SHORT COMMUNICATION

Robot-assisted pelvic lymphadenectomy for prostate cancer. Potentially advantageous in the elderly?

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Background and Aims. Pelvic lymphadenectomy is the most effective method for the detection of lymph node metastases due to prostate cancer. Question remains whether robot-assisted pelvic lymphadenectomy provides the same number of nodes than open lymphadenectomy. We compared outcomes and number of nodes retrieved by the two procedures.

Methods. Data of patients who had undergone pelvic lymphadenectomy during robot-assisted radical prostatectomy (Group A) between January 2016 and June 2018 were compared to those of a matched population having undergone pelvic lymphadenectomy during open retropubic prostatectomy (Group B).

Results. The median number of removed lymph nodes was 11 (range 8-15) in Group A and 14 (range 12-16) in Group B (p = 0.05) but the rate of N+ patients was 11.4% in Group A and 14.7% in group B (p = 0.3). The median number of metastatic lymph nodes was 1 (range 1-1) in Group A and 2.2 (range 1-9) in Group B. There was no vascular complication but the rate of lymphocele requiring percutaneous drainage was 9% in Group B as opposed to none in Group A (p = 0.12) and mean age of patients suffering this complication was 70y.

Conclusions. Robot-assisted pelvic lymphadenectomy provided a lower number of nodes than the open approach but this did not significantly change the number of patients diagnosed as N+. Though more time-consuming, the robotic approach avoided pelvic lymphoceles which were seen in almost 10% of patients having undergone the open approach. The risk of such complication appeared to be related to age.

Key words: Elderly, Prostate cancer, Radical Prostatectomy, lymphadenectomy, robotic surgery, open surgery

INTRODUCTION

The most effective method for detecting lymph node metastases in prostate cancer (PCa) remains pelvic lymph node dissection (PLND). This procedure allows having precise staging and consequent prognostication, thus guiding the postsurgical decision-making process [1,2].

Recent years have seen a decline in PLND during radical prostatectomy (RP). While this has been mainly attributed to PCa stage migration occurring in the prostate-specific antigen (PSA) screening era, question remains whether this has also been the result of the introduction of training programs in novel minimally-invasive procedures such as laparoscopic and robotic-assisted radical prostatectomy [3]. Indeed, although the feasibility of PLND during robot-assisted radical prostatectomy (RARP) has been well demonstrated [4], patients undergoing open retropubic radical prostatectomy (RRP) were more likely to have concomitant PLND than patients undergoing minimally invasive RP [5-7]. Moreover, as much as 20% of surgeons performing both open and robotic approaches, declare that the indication for and the extent of their PLND depends on the approach they elect to use [8].

Potential reasons for PLND being less common during RARP include increased operative room time and costs and the risk of vascular complications, particularly in patients aging > 65y as they are more likely to have vascular comorbidities. Moreover, skipping PLND may be linked to the need of shortening surgical time in patients with reduced respiratory capacity; again, this is more common in patients aging > 65y. The same reasons might also lead to a less aggressive dissection, thus resulting in a lower number of removed nodes. Surgical volume and learning curve may also play a relevant role in determining the number of retrieved noded.

To determine whether RARP allows to retrieve a number of nodes similar to RRP, in the present study we compared the yields of nodes of the two procedures.

PATIENTS AND METHODS

Data of patients scheduled for RP at our institution from January 2016 to June 2018 were entered into our prospectively maintained, Internal Review Board approved database. To avoid potential inclusion biases, we carried out a retrospective analysis of only those patients who had undergone prostate biopsy (PBx) at our institution. Accordingly, all included patients had undergone PSA measurement before DRE and transrectal ultrasound (TRUS) as well as to uroflowmetry (UFM) unless they had an indwelling urethral catheter [9-12]. PBx was carried out under local non-infiltrative anesthesia [13] [14], TRUS was used to determine prostate and transition zone volume and to guide transrectal prostate sampling according to our systematic 18-core biopsy scheme [15]. A senior uropathologist evaluated the specimens according to contemporary diagnostic criteria for high-grade prostatic intraepithelial neoplasia (HGPIN), atypical small acinar proliferation (ASAP) of prostate [16], and PCa.

