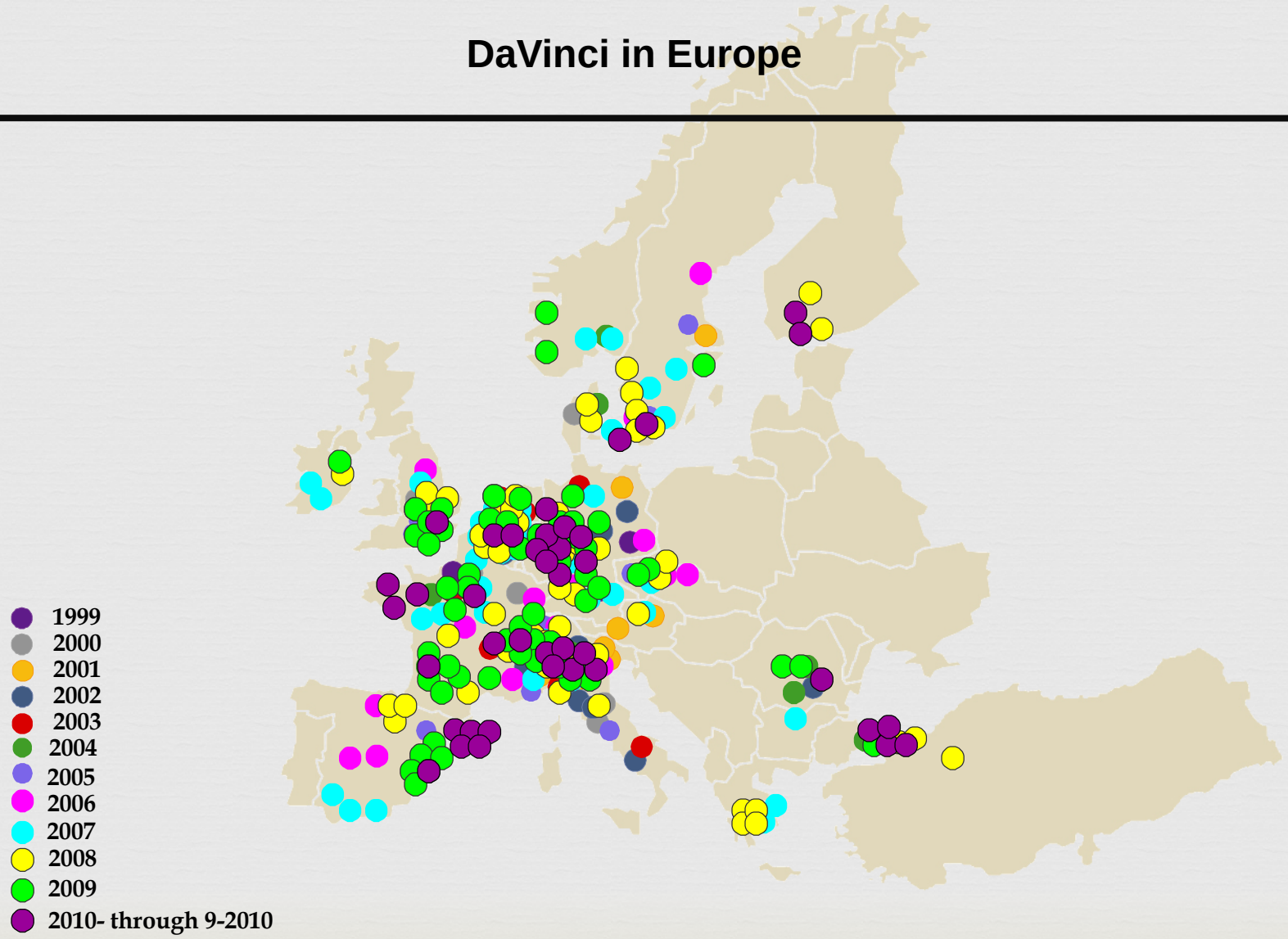
Open versus robot-assisted radical prostatectomy

Jonas Hugosson

Oslo 160205

DaVinci in Europe



Why is is important to discuss surgical technique?

- Surgery is the most common strategy to treat localised prostate cancer
- Treatment of prostate cancer is associated with a high rate of overtreatment
- The Quality of Life in prostate cancer patients is highly associated to the risk of permanent treatment associated side effects
- The rate of permanent side effects can be diminished by improving surgical technique

Articles

D-10-00484R2

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Mortality results from the Göteborg randomised population-based prostate-cancer screening trial

Jonas Hugosson, Sigrid Carlsson, Gunnar Aus, Svante Bergdahl, Ali Khatami, Pär Lodding, Carl-Gustaf Pihl, Johan Stranne, Erik Holmberg, Hans Lilja

Summary

Background Prostate cancer is one of the leading causes of death from malignant disease among men in the developed world. One strategy to decrease the risk of death from this disease is screening with prostate-specific antigen (PSA); however, the extent of benefit and harm with such screening is under continuous debate.

Methods In December, 1994, 20 000 men born between 1930 and 1944, randomly sampled from the population register, were randomised by computer in a 1:1 ratio to either a screening group invited for PSA testing every 2 years (n=10 000) or to a control group not invited (n=10 000). Men in the screening group were invited up to the upper age limit (median 69, range 67–71 years) and only men with raised PSA concentrations were offered additional tests such as digital rectal examination and prostate biopsies. The primary endpoint was prostate-cancer specific mortality, analysed according to the intention-to-screen principle. The study is ongoing, with men who have not reached the

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See Online/Reflection and Reaction DOI:10.1016/S1470-2045(10)70152-2

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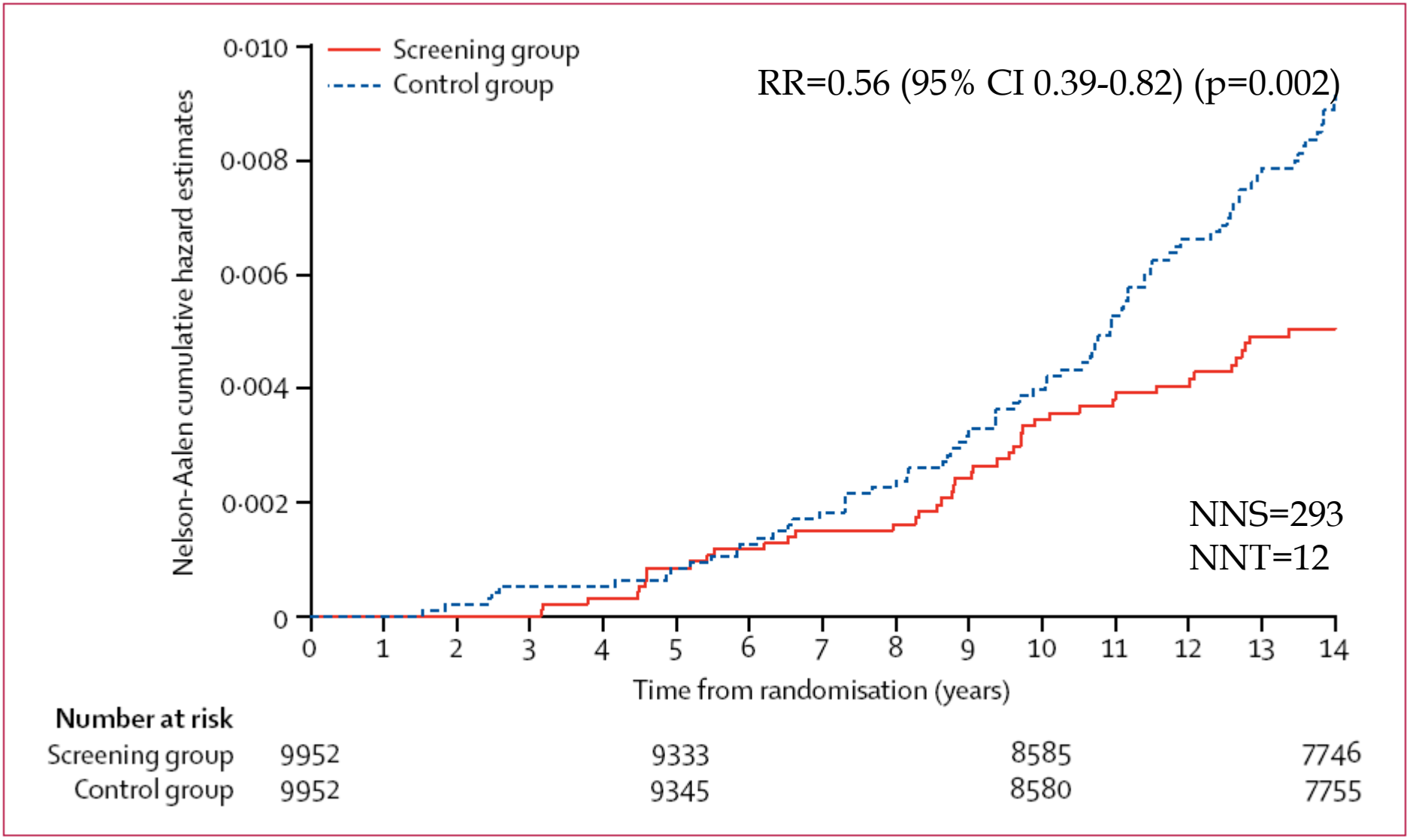

Figure 3: **Cumulative risk of death from prostate cancer using Nelson-Aalen cumulative hazard estimates**

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Quality-of-Life Effects of Prostate-Specific Antigen Screening

Eveline A.M. Heijnsdijk, Ph.D., Elisabeth M. Wever, M.Sc., Anssi Auvinen, M.D., Jonas Hugosson, M.D., Stefano Ciatto, M.D.,* Vera Nelen, M.D., Maciej Kwiatkowski, M.D., Arnauld Villers, M.D., Alvaro Páez, M.D., Sue M. Moss, Ph.D., Marco Zappa, M.D., Teuvo L.J. Tammela, M.D., Tuukka Mäkinen, M.D., Sigrid Carlsson, M.D., Ida J. Korfage, Ph.D., Marie-Louise Essink-Bot, Ph.D., Suzie J. Otto, Ph.D., Gerrit Draisma, Ph.D., Chris H. Bangma, M.D., Monique J. Roobol, Ph.D., Fritz H. Schröder, M.D., and Harry J. de Koning, M.D.

