Results Mean patient age, serum prostate specific antigen (PSA), prostate weight and body mass index (BMI) were 62.2 ±5.5 (range 45–74), 9.3 ±6.3 ng/dl (range 0.26-30.3), 60.3 ±27.2 grams (range 11.0–180) and 26.6 ±1.9 kg/m^2 (range 20.0–30.3), respectively. Overall, LNs in APPF tissues were detected in 14 (10.9%) patients with a mean LN yield of 1.1 ±0.7 LNs (range, 1–3). Among those found, no metastatic LN was detected. Of the patients with pT2a (n = 22), pT2b (n = 15), pT2c (n = 62) and pT3a (n = 21) disease, LNs in APPF tissues were detected in 1 (4.6%), 1 (6.7%), 11 (17.7%) and 1 (4.8%) patient in each group, respectively. Among the patients, LNs in APPF tissues were detected in 0 (0%), 5 (35.7%), 8 (57.1%) and 1 (7.1%) patients of underweight, optimal weight, overweight and obese patients due to body mass index, respectively.

Conclusions In our series, LNs were detected in around 10% of the patients. Therefore, this fat should, not be pushed back during RARP but should be removed and sent for pathologic evaluation. Although no metastatic LN was detected in our series, the presence of metastatic LNs might have an impact on the oncologic outcomes of the patients and warrants further research.

Key Words: lymph nodes ‹› anterior periprostatic fat tissue ‹› metastasis ‹› robotic radical prostatectomy

INTRODUCTION

Radical Prostatectomy (RP) is a common curative surgical treatment option in localized prostate cancer (PCa). Pelvic lymph node (LN) dissection is performed in order to determine the disease stage, prognosis, and the necessary future treatment options [1, 2].

The fatty tissue overlying the prostate is removed in order to have a better exposure of the dorsal venous complex, the puboprostatic ligaments, and the prostate apex [3]. However, if this fatty tissue is not examined separately by a pathologist, the presence of LNs and possible metastasis might be missed and underreported. This might ultimately have an impact on the postoperative disease stage, treatment, and oncologic outcomes.

In our study, we investigated the histopathologic evaluation outcomes of anterior periprostatic fat (APPF) tissues that were separately sent for pathologic evaluation in order to examine presence of LNs and metastasis.

doi: 10.5173/ceju.2015.650

MATERIAL AND METHOD

Overall, 129 patients who underwent RARP between January 2012 and October 2014 were included in our study. Surgical procedures were performed by three robotic surgeons (AFA, AEC and MDB). All of the RARP procedures were performed via a transperitoneal approach and patients who had history of transurethral surgery or radiotherapy were excluded from the study.

During the RARP procedures, APPF tissue samples were sent separately for pathologic evaluation. APPF covering prostate, endopelvic fascia, dorsal venous complex, prostatic apex, puboprostatic ligaments, prostate-vesical junction and the bladder neck was dissected en bloc laterally and cephalad. If metastatic LN(s) was /were detected, immunohistochemistry for prostate specific antigen (PSA) and prostate specific acid phosphatase were performed.

Parameters including serum PSA, prostate weight, body mass index (BMI), positive surgical margins (PSM) and Gleason score (GS) were included for further evaluation. Patients were classified according to BMI (kg/m^2) as follows: <18.5 underweight, 18.5–24.9 optimal weight, 25–29.9 overweight and >30 obese. Presence of LNs in each BMI group was evaluated.

RESULTS

Patient characteristics are summarized in Table 1. Mean patient age, serum PSA, prostate weight and BMI were 62.2 ±5.5 (range 45–74), 9.3 ±6.3ng/dl (range 0.3–30.3), 60.3 ±27.2 grams (range 11.0–180) and 26.6 ±1.9 kg/m^2 (range 20.0-30.3), respectively. Overall, LNs in APPF tissues were detected in 14 (10.6%) patients with a mean LN yield of 1.1 ±0.7 LNs (range, 1–3). Among those found, no metastatic LN was detected. No additional complication or morbidity due to excision of the APPF was found in any of the patients.

