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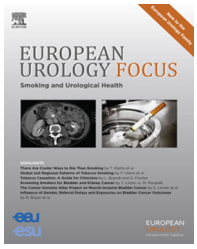

Prostate Cancer

Five-year Outcomes for a Prospective Randomised Controlled Trial Comparing Laparoscopic and Robot-assisted Radical Prostatectomy

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Abstract

Background: The literature is lacking randomised controlled trials comparing robot-assisted (RARP) and laparoscopic (LRP) radical prostatectomy, especially for follow-up >1 yr.
Objective: To report 5-yr outcomes for our previously published prospective randomised study comparing RARP and LRP.
Design, setting, and participants: From January 2010 to January 2011, 120 patients with organ-confined prostate cancer were enrolled and randomly assigned to RARP or LRP.
Intervention: A single surgeon performed all interventions using the same transperitoneal anterograde technique.
Outcome measurements and statistical analysis: Continence, potency, and serum prostate-specific antigen were assessed postoperatively at 1, 3, 6, and 12 mo, and then every 6 mo until 60 mo. At the end of the follow-up period, patients were administered questions 1 and 46 of the Expanded Prostate Cancer Index Composite questionnaire to assess their satisfaction with the intervention and general health status. A generalised estimating equations model was used to compare time series data for functional results, and Kaplan-Meier and Cox models were used to analyse oncologic outcomes.
Results and limitations: The probability of achieving continence (odds ratio [OR] 2.47, $p < 0.021$) and potency (OR 2.35, $p < 0.028$) over time was more than doubled for the RARP compared to the LRP group. There was no difference between the two approaches in terms of patient survival. Pathologic Gleason score, positive surgical margins, and pT stage were associated with significantly higher biochemical recurrence in Cox multivariate models. Patient satisfaction with the intervention and their general health status was significantly higher in the RARP group.
Conclusions: Throughout the 5-yr follow-up, RARP yielded better functional results compared to LRP, without compromising oncologic outcomes.
Patient summary: In this report we looked at 5-yr outcomes for a study comparing robot-assisted radical prostatectomy (RARP) and laparascopic radical prostatectomy for the treatment of prostate cancer. We found that continence and potency are better among patients treated with RARP, while oncologic results are comparable.

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1. Introduction

Radical prostatectomy (RP) is the standard surgical treatment for clinically localised prostate cancer [1] and robot-assisted RP (RARP) has become a popular procedure both in the USA and Europe. More than 75% of RARP procedures are now performed using the da Vinci platform (Intuitive Surgical, Sunnyvale, CA, USA) [2,3].

In recent years, reviews and meta-analyses of the literature have highlighted the potential benefits for functional outcomes of RARP compared to open and laparoscopic approaches [4–6]. Moreover, Tewari et al [7] suggested that a robotic system can shorten the learning curve for minimally invasive RP and reduce short-term complication rates. However, the vast majority of studies in the literature have failed to demonstrate the superiority of RARP in terms of oncologic results, at least in terms of positive surgical margin (PSM) rates, with data on biochemical recurrence (BCR) after RARP versus laparascopic (LRP) still being poor [7,8].

There is a paucity of data from prospective randomised studies comparing RARP to LRP. Moreover, the vast majority of studies are focused on perioperative results, and no data are available for medium-term or long-term follow-up.

We previously reported 1-yr results from a prospective single-centre, single-surgeon randomised study comparing LRP and RARP [9]. This study population has been prospectively followed over time, and all patients recently completed 5-yr follow-up after the intervention. The aim of the present paper is to report the 5-yr outcomes from this prospective randomised study.

2. Patients and methods

2.1. Study design

The enrolment phase began in January 2010 and ended in January 2011; the follow-up period was formally closed in January 2016. The study was approved by the local ethics committee of San Luigi Gonzaga Hospital in Orbassano, Italy.

A total of 120 males with pathologically confirmed prostate cancer (T1–2N0M0) clinically staged according to TNM 2009 [10] for whom RP was indicated signed written informed consent and were randomly assigned to LRP or RARP.