Table 2. Rates of Incontinence and Erectile Dysfunction Associated with Prostate-Cancer Treatments at Two ERSPC Centers.*

Side Effect and Treatment	Study Site	Rate of Side Effect				
		Preoperative	6 Mo	12 Mo	18 Mo	52 Mo
		percent				
Incontinence						
Regular daytime use of pads						
Radical prostatectomy (N = 294)	Gothenburg	1	NA	NA	16	NA
Daily urinary leakage and use of ≥3 pads per day						
Radical prostatectomy (N = 127)	Rotterdam	2	16	7	NA	6
Radiation therapy (N = 187)	Rotterdam	1	1	1	NA	3
Erectile dysfunction†						
No sexual activity or impotent						
Radical prostatectomy (N = 294)	Gothenburg	32	NA	NA	83	NA
Sexually active and erectile dysfunction or sexually inactive because of erectile dysfunction						
Radical prostatectomy (N = 127)	Rotterdam	31	88	88	NA	88
Radiation therapy (N = 187)	Rotterdam	40	42	43	NA	66

Table 1. Utility Estimates and Durations for Various Health States.

Health State	Utility Estimate			Source of Utility Estimate	Duration	Source of Duration†
	Base	Favorable	Unfavorable			
Screening attendance	0.99	1.00	0.99	Essink-Bot et al.[17] and de Haes et al.[18]	1 wk	Assumption
Biopsy	0.90	0.94	0.87	de Haes et al.[18]	3 wk	Assumption
Cancer diagnosis	0.80	0.85	0.75	Korfage et al.[19]	1 mo	Assumption
Radiation therapy						
At 2 mo after procedure	0.73	0.91	0.71	Stewart et al.[20]	2 mo	Stewart et al.[20]
At >2 mo to 1 yr after procedure	0.78	0.88	0.61	Konski et al.[21]	10 mo	Sanda et al.[22]
Radical prostatectomy						
At 2 mo after procedure	0.67	0.90	0.56	Stewart et al.[20]	2 mo	Stewart et al.[20]
At >2 mo to 1 yr after procedure	0.77	0.91	0.70	Calvert et al.[23]	10 mo	Sanda et al.[22]
Active surveillance	0.97	1.00	0.85	Bennett et al.,[24] Zeliadt et al.,[25] and Cooperberg et al.[26]	7 yr	van den Bergh et al.[27]
Postrecovery period	0.95	1.00	0.93	Sanda et al.[22] and Stewart et al.[20]	9 yr*	Assumption
Palliative therapy	0.60	0.24	0.86	Konski et al.,[29] Moeremans et al.,[30] Penson et al.,[31] and Ramsey et al.[32]	30 mo	Damber and Aus[33]
Terminal illness	0.40	0.24	0.40	Konski et al.,[29] Penson et al.,[31] and Ramsey et al.[32]	6 mo	Penson et al.[31] and Ramsey et al.[32]

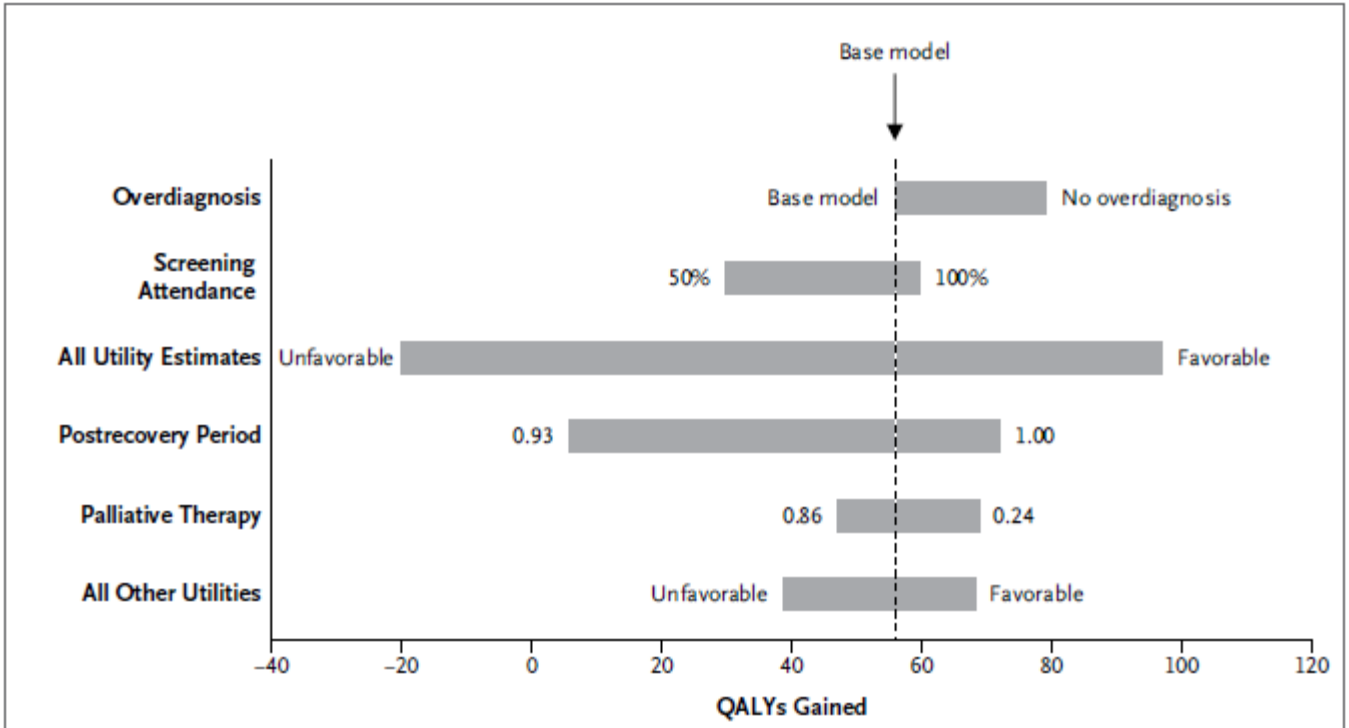

Figure 1. Effect of Various Modeling Assumptions on Quality-Adjusted Life-Years (QALYs) Gained by Prostate-Cancer Screening in Comparison with the Base Model.

The base model predicted a gain of 56 QALYs (range, −21 to 97) for men between the ages of 55 and 69 years who underwent prostate-cancer screening, which means that 23% of the unadjusted life-years gained by screening would be counterbalanced by a loss in quality of life because of follow-up biopsies and procedures. In the base model, sensitivity analyses considered various assumptions, including the effects of overdiagnosis, screening attendance of 50% and 100%, all unfavorable and favorable utility estimates, utility estimates of 0.93 and 1.00 for the lifetime postrecovery period, utility estimates of 0.86 and 0.24 for palliative therapy, and utility estimates for the postrecovery period (0.95) and palliative therapy (0.60) as used in the base model combined with the unfavorable and favorable utility estimates of all other health states.

