PROSTATE CANCER

Superior outcomes after a long learning curve with RARP

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Despite increased use of robot-assisted radical prostatectomy (RARP), there is still a paucity of data defining the learning curve associated with this approach. A recent study suggests superior quality-of-life outcomes and improved surgical margin rates are achievable after a long learning curve for open surgeons who undertake RARP.

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In 2012, an estimated 241,740 men were diagnosed with prostate cancer.[1] In a prospective randomized trial, radical prostatectomy was the only treatment for localized prostate cancer to show a benefit for cancer-specific survival compared with conservative management.[2] Increasing life expectancy and the emergence of new robotic technology have accounted for a resurgence of minimally invasive surgical treatments for the management of prostate cancer.[3] In view of healthier geriatric populations, greater emphasis is being placed on quality of life (QOL) and safer oncological outcomes. Robot-assisted radical prostatectomy (RARP) involves safe surgical removal of the prostate with lower rates of blood loss and transfusion than those associated with open prostatectomy.[4] Although robot assistance was used for 80% of all prostatectomies performed in the USA in 2010,[5] there is a paucity of data defining the learning curve required to achieve equivalent or superior QOL outcomes compared with open radical prostatectomy (ORP).

A recent single-surgeon study by Thompson *et al.*[6] has provided new insight into the impact of the learning curve of experienced open surgeons adapting to robotic radical prostatectomy. QOL parameters and positive surgical margins (PSMs) were assessed prospectively in a cohort of 1,552 consecutive patients receiving either RARP ($n = 866$) or ORP ($n = 686$). Of the outcomes evaluated, erectile function, urinary function, and PSMs following RARP surpassed those achieved with open prostatectomy beyond the initial learning curve. Sexual function and early incontinence scores for RARP surpassed those for ORP after 99 RARPsand 182 RARPs, respectively. The odds of pT2 PSMs were initially higher for RARP than for ORP, but became lower after 108 RARPs. The authors concluded that RARP might be worthwhile for young or high-volume surgeons, but not for late-career or mid-career low-volume surgeons, owing to the fact it can take 5 years to achieve similar outcomes and 15 years to achieve superior outcomes.

Thompson *et al.*[6] make a valiant attempt to quantify an effect that is inherently challenging to define, the 'learning curve'. The duration of the learning curve is highly subjective and depends on the parameters used for comparison and set expectations. In this study, the authors perform a straight comparison between ORP and RARP and find that, after a certain number of cases, QOL outcomes with RARP surpass those associated with ORP. What the study fails to recognize and acknowledge, however, is the overbearing influence of the prior 3,000 ORPs. The QOL outcomes for ORP would undoubtedly have been raised by the prior open experience of the surgeon, thus raising the bar for the RARP cohort.

> "...[outcomes] following RARP surpassed those achieved with open prostatectomy beyond the initial learning curve..."

What further confounds the study is the large percentage of patients who were not included in the analysis. Every surgical case experience, whether open or robotic, has some value and influences the learning curve and outcomes. However, of the 1,552 patients who participated in the study, 874 (52%) were excluded from analysis owing to lack of data. Of the 637 remaining patients, 379 had RARP and 230 had ORP. From the surgeon's overall experience of 4,552 patients, data from a mere 379 (8%) of them were used to draw conclusions relating to the learning curve for RARP, which is obviously influenced by the other 92% of cases. It is difficult to draw conclusions on the number of cases needed to surpass one's own expectations from such a limited sample size. The only conclusion we can conclusively draw is that surgeons who start RARP having already performed thousands of open cases are still likely to experience a learning curve for RARP numbering hundreds of patients.

This study also includes an inherent selection bias owing to the type of patient chosen for each specific type of procedure. The surgical team was more likely to select the ORP technique earlier in the series compared with later. 84% of the ORP cases were performed from 2006–2009, whereas almost 50% of RARP cases were done after 2009. ORP patients were also more likely to have a stage T3/T4 cancer compared with RARP patients (44% versus 34%) and were less likely to have full nerve preservation (63% versus 81%). Thus, it seems that there was a selection bias towards performing ORP earlier in the learning curve and for higher-risk disease, a sensible approach for the period of RARP incorporation. It makes sense for the surgeon to slowly incorporate RARP while mainly performing ORP initially, using RARP for the lower-oncological-risk patients.

In summary, the study is well conducted and makes some important conclusions. One of the key lessons here is that a plateau is reached with ORP, beyond which no improvements are seen. The switch to RARP marks the beginning of a new learning curve and, eventually, improved outcomes. The addition of robot-assisted technology renders inferior outcomes at first, but then eventually offers superior outcomes over the ORP approach. At some point, however, the improved outcomes experienced with RARP will also plateau. In agreement with Thompson and colleagues,[6] we advocate a slow transition from ORP to RARP, with an initial mixture of cases.

Our experience with robotic prostatectomy continues to grow and will no doubt be important for future studies of the QOL parameters these investigators have