Postoperative pathologic stages included pT0 (n = 1, 0.8%), pT2a (n = 22, 17.1%), pT2b (n = 15, 11.6%), pT2c (n = 62, 48.1%), pT3a (n = 21, 16.3%) and pT3b (n = 8, 6.2%). Overall, PSM were detected in 32 (24.8%) patients. Of the patients with pT2 disease (n = 99), PSM rate was 13.1% (n = 13). Of the patients with pT3 disease (n = 29), PSM rate was 65.5% (n = 19). Of the patients with pT2a (n = 22), pT2b (n = 15), pT2c (n = 62) and pT3a (n = 21) disease, LNs in APPF tissues were detected in 1 (4.6%), 1 (6.7%), 11 (17.7%) and 1 (4.8%) patient in each group, respectively. No LN was detected in APPF tissue in patients with pT0 (n = 1) and pT3b (n = 8) disease. Of the patients with postoperative GS 3 + 3 = 6 (n = 63), GS 3 + 4 = 7 (n = 34), GS 4 + 3 = 7 (n = 14) and GS 4 + 4 = 8 (n = 7) diseases, LNs in APPF tissues were detected in 11 (17.5%), 1 (2.9%), 1 (7.1%) and 1 (14.3%) patient, respectively. No LN was detected in APPF tissue in patients with postoperative GS of 5 + 3 = 8 (n = 1), 3 + 5 = 8 (n = 2) and 4 + 5 = 9 (n = 6). We did not have any patient with postoperative GS of 5 + 4 = 9 or 5 + 5 = 10.

Of the patients, LNs in APPF tissues were detected in 0 (0%), 5 (35.7%), 8 (57.1%) and 1 (7.1%) patients of underweight, optimal weight, overweight and obese patients due to BMI, respectively. No associa-

Table 1. *Patient characteristics*

Patient characteristics	Patients with LN(s) in the periprostatic fat tissue	Patients without LN(s) in the periprostatic fat tissue	Total	P value
Age	61.5 ±5.6	62.3 ±5.4	62.2 ±5.5	0.6
BMI	25.8 ±2.5	26.7 ±1.7	26.6 ±1.9	0.1
Serum PSA	9.1 ±7.0	9.3 ±6.2	9.3 ±6.3	0.9
Prostate weight	73.1 ±40.9	58.8 ±24.9	60.3 ±27.2	0.06

Table 2. *Outcomes of published literature on periprostatic fat tissue and presence of lymph nodes*

Ref. no	Year	Robotic or open	Number of patients	Presence of LNs N (%)	Presence of LN metastasis N (%)	pT2	pT3	pT4
Kim et al. [8]	2013	Both	4261	388 (11.9%)	40 (0.94%)	4 (10%)	33 (82.5%)	3 (7.5%)
Finley et al. [6]	2007	Robotic	204	30 (14.7%)	4 (2%)	0 (0%)	4 (100%)	0 (0%)
Jeong et al. [5]	2013	Robotic	258	30 (11%)	3 (1.16%)	0 (0%)	3 (100%)	0 (0%)
Our series	2015	Robotic	129	14 (10.9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Figure 1. *Periprostatic fat tissue excision (before removal). Prostate, endopelvic fascia, puboprostatic ligaments, junction between prostate and bladder neck are covered with fat tissue.*

Figure 2. *Periprostatic fat tissue excision (after removal). Prostate, endopelvic fascia, puboprostatic ligaments, junction between prostate and bladder neck are seen clearly following excision of the fat tissue.*

tion was detected between BMI and presence of LNs or mean LN count in the APPF tissue ($p > 0.05$).

We removed APPF tissue as an en bloc excision and sent it as one piece for pathologic evaluation. We generally started removing the fat laterally from one side on the endopelvic fascia from, laterally to medially, and then shift to the other side. We accumulated both sides in the middle around the superficial dorsal vein on the prostate. Thereafter, we elevated it above the prostate using Maryland bipolar scissors and cauterized and cut its tip over the prostatic apex by applying bipolar energy. We then pushed it back up to the junction between the prostate and bladder neck and excised the tissue by applying monopolar and bipolar cautery. Following excision of the APPF tissue, the area of endopelvic fascia, puboprostatic ligaments, prostatic apex, surface of the prostate and junction between prostate and bladder neck are all cleared (Figures 1 and 2).

DISCUSSION

In our study, we identified LNs in APPF tissue in 10.9% of the patients. Aning et al. [4] reported 17% (n = 282), Jeong et al. [5] reported 11.6% (n = 228) and Finley et al. [6] reported 14.7% (n = 204) LNs in APPF tissue in their series, respectively. Therefore, our findings are similar to previously published studies.