The postrecovery period is by far the most important in QoL

Pad Use and Patient Reported Bother From Urinary Leakage After Radical Prostatectomy

Anna Wallerstedt,* Stefan Carlsson, Andreas E. Nilsson, Eva Johansson, Tommy Nyberg, Gunnar Steineck† and N. Peter Wiklund†

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Table 1. *Urinary leakage bother 12 months after radical prostatectomy*

Question (No.)	No. Pts	No. Bother					Moderate/Much RR (95% CI)
		Not Applicable	None	Little	Moderate	Much	
No. pads (1):							
6 or Greater	12	0	0	1	3	8	15.4 (11.1–21.4)
4–5	25	0	1	2	7	15	14.8 (10.8–20.3)
2–3	85	0	3	18	25	39	12.7 (9.4–17.2)
1	143	2	13	51	39	38	9.1 (6.6–12.5)
Less than 1	123	8	23	54	23	15	5.2 (3.5–7.7)
0	775	542	88	99	23	23	1.0 (referent)
Leakage (2):							
Much	42	0	1	2	5	34	70.8 (33.8–148.6)
Moderate	80	0	1	12	25	42	63.9 (30.4–134.2)
Little	504	49	111	198	89	57	22.0 (10.5–46.7)
None	534	499	15	13	2	5	1.0 (referent)
Leakage (3):							
Continuous pad change	12	2	0	2	2	6	27.5 (10.6–71.3)
Wet pad	16	2	0	3	2	9	28.3 (11.2–71.6)
Safety pad	78	4	4	28	23	19	22.2 (9.1–54.0)
Physical activity pad	214	79	43	60	19	13	6.1 (2.4–15.5)
Never	206	165	20	16	3	2	1.0 (referent)

The bother of incontinence vary between individuals but also minor leakage is associated with bother in some patients

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European Association of Urology

Platinum Priority – Prostate Cancer

Editorial by Patrick J. Bastian on pp. 323–324 of this issue

Cancer Control and Functional Outcomes After Radical Prostatectomy as Markers of Surgical Quality: Analysis of Heterogeneity Between Surgeons at a Single Cancer Center

Andrew Vickers [a,*], Caroline Savage [a], Fernando Bianco [b], John Mulhall [c], Jaspreet Sandhu [c], Bertrand Guillonneau [c], Angel Cronin [d], Peter Scardino [c]

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[b] Columbia University Division of Urology at Mount Sinai Medical Center, New York, NY, USA
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[d] Department of Medical Oncology, Dana-Farber Cancer Institute, Boston, MA, USA

Heterogeneity between surgeons after corrections for differences in case mix

Incontinence rate 1 year

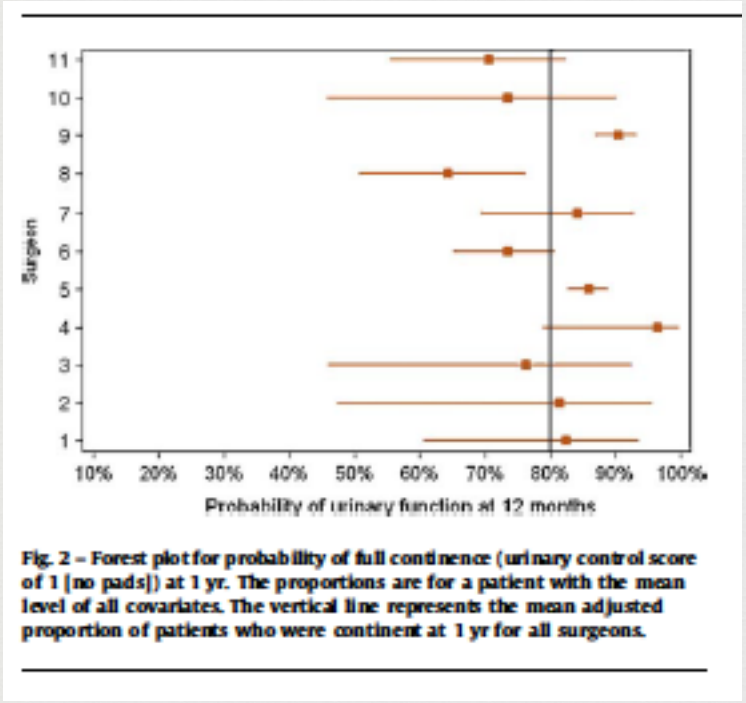


Fig. 2 – Forest plot for probability of full continence (urinary control score of 1 [no pads]) at 1 yr. The proportions are for a patient with the mean level of all covariates. The vertical line represents the mean adjusted proportion of patients who were continent at 1 yr for all surgeons.

Erectile function 1 year

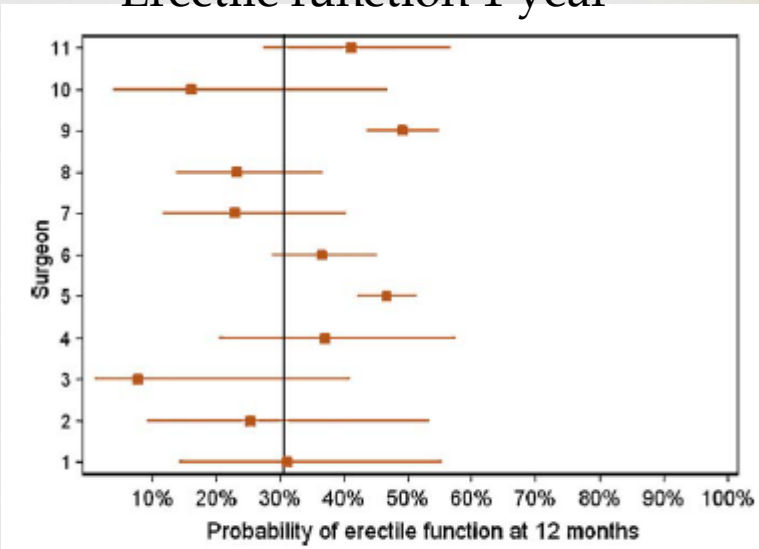


Fig. 1 – Forest plot for probability of erectile function (erectile rigidity score of 1 or 2) at 1 yr. The proportions are for a patient with the mean level of all covariates. The vertical line represents the mean adjusted proportion of patients with erectile function at 1 yr for all surgeons.

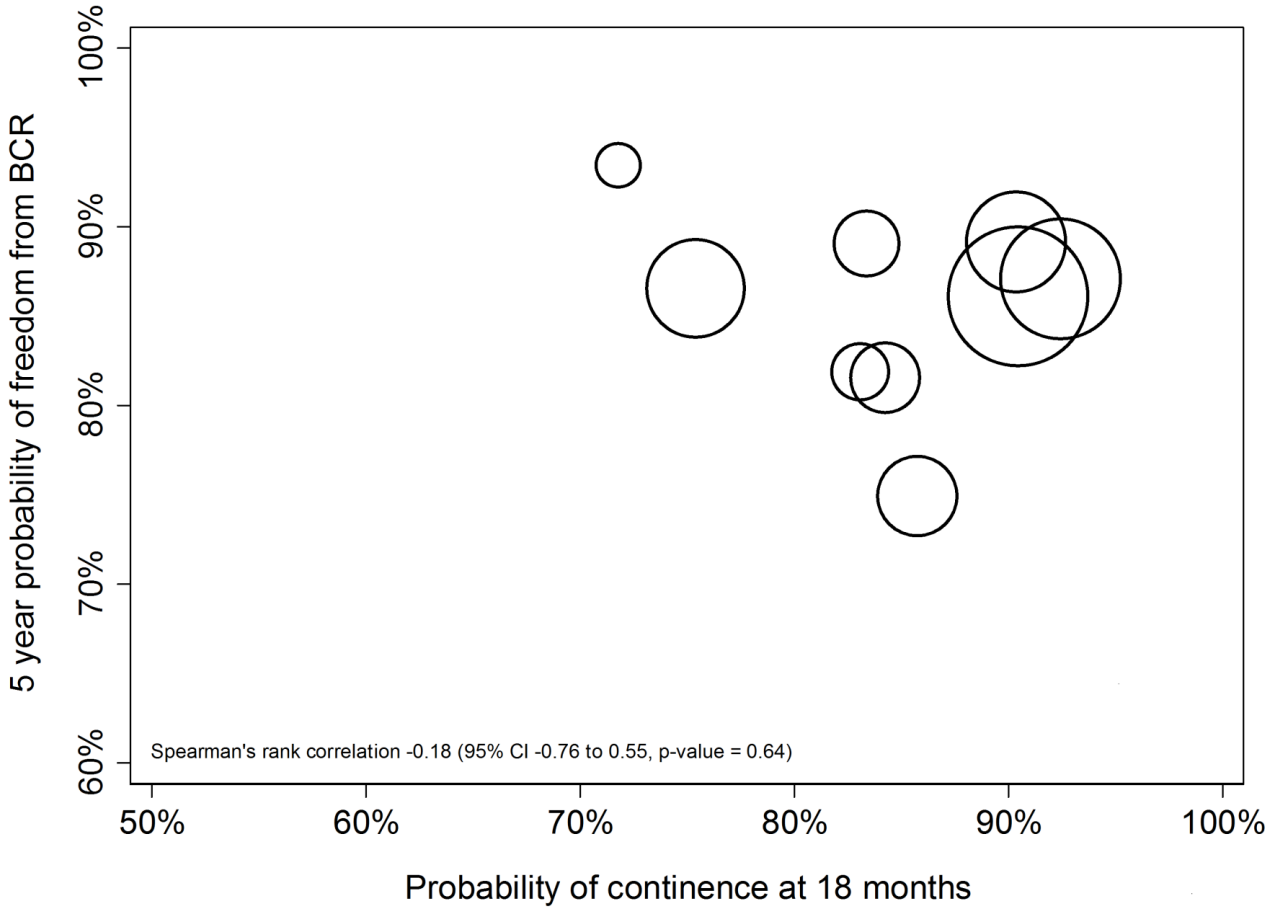
Carlsson et al. BMC Urology 2014, 14:25
http://www.biomedcentral.com/1471-2490/14/25

