



RESEARCH

INFORMATION

## Laparoscopic Radical Prostatectomy (LRP) vs Robotic assisted Laparoscopic Prostatectomy (RALP): a comparative study of outcomes and costs

### AIMS

To assess and compare the outcomes and costs for laparoscopic (LRP) versus robotic assisted radical prostatectomy (RARP) for early (3month) and 12 month urinary continence, potency and surgical margins.  
We also sought to compare the patient reported outcomes (PROM) across a range of criteria (urinary, sexual and overall quality of life).

### KEY FINDINGS

- We set out to compare two cohorts of patients –RARP at Guys/Royal Marsden in London, versus LRP at the Western General Hospital, Edinburgh. Unfortunately, the one-year follow-up for the RARP group proved difficult with approximately 50% of patients data missing. We therefore included the 1-year outcome data for the first 200 men undergoing RARP in Edinburgh. Our conclusions are therefore likely to be confounded by a lack of follow-up data in London and the learning curve effect for RARP in Edinburgh.
- We observed significantly lower positive surgical margin rate for RARP in London than with LRP. This difference was not observed in the RARP cohort in Edinburgh, which may be due to inter-observer differences between the reporting pathologists or learning curve effect. At 1 year the biochemical recurrence rate was no different between the 3 groups.
- RARP (London & Edinburgh) was associated with a significantly better early and late urinary continence rate than LRP. PROM data show statistically significantly better outcomes for RARP vs LRP for urinary incontinence (ICIQ-UI, EPIC-26 UI, EPIC-26 pad usage), sexual (EPIC-26- sexual), there was no significant difference, for IPSS, EPIC-26 (bowel or hormonal) symptoms.
- We observed a greater variability in outcomes between the surgeons performing LRP than RARP surgeons, which likely reflects the longer learning curve associated with LRP.
- The results of our economic analysis show that the cost of robotics is well above the 20-30k per QALY thresholds NICE recommend, when outcomes are assessed using the EQ5D5L QOL measure.



## WHAT DID THE STUDY INVOLVE?

The Scottish planning forum sought to assess whether it would be cost effective to invest in Robotics for prostate cancer surgery. We involved the Lothian prostate cancer support group and prostate Scotland in our planning of the study. As there were no Robotic urology units in Scotland in 2015 at the time we (Edinburgh, Department of Urology) where laparoscopic prostatectomy was being carried out set up a prospective comparison study with Guy's Hospital (London) and latterly the Royal Marsden (London) both experienced Robotic Urology units.

We sought to enrol a minimum of two hundred patients from both centres into the study and followed for 1 year after surgery. Patient reported outcomes were collected at baseline, 6 weeks, 3,6,9 and 12 months post-op.



## WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

In total 201 patients were recruited and enrolled in the laparoscopic (LRP) group and 238 in the initial Robotic group (RARP) from London. The groups were not evenly matched, with the LRP group having a greater proportion of higher risk men in it and greater detail of men with prostate cancer beyond the prostate (pT3). This makes any comparison of outcomes more difficult.

- With regard to oncological outcomes: The overall margins rate was significantly lower for the RARP group (18.3%) vs LRP (33.8%), however, when apical only margins were removed this narrowed the difference substantially (11.1% vs 16.4%). Focal apical margins are now believed not to be to be important in cancer returning (biochemical recurrence). There was no difference at 1 year for biochemical recurrence rate between the 2 groups.

One of the arguments for the use of robotics is to “future” proof the prostate cancer service, and certainly there was a trend towards less variability in the oncological outcomes for the RARP compared to the LRP group although this just missed statistical significance ( $p=0.06$ ).

- With regard to functional outcomes: The PROM data showed statistically significantly better outcomes for Robotic vs laparoscopic for both early and late urinary incontinence (ICIQ-UI, EPIC-26 UI, EPIC-26 pad usage), and sexual (EPIC-26- sexual), there was no significant difference, for IPSS, EPIC-26 (bowel or hormonal) symptoms. For sexual and urinary incontinence EPIC data this difference met the “minimal clinical importance difference” threshold. However, as noted that the RARP group had a very high rate of missing data (>100 patients) which was not the case in the LRP group, this may have had an effect on the outcomes of this comparison.

In order to further elucidate and control for outside factors “radiology and pathology” we compared our LRP groups outcomes with our first 200 RARP cases in Edinburgh. Whilst this includes the learning curve for RARP, a statistically and clinically significant lower late urinary incontinence and sexual function (EPIC-26) was observed with RARP in comparison to the LRP group.

- With regard to the economic analysis using in hospital, post hospital healthcare resource use and impact on QOL assess using EQ5D5L:

In all economic analyses including high case volumes (1000cases/year), LRP was considered the superior intervention. This was primarily driven by the capital investment and maintenance costs totalling 400k+ per year.



### WHAT IMPACT COULD THE FINDINGS HAVE?

- This study shows that The SGHD decision to invest in robotically assisted prostate cancer surgery is justified on the basis RARP is associated with better functional outcomes for men undergoing radical prostatectomy. While the economic cost of this is difficult to justify when assessed by the parameters we used it seems likely that differences in functional outcome are important to men and that RARP in high volume centres will also lead a reduction in the variance in outcomes between surgeons and centres across the country.
- Patients will be reassured that they are receiving the latest technology for prostate cancer surgery which can yield excellent outcomes.



### HOW WILL THE OUTCOMES BE DISSEMINATED?

The results will be presented at a meeting of the research committee and then presented at national and international meetings.

We anticipate that publication of the oncological and PROMs outcome data will be difficult in light of the differences between the groups observed at baseline and also the amount of missing follow-up data at 1 year from the London RARP group. However, we believe that the data we have collated provides a great opportunity to assess the relationship between pad use and PROMS outcome data, whilst also allowing analysis of the optimum time to assess PROMS post op.



### CONCLUSION

Robotically assisted radical prostatectomy leads to better functional outcomes in comparison to laparoscopic surgery. There is also a trend for less variability between surgeons performing RARP compared to LRP, which is likely due to the greater technical difficulty with LRP and means that investing in a RARP programme is likely to result in shorter surgical learning curves with reduced variation in outcome.

In summary, the shift to RARP is appropriate on the basis of improving outcomes and reducing variation, although overall RARP is more costly than LRP.



### RESEARCH TEAM & CONTACT

**Professor Alan McNeill**  
Consultant Urological Surgeon

 **Department of Urology**  
**NHS Lothian**  
**EH4 2XU**

 [Alan.mcneill@nhs.net](mailto:Alan.mcneill@nhs.net)

 **01315371000**

#### Additional Information

E.g.: Project end date 31<sup>st</sup> March 2019, grant award: £225,000