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European Association of Urology

Editorial – referring to the article published on pp. 785–793 of this issue

Robotic-Assisted Prostatectomy: Is There Truth in Advertising?

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The goal of radical prostatectomy (RP) is to remove the entire prostate with negative surgical margins, without intra- or perioperative complications or blood transfusions and with full recovery of baseline urinary continence and erectile function. While no surgeon universally achieves these goals, there certainly is the suggestion, both in the published literature and on the Internet, that optimum patient outcomes after RP are more consistently achieved with robotic-assisted approaches than with open ones. Indeed, the manufacturer of the robotic system states on its Web site that the potential benefits of robotic-assisted prostatectomy are:

> **Effective Cancer Control:**
> Studies have shown that experienced surgeons have achieved excellent results in removing prostate cancer without leaving cancer cells behind.
> **Improved and Early Return of Sexual Function:**
> Studies have shown that most patients have a rapid return of sexual function.
> **Improved and Early Return of Continence:**
> Studies have shown that most patients have a rapid return of urinary continence [1].

Such claims are made despite a paucity of clinical data. There have been no prospective randomized trials comparing patient outcomes after robotic-assisted and open RP. Single-institution studies have their own inherent biases. Most ultimately conclude that the approach favored by the investigators has ''better'' outcomes. Few hospitals promote open RP, whereas the majority of centers with the robotic system advertise these services. Patients are given the distinct impression that robotic-assisted RP is superior in essentially every comparison—oncologic and functional—to open surgery.

Why, then, is patient satisfaction with robotic-assisted surgery inferior to open surgery? The simple reason is unmet patient expectations. Unsubstantiated claims are made about the benefits of undergoing a robotic-assisted RP rather than an open RP. Schroeck et al detail outcomes in patients who had underwent open radical RP or robot-assisted RP between 2000 and 2007 [2]. Patients were mailed cross-sectional surveys composed of sociodemographic information, the Expanded Prostate Cancer Index Composite (EPIC), and questions regarding satisfaction and regret. A total of 400 patients responded (response rate: 61%), of whom 84% were satisfied and 19% regretted their treatment choice. In multivariate analysis, lower income (odds ratio [OR]: 0.08; 95% confidence interval [CI], 0.03–0.23), shorter follow-up (OR: 0.63; 95% CI, 0.41–0.98), having undergone open RP versus robotic-assisted RP (OR: 4.45; 95% CI, 1.90–10.4), urinary domain scores (OR: 2.70; 95% CI, 1.60–4.54), and hormonal domain scores (OR: 2.01; 95% CI, 1.30–3.12) were independently associated with satisfaction ($p \leq 0.039$). In terms of regret, robotic-assisted RP versus open RP (OR: 3.02; 95% CI, 1.50–6.07), lower urinary domain scores (OR: 0.58; 95%

DOI of original article: 10.1016/j.eururo.2008.06.063
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 doi:10.1016/j.eururo.2008.07.035

CI, 0.37–0.91) and hormonal domain scores (OR, 0.67; 95% CI, 0.45–0.98), and years since surgery (OR: 1.63; 95% CI, 1.13–2.36) were again predictive ($p \leq 0.041$).

The investigators conclude that sociodemographic variables and quality of life were important variables associated with satisfaction and regret with patients who underwent robotic-assisted RP who were more likely to be regretful and dissatisfied. The authors suggest that urologists carefully portray the risks and benefits of the robotic-assisted procedure during preoperative counseling to minimize patient regret and maximize satisfaction. These results further suggest that there is no basis for portraying open RP, a procedure with which the patient is likely to be 4.4 times more satisfied, as inferior to robotic-assisted RP.

The study by Schroeck et al [2] strongly suggests that the potential or theoretical benefits of robotic-assisted RP are conveyed to the patient rather than realistic outcomes. The concept that lower blood loss and magnification leads to a better ability to perform RP is simply unproven. This is most apparent in the area of recovery of erectile function. Rojas-Cruz and Mulhall [3] accessed links posted on the Intuitive Surgical Web page (www.davincipros-tatectomy.com). They identified 116 hospital Web pages and reviewed them for information regarding erectile function outcomes, focusing on any claims that robotic-assisted RP was advantageous over open RP and data to support such claims. Of the 116 Web pages reviewed, 75 described robotic-assisted RP. Approximately 40% contained text that was explicitly copied from the Intuitive Surgical Web page, with a similar percentage having direct links to that Web page. Of the 45 (60%) sites reporting information on potency, 78% stated potency was better after robotic-assisted RP than open RP, 52% stated that nerve preservation was better, and 15% stated that potency results might be similar. Only 15% had any potency data, and only two sites reported their own data.