BMC Urology

RESEARCH ARTICLE Open Access

Effects of surgeon variability on oncologic and functional outcomes in a population-based setting

Sigrid Carlsson[1,2*], Anders Berglund[3], Daniel Sjoberg[4], Ali Khatami[2], Johan Stranne[2], Svante Bergdahl[2], Pär Lodding[2], Gunnar Aus[5], Andrew Vickers[4] and Jonas Hugosson[2]



Cure rate and side effects

Good surgery is good and bad surgery is bad

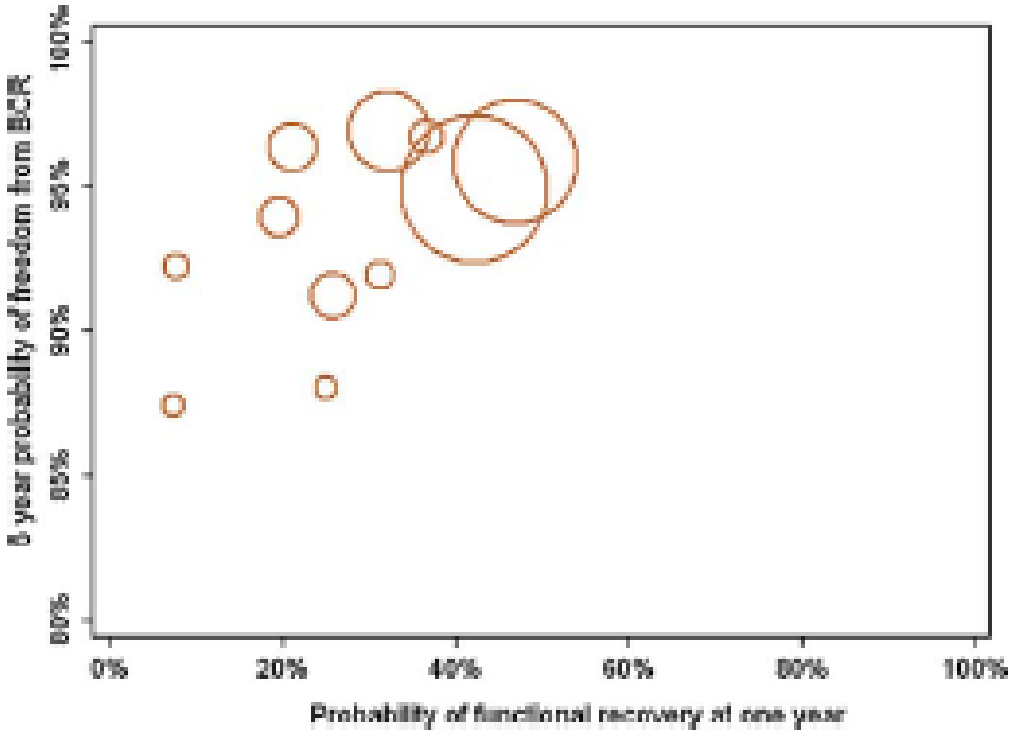


Fig. 4 – Scatter plot of adjusted biochemical recurrence (BCR) rates versus recovery of both urinary and erectile function at 12 mo. Each circle represents a single surgeon, and the size of the circle is in proportion to the number of patients treated by that surgeon.

Commentary

Great Meaningless Questions in Urology: Which Is Better, Open, Laparoscopic, or Robotic Radical Prostatectomy?

Andrew J. Vickers

Who is operating me?

Conclusion and Questions

- Current diagnostic activity result in a high rate of over treatment
- Over-treatment can be justified only if the impact on Quality of Life is minimal
- Could surgical technique be improved by introduction of RALP?
- Is the introduction RALP supported by scientific evidence?
- Is the introduction of RALP cost-effective?

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Problems evaluating RALP

- No randomised study
- Of published papers, 96 % of first author and/or last author are Robotic Surgeons
- Single center data
- Retrospective cohort studies with historical material
- Retrospective cohort studies with contemporary controls
- Retrospective cohort studies compared to contemporary controls with adjustment for case mix
- Prospective non-randomised studies with adjustment for case-mix in highly specialised units

HU et al JAMA 2008

- Medicare data
- MIRP lower perioperative complication rate
- MIRP Increased the risk for secondary treatment of incontinence

TABLE 1
Perioperative Overall Complication Rates of ORP and RALP

Study	Complication Rates*		*p* Value
	ORP	RALP	
Lowrance[17]	24% (n = 4,697)	21% (n = 1,006)	—
Hu[12]	23% (n = 6,899)	22% (n = 1,938)	0.31
Carlsson[20]	33% (n = 485)	16% (n = 1,253)	—
Krambeck[18]	5% (n = 586)	8% (n = 294)	0.064
Tewari[21]	20% (n = 100)	5% (n = 200)	<0.05
Ficarra[19]	11% (n = 105)	10% (n = 103)	0.85

TABLE 2
Oncologic Outcomes in Comparative Studies of ORP vs. RALP: Positive Surgical Margins

Study	Surgical Margins		*p* Value
	ORP	RALP	
Smith*[32]	35% (n = 200)	15% (n = 200)	<0.001
Krambeck[18]	17% (n = 588)	16% (n = 294)	0.61
Ou[28]	20% (n = 30)	50% (n = 30)	—
Tewari[21]	23% (n = 100)	9% (n = 200)	<0.05
Ficarra[19]	30% (n = 105)	34% (n = 103)	0.97
Kordan*[24]	31% (n = 414)	21% (n = 830)	<0.001
Schroeck[35]	28% (n = 435)	29% (n = 362)	0.7
Barocas*[33]	30% (n = 491)	20% (n = 1,413)	<0.01

* Smith, Kordan, and Barocas studies contain overlapping patients.

TABLE 3
Oncologic Outcomes in Comparative Studies of ORP vs RALP: Biochemical PFS Rates

Study	Unadjusted 3-Year Biochemical PFS		Follow-Up	Log-rank *p* Value
	ORP	RALP		
Barocas[33]	84%	84%	Median ORP = 17 months; RALP = 8 months	0.19
Krambeck[18]	92%	92%	Median ORP = 1.3 years; RALP = 1.3 years	0.69
Schroeck[35]	NR	NR	Mean ORP = 1.37 years; RALP = 1.09 years	0.82

PFS, progression-free survival; NR, not reported.

Adverse Effects of Robotic-Assisted Laparoscopic Versus Open Retropubic Radical Prostatectomy Among a Nationwide Random Sample of Medicare-Age Men

Michael J. Barry, Patricia M. Gallagher, Jonathan S. Skinner, and Floyd J. Fowler Jr

See accompanying article on page 476

A B S T R A C T

Purpose
Robotic-assisted laparoscopic radical prostatectomy is eclipsing open radical prostatectomy among men with clinically localized prostate cancer. The objective of this study was to compare the risks of problems with continence and sexual function following these procedures among Medicare-age men.

Patients and Methods
A population-based random sample was drawn from the 20% Medicare claims files for August 1, 2008, through December 31, 2008. Participants had hospital and physician claims for radical prostatectomy and diagnostic codes for prostate cancer and reported undergoing either a robotic or open surgery. They received a mail survey that included self-ratings of problems with continence and sexual function a median of 14 months postoperatively.

Results
Completed surveys were obtained from 685 (86%) of 797 eligible participants, and 406 and 220 patients reported having had robotic or open surgery, respectively. Overall, 189 (31.1%; 95% CI, 27.5% to 34.8%) of 607 men reported having a moderate or big problem with continence, and 522 (88.0%; 95% CI, 85.4% to 90.6%) of 593 men reported having a moderate or big problem with sexual function. In logistic regression models predicting the log odds of a moderate or big problem with postoperative continence and adjusting for age and educational level, robotic prostatectomy was associated with a nonsignificant trend toward greater problems with continence (odds ratio [OR] 1.41; 95% CI, 0.97 to 2.05). Robotic prostatectomy was not associated with greater problems with sexual function (OR, 0.87; 95% CI, 0.51 to 1.49).

Conclusion
Risks of problems with continence and sexual function are high after both procedures. Medicare-age men should not expect fewer adverse effects following robotic prostatectomy.

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J Clin Oncol 30:513-518. © 2012 by American Society of Clinical Oncology

Table 5. Output of Logistic Regression Models Predicting the Log Odds of a Moderate or Big Problem With Continence After Surgery, With ORs and 95% CIs Associated With Predictive Variables

Variable	Model 1		Model 2	
	OR	95% CI	OR	95% CI
Age (70+ *v* 65-69 years)	1.31	0.91 to 1.87	1.33	0.92 to 1.90
Education (college *v* less than college)	0.72	0.50 to 1.03	0.78	0.53 to 1.13
Robotic surgery (yes *v* no)	1.41	0.97 to 2.05	1.46	1.00 to 2.12
Mental health (excellent *v* less than excellent)			1.12	0.74 to 1.69
Overall health (excellent *v* less than excellent)			0.62	0.38 to 1.02

Abbreviation: OR, odds ratio.

