Does the Extraperitoneal Laparoscopic Approach Improve the Outcome of Radical Prostatectomy?

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Introduction

Throughout the past several years, laparoscopic radical prostatectomy (LRPE) has become a routine procedure for the treatment of localized prostate cancer in selected urological departments in Europe and the United States, challenging traditional open surgical procedures. LRPE was first performed by Schuessler et al. [1] in 1992, but it was in 1998 when Guillonneau et al. [2] reported an initial series of 28 cases with a standardized technique based on the primary access to the seminal vesicles.

Although the departments performing routine laparoscopic prostatectomies are relatively few, it is likely that minimal invasive radical prostatectomy will become a standard procedure in most urology departments. In a recent survey of urology departments, 35% of those performing laparoscopy also have introduced radical prostatectomy and almost 100% plan to introduce it [3,4]. These data, the patients’ increasing suffering, and pressure toward minimal invasive procedures and reimbursement issues will play a key role in the future.

One of the major recent advancements in minimal invasive radical prostatectomy is the introduction of the totally extraperitoneal approach. The first case of extraperitoneal laparoscopic radical prostatectomy was described by Raboy et al. [5] in 1997. The first series of 42 cases of extraperitoneal laparoscopic radical prostatectomy was published by Bollens et al. [6] in 2001. In conjunction with the study by Bollens et al. [6], Stolzenburg et al. [7–9] developed a similar approach termed endoscopic-extraperitoneal radical prostatectomy (EERPE). Based on our growing experience with this procedure, we subsequently introduced several technical modifications, improvements, and refinements, including a nerve-sparing, potency-preserving approach (nEERPE), in an effort to further improve this minimally invasive procedure [10••].

Principal outcome parameters in radical prostatectomy for localized prostate cancer are the short- and long-term oncologic outcome and the functional (continence rates, potency rates) results. Additional aspects to be evaluated are intra-, peri- and postoperative complication rates, operative time, quality-of-life considerations, and socioeconomic considerations. This article reviews the available literature on minimally invasive (LRPE and EERPE) radical prostatectomy.
Oncologic Results
The most important surrogate parameter for short-term oncologic outcome is the rate of positive margins in the series that have been published. Türk et al. [1] noted positive surgical margins in 20% of pT2 and 69% of pT3 (total, 44%) in their series of 145 patients who underwent LRPE. Rassweiler et al. [12] found positive surgical margins in 2.5% (pT2a), 15.5% (pT2b), 38.8% (pT3a), and 54.5% (pT3b), respectively. In their large series that included 1000 patients who underwent laparoscopic radical prostatectomy, Guillonneau et al. [13] reported positive surgical margin rates in 6.9% (pT2a), 18.6% (pT2b), 20% (pT3a), and 34% (pT3b) of patients, respectively. Few data are available comparing the short-term oncologic outcome between the transperitoneal versus extraperitoneal approaches. Hoznek et al. [14] found that the incidence of margin positivity corrected for pathologic stage was similar, regardless of the operative approach.

Bollens et al. [6] reported a positive surgical margin rate of 22% in their series of extraperitoneal prostatectomies (n = 42). In our most recent data of 300 patients who underwent endoscopic extraperitoneal radical prostatectomy, the positive surgical margin rates were 9.2% of pT2 tumors and 30.3% of pT3 tumors (Stolzenburg et al., submitted for publication). Therefore, the first oncologic results with EERPE equal the data of large series of laparoscopic radical prostatectomy and standard open radical prostatectomy in centers of excellence. The absence of tactile control does not lead to a higher rate of positive surgical margins at the apex compared with open prostatectomies [15].

Another important aspect is the freedom from prostate-specific antigen (PSA) progression. Although available data are limited to few investigators, the 3-year follow-up data by Guillonneau et al. [13] should be noted. PSA progression-free survival was found in 91.8% (pT2a), 88% (pT2b), 77% (pT3a), and 44% (pT3b) of patients, respectively. These data match oncologic results of similar series with open prostatectomies [4,16]. There are no long-term follow-up results or PSA progression-free survival rates available for EERPE; however, because of the similar technique (identical instruments, similar excellent visualization), no significant differences are to be expected.

Potency Rates
Published potency rates after standard radical retropubic prostatectomy vary considerably from 0% to 91% [4,16]. Main factors influencing potency rates after radical prostatectomy are age, clinical and pathologic tumor stage, surgical technique (uni- vs bilateral nerve sparing), and preoperative risk factors for erectile dysfunction [4,19,20]. Potency rates after laparoscopic radical prostatectomy are not as well investigated as in open prostatectomies. Minimally invasive techniques continue to undergo technical improvements and refinements. For example, there is still an ongoing debate regarding which surgical armamentarium is best suited for the preservation of the neurovascular bundles (ultrasound scalpels vs bipolar forceps vs endoclips). However, initial results of potency-preserving strategies are very encouraging: up to 67% of pre-operative potent patients have erections sufficient for intercourse 6 months after undergoing a minimal invasive radical prostatectomy [6,11]. The superior visibility of the pelvic anatomy is one of the fundamental advantages of minimally invasive procedures. Ultimately, this should translate into favorable postoperative potency rates in experienced hands.

Operative Time
Operating time reflects the feasibility and reproducibility of the procedure and has been used as variable to express the level of difficulty and to define the learning curve of a technique. It also has direct influence on cost effectiveness on many levels. In addition, operative time is linked with operative and postoperative morbidity and is one of the factors determining the need for invasive anesthetic monitoring. The estimated length of a procedure especially during the initial learning curve, which may be considerable and thus be discouraging, determines the surgeon’s attitude toward a novel operative technique.

Operating time was one of the major concerns during the initial development of LRPE. According to Rassweiler et