The reality is that there are no data to confirm a potency benefit after robotic-assisted RP, either in terms of time to potency or overall potency outcomes. Confusion about the facts is further confounded by the practice of reporting outcomes in the most favorable patients, even if this subgroup represents a minority of the patients being treated. Consider the well-cited manuscript by Menon et al [4]. The authors state in the abstract that ''the intercourse rate was 93% in men with no preoperative erectile dysfunction undergoing veil nerve-sparing surgery.'' While this statement is true, the caveats of this conclusion are deep within the manuscript itself. The authors state that 42% of patients underwent standard bilateral nerve sparing, 25% of patients had a unilateral veil with contralateral standard nerve sparing, and 33% of patients underwent a bilateral veil nerve-sparing operation. This is quite perplexing in that no patient is reported to have even a portion of his nerve bundle resected. No other published surgical series detailing potency outcomes after RP includes 100% of patients undergoing bilateral nerve sparing. This is despite the fact that 22% of this patient population had clinical stage T2 disease or higher and 70% had Gleason score $\geq$7 cancer. Twelve months following robotic-assisted RP in men with a preoperative Sexual Health Inventory for Men (SHIM) $>$21, 40% of men undergoing standard bilateral nerve sparing, 60% of men undergoing unilateral veil and contralateral standard nerve sparing, and 70% of men undergoing bilateral veil nerve sparing were potent (defined as ''able to have intercourse''). The true number of men with this level of preoperative erectile function is not stated in the manuscript. Two questions arise. First, if preoperative potency is defined by a SHIM score, why is postoperative potency defined as ''able to have intercourse'' rather than a SHIM score? Second, what is the likelihood of potency for an individual patient undergoing robotic-assisted RP? A given patient is most likely to be quoted the most optimistic outcome, which would only apply to the minority of patients. In addition, are these outcomes really ''better'' than open surgery? Montorsi et al reported potency outcomes after open RP [5]. In the select population—patients who were preoperatively potent and underwent bilateral nerve sparing—patient-reported postoperative erectile function (International Index of Erectile Function [IIEF] erectile function domain score $\geq$26) was 58% 6 mo after surgery. Similarly, Masterson et al reported that in preoperatively potent patients undergoing bilateral nerve-sparing open RP (representing 60% of the patient population), patient-reported postoperative erectile function (corresponding to an IIEF erectile function domain score $\geq$20), was 79% 6 mo after surgery (Table 1) [6]. Clearly, any claim that potency after robotic-assisted RP is superior to potency outcomes after open RP is unfounded.

What about the claims that cancer control, the primary objective of RP, is more likely to be achieved using robotic-assisted techniques? A recent report suggests that oncologic outcomes after robotic-assisted RP may actually be inferior to outcomes obtained with open RP. Hu et al studied 2702 men undergoing minimally invasive (robotic-assisted and laparoscopic) RP and open RP between 2003 and 2005 from a national 5% sample of Medicare beneficiaries [7]. The investigators determined that

Table 1 – Recovery of potency after bilateral nerve-sparing (BNS) radical robotic-assisted laparoscopic prostatectomy (RALP) and open radical prostatectomy (RP)

Series	Approach	% of patients undergoing BNS	Potency (%)
Menon (2007) [4]	RALP	33	70[a]
Montorsi (2005) [5]	Open RP	NA	58[b]
Masterson et al (2007) [6]	Open RP	60	79[c]

NA, not applicable.
[a] Patient-reported rate of intercourse 12 mo after surgery following "veil-of-Aphrodite" technique.
[b] Patient-reported postoperative erectile function (International Index of Erectile Function [IIEF] erectile function domain score ≥26) 6 mo after surgery.
[c] Patient-reported postoperative erectile function (IIEF erectile function domain score ≥20) 6 mo after surgery.

men undergoing a minimally invasive RP were >3.5 times more likely to be treated with salvage therapy (radiation and/or hormonal therapy) within 6 mo of surgery than men treated with open RP (minimally invasive RP: 28%; open RP: 9%; OR: 3.67; 95% CI, 2.81–4.81). While this difference narrowed as minimally invasive surgeons gained experience (minimally invasive RP salvage therapy ranged from 40% for low-volume surgeons to 19% for high-volume surgeons), the use of salvage therapy remained higher.

The study by Hu et al [7] highlights the importance of surgical experience in improving oncologic outcomes. Various authors have concluded that in order to become proficient at robotic-assisted RP (defined as achieving outcomes comparable to their open surgical experience), a surgeon must perform as few as 8–12 cases [8] to as many as 200 cases [9]. Certainly the perceived number of cases will depend upon the expectations of the surgeon regarding patient outcomes. Current data suggest that the most significant outcomes (cancer control, continence, and potency) with robotic-assisted RP are no better than with open RP. If a surgeon opts to convert from open to robotic-assisted RP, he or she must go through a learning curve that, conservatively, is a minimum of 100 cases. Simple math predicts that a number of patients are achieving inferior outcomes than they might otherwise have obtained. In addition, some surgeons do not have the patient volume to ever complete their learning curve.

How can patient satisfaction with robotic-assisted and open RP approaches be improved? The simple answer is, the surgeon should always give the patient a realistic understanding of the probable outcomes at that individual surgeon's hand. Actual, rather than theoretical, data should be provided. The surgeon should discuss his or her own results rather than describe the "best case scenario" from the literature. The benefit to the patient is knowing what to expect. The benefit to the surgeon is not only having a patient who is more likely to be satisfied with his outcome but also identifying areas where technique might be modified to improve results.

Conflicts of interest: The author has nothing to disclose.

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