Evaluation by questionairres at a median of 422 days post-operatively

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Review – Prostate Cancer

Retropubic, Laparoscopic, and Robot-Assisted Radical Prostatectomy: A Systematic Review and Cumulative Analysis of Comparative Studies

Vincenzo Ficarra [a,*], *Giacomo Novara* [a], *Walter Artibani* [a], *Andrea Cestari* [b], *Antonio Galfano* [a], *Markus Graefen* [c], *Giorgio Guazzoni* [b], *Bertrand Guillonneau* [d], *Mani Menon* [e], *Francesco Montorsi* [f], *Vipul Patel* [g], *Jens Rassweiler* [h], *Hendrik Van Poppel* [i]

Conclusions: The quality of the available comparative studies was not excellent. LRP and RALP are followed by significantly lower blood loss and transfusion rates, but the available data were not sufficient to prove the superiority of any surgical approach in terms of functional and oncologic outcomes. Further high-quality, prospective, multicentre, comparative studies are needed.

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Platinum Priority – Prostate Cancer

Editorial by XXX on pp. x–y of this issue

Short-term Results after Robot-assisted Laparoscopic Radical Prostatectomy Compared to Open Radical Prostatectomy

Anna Wallerstedt [a,], Stavros I. Tyritzis [a], Thordis Thorsteinsdottir [b,c], Stefan Carlsson [a], Johan Stranne [d], Ove Gustafsson [e], Jonas Hugosson [d], Anders Bjartell [f], Ulrica Wilderäng [b], N. Peter Wiklund [a], Gunnar Steineck [b,g], Eva Haglind [h], on behalf of the LAPPRO steering committee*

Table 3 – Comparison between open surgery and robot-assisted surgery concerning parameters during hospital stay [a]

Variable	Open surgery [b] Mean (range) Median (IQR)	Robot-assisted surgery [c] Mean (range) Median (IQR)	*p* value
Perioperative bleeding (ml)	683 (50–8000) 550 (350–800)	185 (0–5200) 100 (50–200)	<0.001
OR [d] time (min)	103 (40–428) 89 (74–125)	175 (45–575) 168 (144–201)	<0.001
Time in recovery unit (h)	6.7 (1–90) 4.0 (2.8–7.0)	4.5 (0–45) 4.0 (3.0–5.0)	0.054
Length of hospital stay (d)	4.1 (1–17) 4 (3–5)	3.3 (2–53) 3 (2–4)	<0.001

	Open surgery, [b] *n* (%)	Robot-assisted surgery, [c] *n* (%)	Unadjusted RR (CI 95%) Unadjusted OR (CI 95%)	Adjusted for nontumour confounders [d,e] OR (CI 95%)	Adjusted for A + tumour-specific confounders [f] OR (CI 95%)	Adjusted for A + B + lymph node dissection [g] OR (CI 95%)
Reoperation during initial hospital stay	8 (1.6)	13 (0.7)	0.47 (0.20–1.13) 0.47 (0.19–1.13)	0.46 (0.19–1.14)	0.32 (0.12–0.90)	0.31 (0.11–0.90)
Mortality during hospital stay	0 (0)	0 (0)	NA	NA	NA	NA

Table 4 – Comparison between open and robot-assisted surgery concerning patient-reported adverse events 3 mo after surgery [a]

Adverse event	Open surgery, [b] *n* (%)	Robot-assisted surgery, [c] *n* (%)	Unadjusted RR (CI 95%) Unadjusted OR (CI 95%)	Adjusted for nontumour confounders [d,e] OR (CI 95%)	Adjusted for A + tumour-specific confounders [f] OR (CI 95%)	Adjusted for A + B + lymph node dissection [g] OR (CI 95%)
Infection	121 (16.4)	309 (17.6)	1.08 (0.89–1.31) 1.09 (0.87–1.38)	1.03 (0.81–1.32)	0.91 (0.70–1.18)	0.90 (0.69–1.18)
Infection in the operation wound	42 (5.6)	59 (3.3)	–	–	–	–
Pneumonia	5 (0.7)	8 (0.5)	–	–	–	–
Urinary tract infection	89 (11.9)	262 (14.8)	–	–	–	–
Cardiovascular	58 (7.9)	101 (5.8)	0.74 (0.54–1.01) 0.72 (0.52–1.01)	0.69 (0.47–1.00)	0.63 (0.42–0.94)	0.65 (0.43–1.00)
Pulmonary embolism	6 (0.8)	5 (0.3)	–	–	–	–
Hypertension	34 (4.6)	70 (4.0)	–	–	–	–
Acute myocardial infarction	1 (0.1)	2 (0.1)	–	–	–	–
Arrhythmia or other heart diseases	12 (1.6)	24 (1.4)	–	–	–	–
Deep venous thrombosis	14 (1.9)	4 (0.2)	–	–	–	–
Stroke	0 (0.0)	0 (0.0)	–	–	–	–
Surgical	187 (25.2)	392 (22.3)	0.88 (0.76–1.03) 0.85 (0.70–1.04)	0.84 (0.67–1.04)	0.81 (0.64–1.03)	0.85 (0.66–1.08)
Pain in the operation wound	49 (6.6)	42 (2.4)	–	–	–	–
Pain in the lower abdomen	58 (7.8)	149 (8.4)	–	–	–	–
Pain in the upper abdomen	20 (2.7)	57 (3.2)	–	–	–	–
Bleeding from the operation wound	37 (5.0)	46 (2.6)	–	–	–	–
Bleeding from the urinary tract	66 (8.8)	162 (9.2)	–	–	–	–
Inguinal hernia	14 (1.9)	33 (1.9)	–	–	–	–
Catheter blockage	58 (7.8)	100 (5.7)	–	–	–	–
Gastrointestinal	138 (18.7)	264 (15.1)	0.81 (0.67–0.97) 0.77 (0.62–0.97)	0.78 (0.61–1.01)	0.76 (0.60–1.01)	0.77 (0.58–1.03)
Nausea	17 (2.3)	35 (2.0)	–	–	–	–
Impaired appetite	37 (5.0)	64 (3.6)	–	–	–	–
Loose or frequent stools	48 (6.4)	99 (5.6)	–	–	–	–
Constipation	84 (11.2)	138 (7.8)	–	–	–	–
Psychological	122 (16.6)	228 (13.1)	0.79 (0.64–0.97) 0.76 (0.60–0.96)	0.81 (0.62–1.06)	0.72 (0.53–0.96)	0.78 (0.58–1.06)
Depressed mood	92 (12.3)	156 (8.8)	–	–	–	–
Worry	94 (12.6)	187 (10.6)	–	–	–	–

Table 5 – Comparison between open and robot-assisted surgery concerning patient-reported readmissions 3 mo after surgery [a]

Readmission and readmission causes	Open surgery, [b] *n* (%)	Robot-assisted surgery, [c] *n* (%)	Unadjusted RR (CI 95%) Unadjusted OR (CI 95%)	Adjusted for nontumour confounders [d,e] OR (CI 95%)	Adjusted for A + tumour-specific confounders [f] OR (CI 95%)	Adjusted for A + B + lymph node dissection [g] OR (CI 95%)
Readmission	57 (7.7)	163 (9.3)	1.21 (0.91–1.62) 1.23 (0.90–1.69)	1.26 (0.89–1.78)	1.21 (0.83–1.77)	1.39 (0.94–2.06)
Infection	10 (1.3)	37 (2.0)	1.56 (0.78–3.12) 1.57 (0.78–3.17)	1.61 (0.75–3.43)	1.44 (0.64–3.21)	1.68 (0.73–3.85)
UTI	7 (0.9)	21 (1.1)	–	–	–	–
Deep infections	2 (0.3)	7 (0.4)	–	–	–	–
Sepsis	0 (0.0)	7 (0.4)	–	–	–	–
Wound infection	1 (0.1)	2 (0.1)	–	–	–	–
Cardiovascular	9 (1.2)	5 (0.3)	0.23 (0.08–0.70) 0.23 (0.08–0.69)	0.32 (0.09–1.16)	0.28 (0.07–1.09)	0.32 (0.08–1.27)
Pulmonary embolism	5 (0.6)	3 (0.2)	–	–	–	–
DVT	2 (0.3)	0 (0.0)	–	–	–	–
Chest pain	1 (0.1)	1 (0.1)	–	–	–	–
AMI	1 (0.1)	1 (0.1)	–	–	–	–
Surgical	15 (1.9)	55 (3.0)	1.54 (0.88–2.72) 1.56 (0.88–2.78)	1.54 (0.82–2.87)	1.48 (0.75–2.92)	1.77 (0.87–3.60)
Catheter blockage and retention after catheter removal	7 (0.9)	19 (1.0)	–	–	–	–
Anastomotic leakage	1 (0.1)	14 (0.8)	–	–	–	–
Bleeding	1 (0.1)	9 (0.5)	–	–	–	–
Lymphocele	4 (0.5)	3 (0.2)	–	–	–	–
Abdominal pain	2 (0.3)	10 (0.5)	–	–	–	–
Miscellaneous	4 (0.5)	25 (1.4)	2.63 (0.92–7.54) 2.66 (0.92–7.65)	2.34 (0.78–6.99)	1.63 (0.54–4.96)	1.44 (0.47–4.45)
Operation hernia	0 (0.0)	4 (0.2)	–	–	–	–
Other likely related to procedure	1 (0.1)	13 (0.7)	–	–	–	–
Other not likely related to procedure	2 (0.3)	6 (0.3)	–	–	–	–
Psychological	1 (0.1)	2 (0.1)	–	–	–	–
Readmission leading to reoperation	13 (1.7)	29 (1.6)	0.94 (0.49–1.80) 0.94 (0.49–1.82)	1.07 (0.54–2.13)	1.22 (0.54–2.73)	1.44 (0.62–2.34)
Readmission not leading to reoperation	36 (4.6)	116 (6.3)	1.36 (0.94–1.95) 1.38 (0.94–2.03)	1.45 (0.95–2.22)	1.34 (0.85–2.11)	1.56 (0.97–2.50)

Conclusions: This large prospective study confirms previous findings that robot-assisted laparoscopic radical prostatectomy is a safe procedure with some short-term advantages compared to open surgery. Whether these advantages also include long-term morbidity and are related to acceptable costs remain to be studied.