All the interventions were performed at San Luigi Gonzaga Hospital by a single surgeon (F.P.). Both RARP and LRP were performed using our previously described transperitoneal anterograde approach [9]. When indicated, unilateral or bilateral neurovascular bundle preservation (nerve-sparing [NS] procedure) and extended pelvic lymph-node dissection (LND) were performed.

Demographic, intraoperative, postoperative, and pathologic data and complications were collected and recorded in a dedicated database by staff members and then analysed.

2.2. Functional data

Preoperative and postoperative continence was defined using a single question from the Expanded Prostate Cancer Index Composite (EPIC) questionnaire [11]: How many pads or adult diapers per day do you usually use to control leakage? Patients were defined as continent if they did not use any pads or used one safety pad per day. Urinary continence was reported at 1, 3, 6, and 12 mo, and then every 6 mo until 60 mo after surgery.

For patients who underwent NS surgery, potency was defined as the ability to achieve an erection sufficient for penetration (full or diminished erections are routinely sufficient for intercourse) with or without the use of a phosphodiesterase type 5 enzyme inhibitor. Potency was reported at 1, 3, 6, and 12 mo, and then every 6 mo until 60 mo after surgery.

2.3. Oncologic data

Serum prostate-specific antigen (PSA) levels were measured at 1, 3, 6, and 12 mo, and then every 6 mo. Patients who received adjuvant therapies during the follow-up period, such as radiotherapy (RT) and hormonal treatment (HT), were recorded.

BCR was denoted as (1) any postoperative cancer treatment, such as RT, HT, or chemotherapy; or (2) PSA >0.2 ng/ml with a single repeated measurement for confirmation [12–14].

BCR-free survival (BCRFS) was measured from the date of surgery to the date of the recurrence; for patients who underwent adjuvant RT or HT after surgery, before a PSA rising, BCRFS was measured from the date of surgery to the date of the start of adjuvant therapy; patients who did not have BCR were censored at the date of the last follow-up visit.

2.4. Late complications and other surgical interventions

Late complications that occurred during follow-up and any further intervention after RP performed during follow-up were recorded. Patients who underwent surgery for incontinence were considered as incontinent for functional analysis. The outcomes of surgeries were reported separately.

2.5. Patient satisfaction and health status

To assess patient satisfaction after surgical intervention and general health status as subjectively perceived by the patient, questions 46 and 1 of the EPIC questionnaire were administered during the last follow-up visit [11].

2.6. Statistical analysis

Associations between any categorical variable (digital rectal examination, biopsy Gleason score, pathologic Gleason score, capsule margin invasion, TN stage, and BCR) and RP technique (RARP vs LRP) were analysed using Fisher's exact test. The Mann-Whitney test was used for inferential analyses of continuous variables (body mass index, PSA, prostate volume, and cancer volume); all descriptive results for these variables are expressed using median values.

For survival analyses, BCRFS curves were estimated by the Kaplan-Meier method and compared using the log-rank test. BCRFS was then analysed in univariate and multivariate Cox proportional hazards models and compared using the Wald test for the following risk factors: age at RP (≥71 vs ≤70 yr), PSA at diagnosis, margins (positive vs negative), pathologic Gleason score (≥7 [4 + 3] vs ≤7 [3 + 4]) and T stage (≥T3b vs T3a vs T1–2).

For functional data, continence and erectile function recovery rates were reported at 12 fixed time points (1, 3, 6, 12, 18, 24, 30, 36, 42, 48, 54, and 60 mo) after RP. The impact of follow-up after RP and the role of RP technique (RARP vs LRP) were evaluated using the generalised estimating equations (GEE) model for repeated-measures logistic regression. GEE is considered an extension of the generalised linear model to longitudinal data when the outcomes are correlated; in our case, the first-order autoregressive correlation matrix best represented the within-subject dependence. Therefore, the trend for continence or

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