In our study, no metastatic LN was detected in the lymphoid tissue that was obtained from the APPF tissue region overlying the prostate. However, Finley et al. [6] found LN metastasis in 4 of 204 patients and Jeong et al. [5] found LN metastasis in 3 of 228 patients in their series. Due to the published literature, LN metastasis rate in anterior periprostatic lymphoid tissue varied between 1.2–2.5% [5–8]. In our study, no metastatic LN was detected, which might be related to the limited number of patients in our series compared to the other published articles with a larger number of patients. In addition, studies that identified LN metastasis in anterior periprostatic lymphoid tissue had a higher volume of patients with high and intermediate risk patients, as compared to our study. In a multi-center study, Kim et al. included 4261 RRP and RARP patients and there were 40 patients who had metastasis on periprostatic LNs [8]. Of the 40 patients, 31 (77.5%) were in a high-risk group, 6 (15%) of them were in an intermediate group and 3 (7.5%) of them were in a low-risk group according to D'Amico risk classifications [8]. Jeong et al. detected metastatic LNs in APPF tissue in 3 patients that were all in the high-risk group [5]. In our study, 55 (42.6%) patients were in the high-risk group, 52 (40.3%) patients were in the intermediate-risk group and 22 (17.1%) patients were in the low-risk group. We summarized the outcomes of published literature on APPF tissue and presence of LNs in Table 2.

The European Association of Urology (EAU) [1] and National Comprehensive Cancer Network (NCCN) [9] recommended extended pelvic lymph node dissection (PLND) in patients at 10% or greater and 7% or greater calculated risk, respectively, for LN metastases. Likewise, the American Urological Association (AUA) recommended PLND in patients

at higher risk for nodal involvement [10]. Prognostic significance of LN metastases in prostate cancer [11] and assessment of rates of LNs and LN metastases in periprostatic fat pads in radical prostatectomy were reported before [12]. In our experience, we performed extended PLND in intermediate or high-risk PCa patients and in those with at least 5% risk of pelvic LN involvement by PCa, according to Partin's tables [13]. In addition, we always remove APPF tissue and send it separately for histopathologic evaluation in patients with low, intermediate and high-risk in order to identify the presence of LNs and possible metastasis that we think could have an impact on identifying the correct stage of the disease. We remove APPF tissue in low-risk patients because removal of this tissue leads to better exposure of the prostatic apex, puboprostatic ligaments, endopelvic fascia and junction of bladder and prostate. We believe that this facilitates tissue dissection during RARP.

Kim et al. suggested that removal of APPF tissue leads to more accurate staging of the patients [8]. In their series, due to the identification of metastatic LNs in the APPF tissue, 0.63% of the patients were up-staged pathologically [8]. This finding might certainly have an impact on postoperative adjuvant treatment requirement in this patient group. The condition of regional LNs is one of the most important prognostic indicators of disease free survival and overall survival in PCa [11]. If a metastatic LN is detected in APPF tissue; patients might require adjuvant hormone therapy or radiotherapy.

By dissecting APPF tissue anatomically, Finley et al. [6] observed that the anterior fat pad was directly connected to the obturator LN chain at the lateral pelvic wall. Jeong et al. identified 3 patients with metastatic LNs in APPF tissue in their series of 258 patients, and 2 of these 3 also had metastasis in pelvic LNs [5]. Harnisch et al. identified 4 patients who had metastasis in APPF tissue in their study including 302 patients and 2 of these 4 patients had also pelvic LN metastasis [4]. Finley et al. identified 4 patients with metastatic periprostatic LNs but only one of them had also pelvic LN metastasis [6]. To assess the need of adjuvant therapy, postoperative serum PSA follow-up is important as well as detecting metastatic LNs. In their multicenter study including 4261 patients, Kim et al. reported that 6 of 40 patients with metastasis on periprostatic anterior fatty lymphoid tissue did not require adjuvant therapy at a follow-up of 1.6–51 months, which might suggest a therapeutic advantage [8].

We removed APPF tissue as an en bloc excision. However, Kim et al. separately evaluated APPF tissue in three pieces as a left packet, middle packet and a right packet [8]. In their results, 89% of the LNs were detected in the middle packet [8]. They suggested separately dissecting and sending APPF tissue for pathologic evaluation. In their center, increased cost was another issue for pathological evaluation of periprostatic fat tissue [8]. In order to decrease cost, they suggested asking for pathological evaluation of the APPF tissue only in intermediate and high-risk patients. In our country, if the surgery is performed in private institutions, pathologic evaluation of the APPF tissue increases costs. However, in government institutions, it does not increase overall cost because all expenses are covered by the government. In addition, because we think that complete removal of APPF tissue leads to better exposure of the surgical field to the operating console surgeon, we excise it even in patients with low-risk PCa.