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ORIGINAL REPORT

Comparative Effectiveness of Robot-Assisted and Open Radical Prostatectomy in the Postdissemination Era

Giorgio Gandaglia, Jesse D. Sammon, Steven L. Chang, Toni K. Choueiri, Jim C. Hu, Pierre I. Karakiewicz, Adam S. Kibel, Simon P. Kim, Ramdev Konijeti, Francesco Montorsi, Paul L. Nguyen, Shyam Sukumar, Mani Menon, Maxine Sun, and Quoc-Dien Trinh

Patients and Methods

Overall, data from 5,915 patients with prostate cancer treated with RARP or ORP within the SEER-Medicare linked database diagnosed between October 2008 and December 2009 were abstracted. Postoperative complications, blood transfusions, prolonged length of stay (pLOS), readmission, additional cancer therapies, and costs of care within the first year after surgery were compared between the two surgical approaches. To decrease the effect of unmeasured confounders, instrumental variable analysis was performed. Multivariable logistic regression analyses were then performed.

Table 1. Demographics and Clinical Characteristics of Patients Treated for Nonmetastatic Prostate Cancer Between October 2008 and December 2009 Within the SEER-Medicare Database Stratified According to the Surgical Approach (ORP *v* RARP)

Demographic or Clinical Characteristic	Total		ORP		RARP		*P*
	No. of Patients	%	No. of Patients	%	No. of Patients	%	
Total patients	5,915	100	2,439	41.2	3,476	58.8	
Age at diagnosis, years							.01
Mean	69.1		69.2		69.0		
Median	68.0		69.0		68.0		
IQR	66.0-71.0		67.0-71.0		66.0-71.0		
Year of diagnosis							.1
2008	1,217	20.6	527	21.6	690	19.9	
2009	4,698	79.4	1,912	78.4	2,786	80.1	
Race							.3
White	4,869	82.3	1,996	81.8	2,873	82.7	
African American	530	9.0	235	9.6	295	8.5	
Other	516	8.7	208	8.5	308	8.9	
Marital status							.2
Married	4,606	77.9	1,880	77.1	2,726	78.4	
Unmarried	1,309	22.1	559	22.9	750	21.6	
Population density							< .001
Metropolitan	5,202	87.9	2,053	84.2	3,149	90.6	
Nonmetropolitan	713	12.1	386	15.8	327	9.4	
Annual median income, US dollars							< .001
≤ $38,012	1,460	24.7	730	29.9	730	21.0	
$38,013-$50,954	1,481	25.0	648	26.6	833	24.0	
$50,955-$69,389	1,486	25.1	581	23.8	905	26.0	
≥ $69,390	1,488	25.2	480	19.7	1,008	29.0	
College education, % of patients							< .001
≤ 14.3	1,468	24.8	711	29.1	757	21.7	
14.4-25.4	1,474	24.9	658	27.0	816	23.5	
25.5-42.2	1,483	25.1	570	23.4	913	26.3	
≥ 42.3	1,490	25.2	500	20.5	990	28.5	
CCI							.1
0	4,080	69.0	1,648	67.6	2,432	70.0	
1	602	10.2	248	10.2	354	10.2	
2	653	11.0	292	12.0	361	10.4	
≥ 3	580	9.8	251	10.3	329	9.5	
Clinical stage							< .001
≤ T2a	5,155	87.2	2,070	84.9	3,085	88.8	
T2b	156	2.6	74	3.0	82	2.4	
≥ T2c	604	10.2	295	12.1	309	8.9	
Gleason score							< .001
≤ 6	1,783	30.1	779	31.9	1,004	28.9	
7	3,235	54.7	1,257	51.5	1,978	56.9	
8-10	897	15.2	403	16.5	494	14.2	
Preoperative PSA, ng/mL							< .001
≤ 10	4,298	72.7	1,691	69.3	2,607	75.0	
10-20	684	11.6	308	12.6	376	10.8	
> 20	286	4.8	146	6.0	140	4.0	
Unknown	647	10.9	294	12.1	353	10.2	
Risk group							< .001
Low	1,445	24.4	604	24.8	841	24.2	
Intermediate	2,971	50.2	1,136	46.6	1,835	52.8	
High	1,499	25.3	699	28.7	800	23.0	
PLND status							< .001
PLND not performed	2,447	41.4	688	28.2	1,759	50.6	
PLND performed	3,468	58.6	1,751	71.8	1,717	49.4	
Pathologic stage							.01
T2	4,054	68.5	1,678	68.8	2,376	68.4	
T3	1,380	23.3	532	21.8	848	24.4	
T4	56	0.9	28	1.1	28	0.8	
Unknown	425	7.2	201	8.2	224	6.4	

(continued on following page)

Table 2. Postoperative Complications, Blood Transfusions, Length of Stay, Additional Cancer Therapy, and Costs Stratified by Surgical Technique for Patients With Prostate Cancer Undergoing Radical Prostatectomy Within the SEER-Medicare Database Between October 2008 and December 2009

Factor	Total		ORP		RARP		*P*
	No. of Patients	%	No. of Patients	%	No. of Patients	%	
Total patients	5,915	100	2,439	41.2	3,476	58.8	
30-day postoperative complications							
Overall	1,351	22.8	581	23.8	770	22.2	.1
Cardiac	104	1.8	43	1.8	61	1.8	.9
Respiratory	297	5.0	134	5.5	163	4.7	.1
Genitourinary	247	4.2	77	3.2	170	4.9	.001
Wound	105	1.8	53	2.2	52	1.5	.05
Vascular	127	2.1	54	2.2	73	2.1	.8
Miscellaneous medical	669	11.3	293	12.0	376	10.8	.2
Miscellaneous surgical	302	5.1	146	6.0	156	4.5	.01
90-day postoperative complications							
Overall	1,609	27.2	704	28.9	905	26.0	.01
Cardiac	119	2.0	49	2.0	70	2.0	.9
Respiratory	354	6.0	164	6.7	190	5.5	.04
Genitourinary	291	4.9	98	4.0	193	5.6	.01
Wound	127	2.1	66	2.7	61	1.8	.01
Vascular	218	3.7	96	3.9	122	3.5	.4
Miscellaneous medical	820	13.9	368	15.1	452	13.0	.02
Miscellaneous surgical	362	6.1	176	7.2	186	5.4	.003
Heterologous blood transfusions	282	4.8	216	8.9	66	1.9	< .001
Length of stay, days*							
Median	2		2		1		< .001
IQR	1-2		2-3		1-2		
30-day readmission rate	230	3.9	93	3.8	137	3.9	.8
90-day readmission rate	334	5.6	143	5.9	191	5.5	.5
Additional cancer therapy within 6 months after surgery							
Overall	279	4.7	154	6.3	125	3.6	< .001
Radiotherapy	210	3.6	113	4.6	97	2.8	< .001
Androgen-deprivation therapy	110	1.9	61	2.5	49	1.4	.002
Additional cancer therapy anytime after surgery							
Overall	626	10.6	314	12.9	312	9.0	< .001
Radiotherapy	494	8.4	244	10.0	250	7.2	< .001
Androgen-deprivation therapy	330	5.6	164	6.7	166	4.8	.002
Median Medicare costs within 12 months from surgery, US dollars*	$12,834.9		$11,970.4		$13,394.6		< .001

Abbreviations: IQR, interquartile range; ORP, open radical prostatectomy; RARP, robotic-assisted radical prostatectomy.
*Based on the Mann-Whitney *U* test.