Patients diagnosed with PCa and considered eligible for radical prostatectomy received PLND if they had a clinically-significant PCa defined as those with a Gleason Grade Group (GGG) > 1 according to the International Society of Urological Pathology (ISUP) consensus [17]. The dissection aimed to remove the obturator, internal iliac and external iliac nodes, from the cross of the ureter over the common iliac artery to the inguinal ring. Our dedicated pathologist (FS) analysed all specimens.

Data of patients having undergone robot-assisted PLND were compared with those having undergone PLND during RRP over the same period.

STATISTICAL ANALYSIS

Continuous variables are reported as medians and interquartile range and analyzed by the Mann Whitney U test. Categorical variables are reported as frequencies and analyzed by the Chi square Test. Statistical Analyses were performed using STATA 14 (StataCorp LP, College Station, TX, USA). Significance was set at $\alpha = 0.05$.

RESULTS

A total of 35 patients underwent robot-assisted PLND (Group A); they were compared to a matched population of 34 patients who underwent PLND during RRP over the same time period (Group B).

Baseline characteristics of the two populations are shown in Table I. There was no difference between the two Groups in Age, preoperative PSA, Suspicious DRE rates and Biopsy Gleason Grade group. Although we did not record surgical time for PLND, the robotic approach certainly took longer than the open one. However, no vascular complication occurred with both approaches, but 3 (9%) patients in Group B had pelvic lymphoceles requiring percutaneous drainage.

Final pathology (Tab. II) showed that the number of retrieved nodes was higher in the open approach than in the robotic one (11 *vs* 14, respectively; p = 0.05) but there was no difference in the rate of patients classified as node-positive (pN+) which was 14.7% for the open approach and 11.4% for the robotic one (p = 0.7).The median number of metastatic lymph nodes was 2.2 (range 1-9) for the open approach and 1 (range 1-1) for the robotic one.

DISCUSSION

The main goal of PLND in PCa is to optimize loco-regional staging; this allows to identify patients at risk of progression who may therefore benefit from adjuvant treatment. Evidence suggests that the more is the number of removed nodes, the greater is the chance of detecting lymph node metastasis but the ideal number of lymph nodes that need to be removed for adequate PCa staging remains unclear. Autopsy series suggests that 20 nodes must be removed for accurate loco-regional staging [18].

In spite of the availability of novel biomarkers [19-21], the risk of a patient with PCa having lymph node metastasis remains linked to standard clinic-pathological factors. Indeed, the Briganti nomogram [22] remains the most effective method to predict the risk of lymph node metastasis and therefore to perform PLND during RP. A simplified approach involves offering PLND to patients with clinically-significant PCa. However, like for other common urological conditions, the decision

Table I. Patients characteristics.

Variable	Group A = robotic (n = 35)	Group B = open (n = 34)	P-value
Age (y)*	64 (60-71)	67 (59-71)	0.5
PSA (ng/mL)*	7.0 (5.6-9.6)	6.5 (4.5-11.3)	0.7
Suspicious DRE, n (%)	21 (60%)	18 (52.9%)	0.5
GGG** Biopsy, n (%)			
1	5 (14.3%)	4 (11.8%)	1
2	11 (31.4%)	11 (32.4%)	
3	7 (20.0%)	6 (17.6%)	
4	9 (25.7%)	9 (26.5%)	
5	3 (8.6%)	4 (11.8%)	
Prostate volume (mL)*	40.0 (33.0-53.0)	41.3 (31.0-62.0)	0.7

*Data are expressed as medians (Interquartile Range). ** GGG: Gleason grade group.