In our study, no association was detected between BMI and presence of LNs or LN count in the APPF tissue. BMI might have an impact on the amount of periprostatic fat rather than presence of LNs.

Not only robotic series but also open retropubic radical prostatectomy (RRP) series have evaluated LN existence in APPF tissue. Hansen et al. identified LNs in periprostatic region in 19 (5.5%) patients of 356 in their RRP series and 4 (1.2%) of them had metastasis, one of 4 patients had also pelvic LN metastasis. In this study they reported that there is no connection between periprostatic LN metastasis and pelvic LN metastasis, but in order to provide exact staging, pathologic examination of periprostatic lymphatic area should be a routine procedure [12].

Our study has some limitations that include limited number of patients and differences in the experiences of the surgeons that performed the cases. With increasing number of patients and having more high-risk PCa patients, we think patients with metastatic LNs in the APPF tissue might be identified.

CONCLUSIONS

Lymph nodes might be present in the APPF tissue which should be removed and sent for histopathologic evaluation following RARP. Identification of metastatic LNs in the APPF might have an impact on postoperative staging and management of the patients. In addition, removal of APPF leads to a better exposure of the surgical field.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

References

1. Heidenreich A, Bastian PJ, Bellmunt J, Bolla M, Joniau S, van der Kwast T, et al. European Association of Urology. Eur Urol. 2014 EAU guidelines on prostate cancer. http://www.uroweb.org/professional-resources/guidelines

2. Abdollah F, Sun M, Briganti A, et al. Critical assessment of the European Association of Urology guideline indications for pelvic lymph node dissection at radical prostatectomy. BJU Int. 2011; 108: 1769-1775.

3. Ahlering TE, Eichel L, Edwards RA, Lee DI, Skarecky DW. Robotic radical prostatectomy: a technique to reduce pT2 positive margins. Urology. 2004; 64: 1224-1228.

4. Aning JJ, Thurairaja R, Gillatt DA, Koupparis AJ, Rowe EW, Oxley J. Pathological analysis of lymph nodes in anterior prostatic fat excised at robot-assisted radical prostatectomy. J Clin Pathol. 2014; 67: 787-791.

5. Jeong J, Choi EY, Kang DI, et al. Pathologic implications of prostatic anterior fat pad Urologic Oncology: Seminars and Original Investigations. 2013; 31: 63-67.

6. Finley DS, Deane L, Rodriguez E, et al. Anatomic excision of anterior prostatic fat at radical prostatectomy: Implications for pathologic upstaging. Urology. 2007; 70: 1000-1003.

7. Yuh B, Wu H, Ruel N, Wilson T. Analysis of regional lymph nodes in periprostatic fat following robotassisted radical prostatectomy. BJU Int. 2012; 109: 603-607.

8. Kim IY, Modi PK, Sadimin E, et al. Detailed Analysis of Patients with Metastasis to the Prostatic Anterior Fat Pad Lymph Nodes: A Multi- institutional Study. J Urol. 2013; 190: 527-534.

9. National Comprehensive Cancer Network: NCCN Clinical Practice Guidelines in Oncology 2012. Prostate Cancer. http://www.nccn.org/professionals/physician_gls/f_guidelines.asp#prostate

10. Thompson I, Thrasher JB, Aus G, Burnett AL, et al. AUA Prostate Cancer Clinical Guideline Update Panel. Guideline for the management of clinically localized prostate cancer: 2007 update. J Urol. 2007; 177: 2106-2131.

11. Gervasi LA, Mata J, Easley JD, Wilbanks JH, Seale-Hawkins C, Carlton CE Jr, et al. Prognostic significance of lymph nodal metastases in prostate cancer. J Urol. 1989; 142: 332-336.

12. Hansen J, Budäus L, Spethmann J, et al. Assessment of rates of lymph nodes and lymph node metastases in periprostatic fat pads in a consecutive cohort treated with retropubic radical prostatectomy. Urology. 2012; 80: 877-882.

13. Partin AW, Mangold LA, Lamm DM, Walsh PC, Epstein JI, Pearson JD. Contemporary update of prostate cancer staging nomograms (Partin Tables) for the new millennium. Urology. 2001; 58: 843-848. ■