Table 3. Logistic Regression Analysis for Postoperative Complications, Blood Transfusions, Length of Stay, Additional Cancer Therapy, and More Expensive Therapy Stratified by Surgical Technique for Patients With Prostate Cancer Undergoing Radical Prostatectomy Within the SEER-Medicare Database Between October 2008 and December 2009

Factor	RARP *v* ORP		
	Odds Ratio	95% CI	*P*
30-day postoperative complications			
Overall	1.19	0.97 to 1.46	.1
Cardiac	1.07	0.56 to 2.02	.8
Respiratory	0.83	0.55 to 1.24	.3
Genitourinary	1.93	1.26 to 2.97	.002
Wound	1.01	0.55 to 1.85	.9
Vascular	0.85	0.47 to 1.55	.6
Miscellaneous medical	1.45	1.11 to 1.89	.01
Miscellaneous surgical	0.88	0.61 to 1.30	.5
90-day postoperative complications			
Overall	1.13	0.94 to 1.37	.2
Cardiac	1.13	0.61 to 2.11	.7
Respiratory	0.88	0.61 to 1.28	.5
Genitourinary	1.69	1.13 to 2.53	.01
Wound	0.88	0.51 to 1.54	.6
Vascular	0.86	0.54 to 1.36	.5
Miscellaneous medical	1.32	1.03 to 1.68	.02
Miscellaneous surgical	0.83	0.59 to 1.18	.3
Heterologous blood transfusions	0.25	0.15 to 0.43	< .001
Length of stay > 2 days	0.30	0.24 to 0.37	< .001
30-day readmission	1.33	0.86 to 2.06	.2
90-day readmission	1.08	0.75 to 1.56	.6
Additional cancer therapy within 6 months from surgery			
Overall	0.76	0.50 to 1.49	.2
Radiotherapy	0.83	0.52 to 1.32	.4
Androgen-deprivation therapy	0.89	0.46 to 1.73	.7
Additional cancer therapy anytime after surgery			
Overall	0.82	0.61 to 1.09	.2
Radiotherapy	0.89	0.65 to 1.23	.5
Androgen-deprivation therapy	0.95	0.65 to 1.40	.8
More expensive therapy within 1 year from surgery	1.52	1.28 to 1.81	< .001

NOTE. Model adjusted for age, race, marital status, population density, income, education, baseline Charlson comorbidity index, pelvic lymph node dissection status, Gleason score, clinical stage, and preoperative prostate-specific antigen.

Abbreviations: ORP, open radical prostatectomy; RARP, robotic-assisted radical prostatectomy.

Conclusion

RARP and ORP have comparable rates of complications and additional cancer therapies, even in the postdissemination era. Although RARP was associated with lower risk of blood transfusions and a slightly shorter length of stay, these benefits do not translate to a decrease in expenditures.

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A case-mix-adjusted comparison of early oncological outcomes of open and robotic prostatectomy performed by experienced high volume surgeons

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- To compare early oncological outcomes of robot assisted laparoscopic prostatectomy (RALP) and open radical prostatectomy (ORP) performed by high volume surgeons in a contemporary cohort.
- We reviewed patients who underwent radical prostatectomy for prostate cancer by high volume surgeons performing RALP or ORP.
- Biochemical recurrence (BCR) was defined as PSA ≥ 0.1 ng/mL or PSA ≥ 0.05 ng/mL with receipt of additional therapy.
- A Cox regression model was used to evaluate the association between surgical approach and BCR using a predictive model (nomogram) based on preoperative stage, grade, volume of disease and PSA.
- To explore the impact of differences between surgeons, multivariable analyses were repeated using surgeon in place of approach.
- Of 1454 patients included, 961 (66%) underwent ORP and 493 (34%) RALP and there were no important differences in cancer characteristics by group.
- Overall, 68% of patients met National Comprehensive Cancer Network (NCCN) criteria for intermediate or high risk disease and 9% had lymph node involvement. Positive margin rates were 15% for both open and robotic groups.
- In a multivariate model adjusting for preoperative risk there was no significant difference in BCR rates for RALP compared with ORP (hazard ratio 0.88; 95% CI 0.56–1.39; P= 0.6). The interaction term between nomogram risk and procedure type was not statistically significant.

- Using NCCN risk group as the covariate in a Cox model gave similar results (hazard ratio 0.74; 95% CI 0.47–1.17; $P = 0.2$). The interaction term between NCCN risk and procedure type was also non-significant.
- Differences in BCR rates between techniques (4.1% vs 3.3% adjusted risk at 2 years) were smaller than those between surgeons (2.5% to 4.8% adjusted risk at 2 years).
- In this relatively high risk cohort of patients undergoing radical prostatectomy we found no evidence to suggest that ORP resulted in better early oncological outcomes then RALP.
- Oncological outcome after radical prostatectomy may be driven more by surgeon factors than surgical approach.

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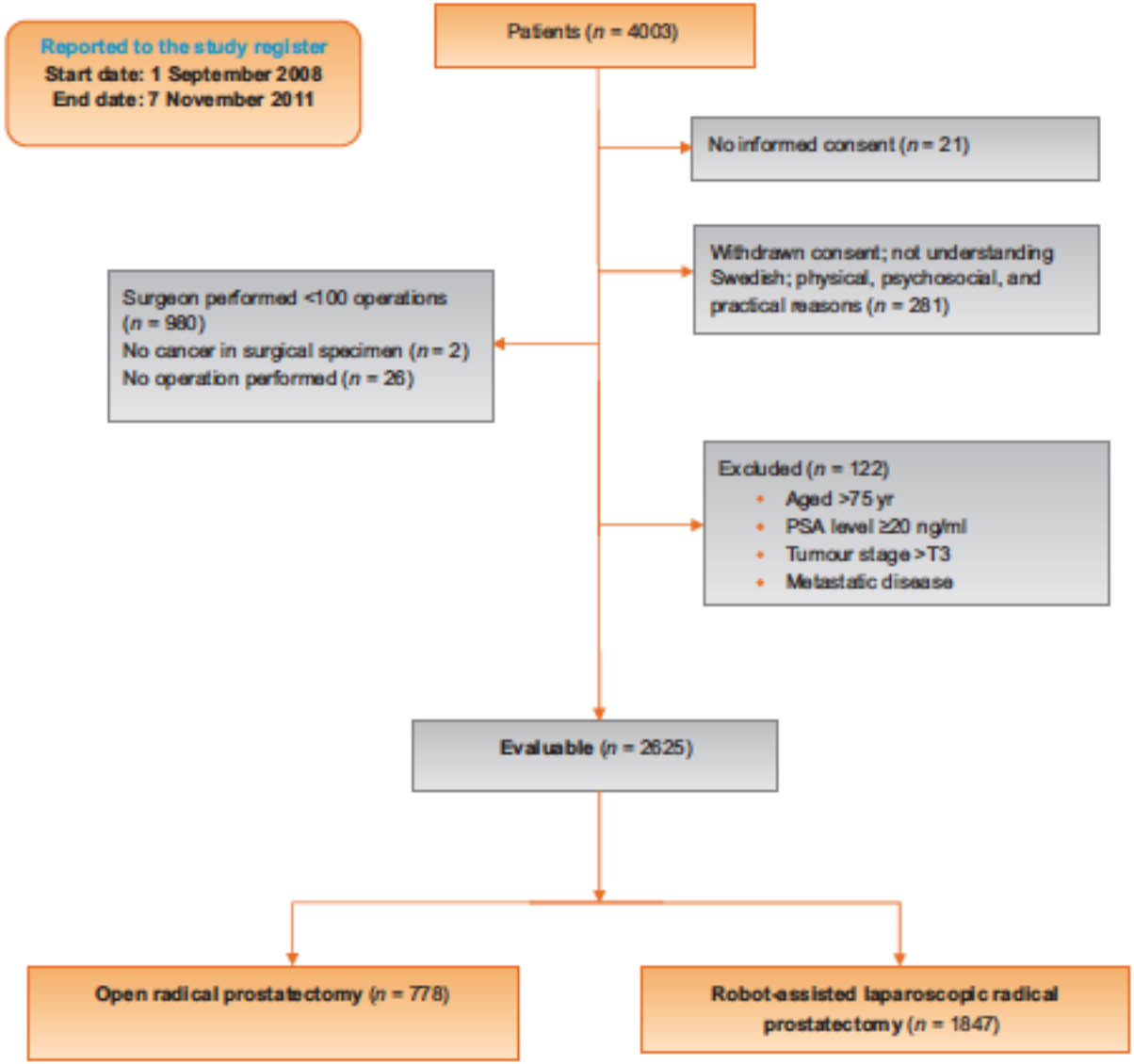
Platinum Priority – Prostate Cancer

Editorial by Thomas E. Ahlering on pp. 226–227 of this issue

Urinary Incontinence and Erectile Dysfunction After Robotic Versus Open Radical Prostatectomy: A Prospective, Controlled, Nonrandomised Trial

Eva Haglind[a,], Stefan Carlsson[b], Johan Stranne[c], Anna Wallerstedt[b], Ulrica Wilderäng[d], Thordis Thorsteinsdottir[d,e], Mikael Lagerkvist[f], Jan-Erik Damber[c], Anders Bjartell[g], Jonas Hugosson[c], Peter Wiklund[b], Gunnar Steineck[d,h], on behalf of the LAPPRO steering committee[†]*



Oslo 160205

Fig. 1 – Flow diagram. Numbers may not sum properly, as the same participant may have fulfilled more than one exclusion criterion.