Table II. Final pathology results.

Variable	Group A = robotic (n = 35)	Group B = open (n = 34)	P-value
T stage, n (%)			
pT2a	1 (2.9%)	5 (14.7%)	0.3
pT2b	5 (14.3%)	4 (11.8%)	
pT2c	14 (40.0%)	15 (44.1%)	
pT3a	7 (20.0%)	7 (20.6%)	
pT3b	8 (22.9%)	3 (8.8%)	
GGG**, n (%)			
1	5 (14.3%)	5 (14.7%)	0.8
2	15 (42.9%)	13 (38.2%)	
3	6 (17.1%)	6 (17.6%)	
4	5 (14.3%)	8 (23.5%)	
5	4 (11.4%)	2 (5.9%)	
Total n. of nodes*	11.00 (8.0, 15.0)	14.00 (12.0, 16.0)	0.05
pN1 patients, n (%)	4 (11.4%)	5 (14.7%)	0.7

*Data are expressed as medians (Interquartile Range). ** GGG: Gleason grade group.

to perform PLND often relies on patients local conditions and wise clinical judgment [23-25]. This turns on the above-mentioned data of 20% of surgeons modulating the indication for and the extent of their PLND on the approach they elect to use [8].

Question remains on the ability of the robotic approach to provide the same number of nodes yielded by open one. Indeed, Zorn et al. [26] noted that overall lymph node yield was significantly lower (12.5 *vs* 15 nodes) during RARP than in an historical cohort of open procedures. Similar findings were reported in other studies [27,28] and such differences remained significant after adjustment for disease characteristics [29]. Conversely, Polcari et al. [30] found no difference in terms of lymphnode yield and probability of finding positive lymphnodes between robot-assisted and open RP. Similarly, Truesdale et al. [31] demonstrated that, when patients were stratified

for preoperative D'amico risk criteria, the number of removed lymph nodes was statistically comparable between RARP and RRP, particularly when the analysis was restricted to patients having received an extended PLND. Katz et al. published similar results [32].

In an attempt to summarise available evidence, Ploussard et al. [33] performed a systematic review of the literature and concluded that PLND during RARP can be performed effectively and safely. The overall number of nodes removed, the likelihood of node positivity, and the types and rates of complications of PLND were similar to those of pure laparoscopic and open retropubic procedures.

Our study pointed out that open PLND allowed to retrieve a greater number of nodes (14 *vs* 11, respectively; p = 0.05) than the robot-assisted one, but this did not turn into a significant difference in the rate of patients

classified as node-positive (14.7% for the open approach and 11.4% for the robotic one). It is worth mentioning that we analysed just the first 35 consecutive cases of our robotic experience, and case load is known to play a key role in almost all surgical procedures [34]. Also, we did not experience more complications with the robotic approach in spite of potential specific complications of this procedure are well known [35]. Conversely, the robotic approach prevented lymphoceles requiring percutaneous drainage, which were seen in 9% of patients having undergone the open approach. This may be a potential advantage of the robotic approach in patients aged > 65y, since the mean age of patients who suffered lymphoceles requiring percutaneous drainage was 70y.

Our study is not without limitations. First, the number of patients is small but we aimed to evaluate the outcome of the initial phase of our robotic experience, assuming we can only do better by time. Second, surgeon's and pathologist's diligence may impact on the number of nodes retrieved; however, this was a single-surgeon experience (GC) with a single pathologist reviewing all specimens.

In conclusion, robot-assisted PLND proved to be safe and effective even during the learning curve. Though providing a lower number of nodes, it did not significantly affect correct N staging. The robotic approach seemed to be safer than the open one since it prevented lymphocele occurrence, which was found to be a common complication of the elderly probably due to impaired vascular and lymphatic status. However, it should be taken into account that the robotic approach is time consuming and this may be relevant in patients with significant preoperative comorbidity, like the elderly, whereby surgical time may be an issue.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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