

Platinum Priority – Collaborative Review – Prostate Cancer

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Pelvic Lymph Node Dissection During Robot-assisted Radical Prostatectomy: Efficacy, Limitations, and Complications—A Systematic Review of the Literature

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Abstract

Context: Pelvic lymph node dissection (PLND) in prostate cancer is the most effective method for detecting lymph node metastases. However, a decline in the rate of PLND during radical prostatectomy (RP) has been noted. This is likely the result of prostate cancer stage migration in the prostate-specific antigen-screening era, and the introduction of minimally invasive approaches such as robot-assisted radical prostatectomy (RARP).

Objective: To assess the efficacy, limitations, and complications of PLND during RARP.
Evidence acquisition: A review of the literature was performed using the Medline, Scopus, and Web of Science databases with no restriction of language from January 1990 to December 2012. The literature search used the following terms: *prostate cancer, radical prostatectomy, robot-assisted, and lymph node dissection.*

Evidence synthesis: The median value of nodal yield at PLND during RARP ranged from 3 to 24 nodes. As seen in open and laparoscopic RP series, the lymph node positivity rate increased with the extent of dissection during RARP. Overall, PLND-only related complications are rare. The most frequent complication after PLND is symptomatic pelvic lymphocele, with occurrence ranging from 0% to 8% of cases. The rate of PLND-associated grade 3–4 complications ranged from 0% to 5%. PLND is associated with increased operative time. Available data suggest equivalence of PLND between RARP and other surgical approaches in terms of nodal yield, node positivity, and intraoperative and postoperative complications.
Conclusions: 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 are similar to pure laparoscopic and open retroperitoneal procedures.

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1. Introduction

Pelvic lymph node dissection (PLND) in prostate cancer (PCa) is the most effective method for detecting lymph node metastases. Appropriate staging allows for more precise prognostication and it may help guide postsurgical follow-up and guide selection of either adjuvant or salvage therapy. However, a decline in the rate of PLND during radical prostatectomy (RP) has been noted, likely due to PCa stage migration that has occurred in the prostate-specific antigen (PSA) screening era and the introduction of minimally invasive approaches. Although the first reports of PLND during robot-assisted radical prostatectomy (RARP) demonstrated the technical feasibility of PLND, patients undergoing open RP were more likely to have concomitant PLND than patients undergoing minimally invasive radical prostatectomy [1–4]. Among surgeons performing both open and robotic approaches, one-fifth reported that the indication for and extent of PLND differed based on surgical approach [5]. Various factors such as surgical volume, learning curve of RARP, and increased operative room time and costs have been suggested to account for the lower likelihood of performing PLND during minimally invasive RP. Thus, the adequacy of robotic PLND during RARP has been questioned. Both open and RARP should have identical indications for and extent of PLND. Recent reports have demonstrated the feasibility of PLND during the robotic procedure. This review assesses the efficacy, limitations, and complications of PLND during RARP.

2. Evidence acquisition

A review of the literature was performed using the Medline, Scopus, and Web of Science databases according to Preferred

Reporting Items for Systematic Reviews and Meta-analysis guidelines [6]. We identified original articles, reviews, and editorials with no restriction of language from January 1990 to December 2012. All published retrospective or prospective full articles were included. Congress communications and abstracts were not included. The literature search used the following terms: *prostate cancer*, *radical prostatectomy*, *robot-assisted*, and *lymph node dissection*. Reference lists of the included studies were checked to identify further studies. The primary outcomes included the number of nodes sampled and the number of positive nodes. The secondary outcomes included the perioperative and postoperative complications of PLND. Articles that did not include these outcomes were excluded. Study eligibility was independently determined by two authors who resolved discrepancies by open discussion (G.P., J.E.). A total of 2150 articles were identified from databases. After reading the titles, 195 abstracts were retrieved for evaluation, and from these, 85 full-text studies were retrieved for evaluation. The selected articles were reviewed and summarised with the consensus of all the authors of this review article.

3. Evidence synthesis

3.1. Anatomic landmarks: prostate cancer drainage

Historically, the levels of lymph node drainage have been segregated into internal iliac, obturator, external iliac, and presacral [7]. Autopsy studies suggest that the predominant region for lymph node metastasis is the external iliac region [8]. Nevertheless, various studies support primary spread of PCa to the internal iliac chain rather than the ilio-obturator lymph nodes [9–12]. The presacral region has also been identified as the initial site of lymphatic drainage in a small

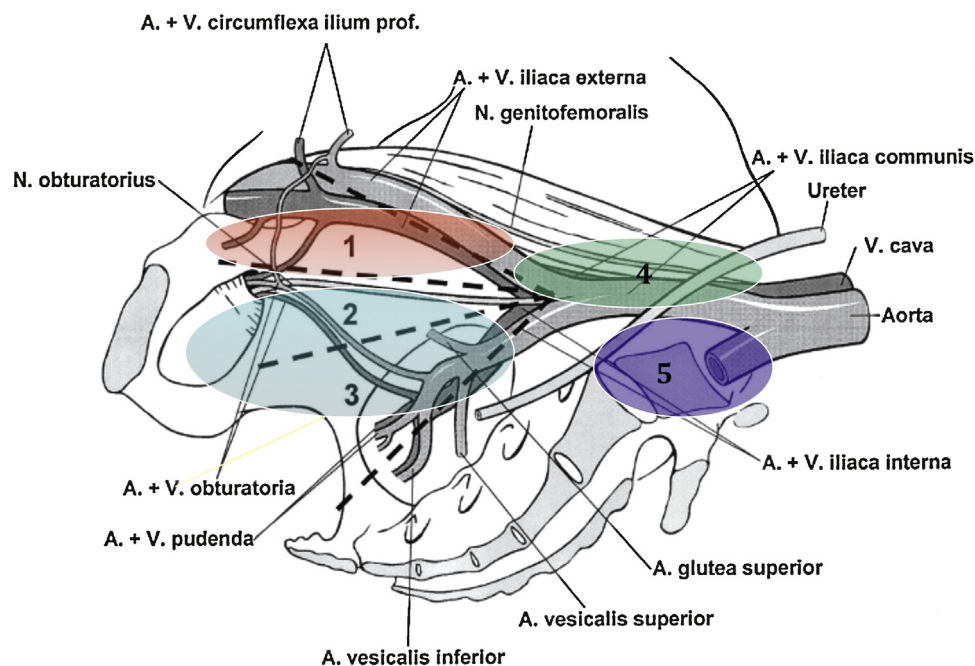


Fig. 1 – Anatomic limits of pelvic lymph node dissection (PLND). Area 1 (red): limited PLND. Areas 1–3 (blue): standard PLND. Areas 1–4 (green): extended PLND. Areas 1–5 (purple): superextended PLND. A = arteria; V = vena; prof = profunda; N = nervus.

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