Table 1b – Urinary incontinence measured by various definitions as reported by patients 12 mo after surgery

Definition of urinary incontinence	Open surgery, *n* (%)	Robot-assisted surgery, *n* (%)	Adjusted A, OR (95% CI) *	Adjusted B, OR (95% CI) †	Adjusted C, OR (95% CI) ‡
Change of pad § at least once per 24 h (primary end point)	144 (20)	366 (21)	1.21 (0.96–1.54)	1.24 (0.96–1.60)	1.31 (1.01–1.70)
Not pad free § and not leakage free	399 (56)	978 (57)	1.14 (0.94–1.37)	1.18 (0.96–1.44)	1.20 (0.98–1.47)
Urinary leakage daytime	252 (35)	606 (35)	1.13 (0.93–1.38)	1.16 (0.94–1.44)	1.19 (0.96–1.48)
Any urinary leakage daytime	367 (51)	902 (52)	1.14 (0.95–1.38)	1.16 (0.95–1.42)	1.19 (0.97–1.45)
Do you have urinary leakage?	117 (17)	310 (18)	1.28 (0.99–1.65)	1.32 (1.00–1.73)	1.38 (1.05–1.83)
Urinary discomfort	261 (37)	592 (35)	0.96 (0.79–1.17)	0.95 (0.77–1.17)	0.98 (0.79–1.21)

CI = confidence interval; OR = odds ratio.
Information on unadjusted risk and ORs is available in Supplementary Table 2.
* Adjusted A: adjusted for age at surgery, inguinal hernia, abdominal surgery, diabetes, pulmonary disease, mental disorder, prostate weight.
† Adjusted B: adjusted for same as A plus all four preoperative tumour factors.
‡ Adjusted C: adjusted for same as A plus B plus degree of neurovascular bundle preservation.
§ To determine use of protective measure against urinary leakage (eg, pads), patients were asked, "How many times do you change pad, diaper or other sanitary protection during a typical 24 hours?" The following responses were available: "Not applicable, I do not use pad, diaper or a sanitary protection," "Less than once per 24 hours," "About once per 24 hours," "About two to three times per 24 hours," "About four to five times per 24 hours," or "About six times or more per 24 hours" [24].

Table 2 – Erectile dysfunction compared between open and robot-assisted laparoscopic surgery using various definitions and as reported by patients 12 mo after surgery

Definition of erectile dysfunction	Open surgery, *n* (%)	Robot-assisted surgery, *n* (%)	Adjusted A, OR (95% CI) **	Adjusted B, OR (95% CI) †	Adjusted C, OR (95% CI) ‡
IIEF score §	531 (75)	1200 (70)	0.80 (0.64–1.00)	0.79 (0.63–1.00)	0.73 (0.58–0.93)
IIEF-5 score * at 12 mo ≤16	570 (81)	1311 (78)	0.86 (0.68–1.09)	0.75 (0.58–0.96)	0.75 (0.58–0.97)
IIEF-5 score * at 12 mo ≤21	654 (93)	1508 (90)	0.71 (0.50–0.99)	0.61 (0.42–0.88)	0.61 (0.42–0.88)
Penile stiffness less than half of the time	574 (81)	1323 (77)	0.81 (0.64–1.03)	0.75 (0.59–0.96)	0.75 (0.58–0.97)
No spontaneous morning erection	664 (93)	1522 (89)	0.59 (0.42–0.82)	0.52 (0.36–0.76)	0.50 (0.35–0.74)
Erectile dysfunction, combined variable °	561 (79)	1282 (75)	0.80 (0.64–1.00)	0.74 (0.59–0.95)	0.75 (0.58–0.96)

CI = confidence interval; IIEF = International Index of Erectile Function; OR = odds ratio.
Information on unadjusted risk and ORs is available in Supplementary Table 3.
** Adjusted A: adjusted for age at surgery, educational level, smoking, employment, cardiovascular disease.
† Adjusted B: adjusted for same as A plus all four preoperative tumour characteristic variables.
‡ Adjusted C: adjusted for same as A plus B plus degree of neurovascular bundle preservation.
§ IIEF Questionnaire, question 3: "When you had erections with sexual stimulation, how often was your erection hard enough for penetration during the last 3 months?" with cutoff between response 2 and 3. The following responses were available: "No sexual activity" (0); "Almost never or never" (1); "A few times (much less than half the time)" (2); "Sometimes (about half the time)" (3); "Most times (much more than half the time)" (4); and "Almost always or always" (5).
* IIEF Questionnaire modified version with five questions, six answer categories, 0–5 points per question; score ≤16 = erectile dysfunction; score ≤21 = some erectile function.
° Erectile dysfunction implies a lack of stiffness at sexual activity or morning erection.

IIEF score < 17 in 81 % of patients operated with open Surgery and in 78 % of robot-assited surgery

Table 4 – Comparison of open surgery and robot-assisted laparoscopic surgery concerning positive surgical margins

	Open surgery, *n*/*N* (%)	Robot-assisted surgery, *n*/*N* (%)	Adjusted RR * (95% CI)	Adjusted OR (95% CI)
PSMs **	156/748 (21)	395/1812 (22)	1.06 (0.90–1.26)	1.09 (0.87–1.35)

CI = confidence interval; OR = odds ratio; PSM = positive surgical margin; RR = relative risk.
* Relative risk: percentage with outcome in the continent group divided by percentage with outcome in the incontinent group for each possible cutoff.
** Defined as a pathology report of cancer cells present in the surgical margin.

Positive margin rate 21 % in open surgery and 22 % in robot-assisted surgery

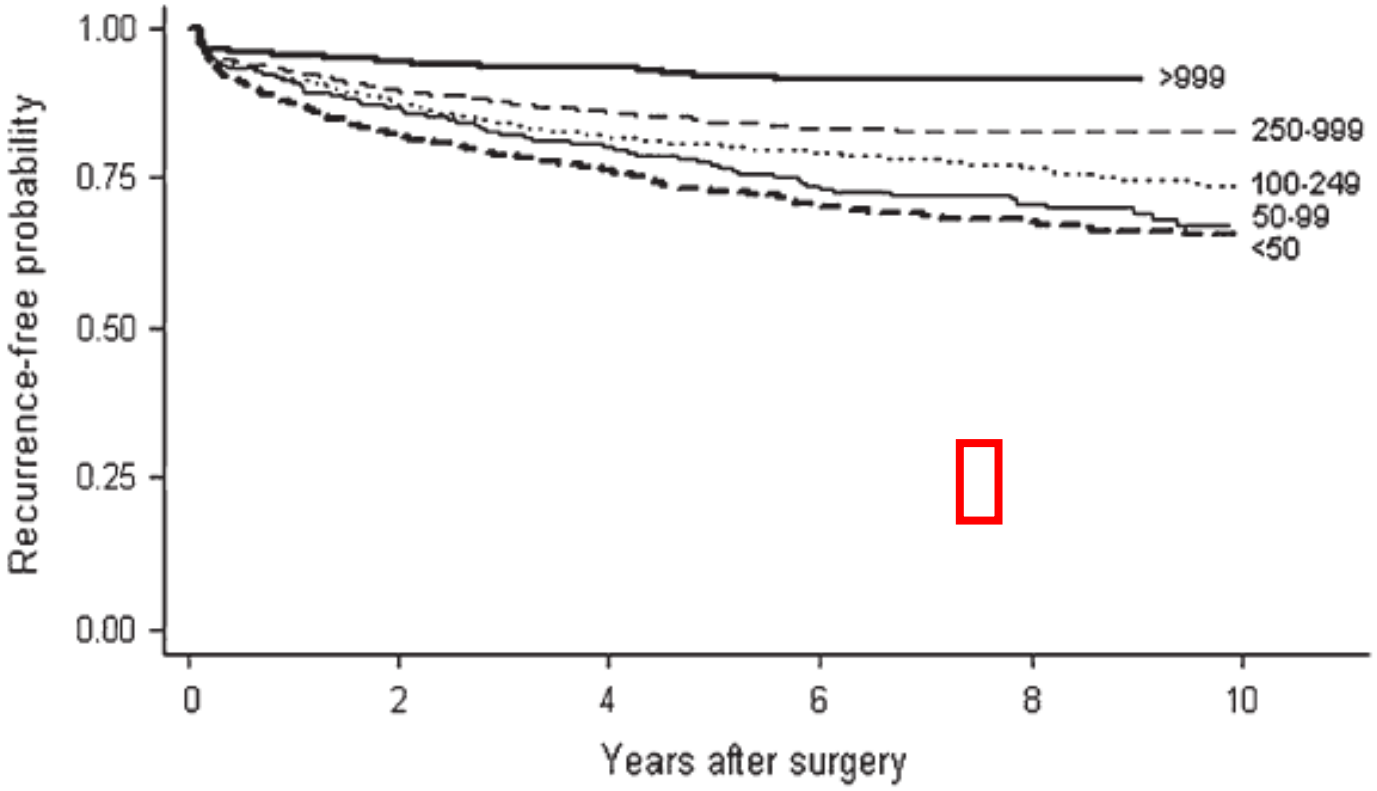
update EAU 2012, Paris
offene RP:

The effect of preoperative cancer aggressiveness on learning curve among high volume surgeons performing radical retropubic prostatectomy: You never stop getting better in challenging cases

Gallina, A., Fossati, N., Capitanio, U., Abdollah, F., Passoni, N., Pellucchi, F., Farina, E., Guazzoni, G., Rigatti, P., Briganti, A.

Conclusions

Higher surgical volume is associated with better biochemical control even when only experienced surgeons are considered. In high risk patients, even among surgeons at the highest expertise, the learning curve is endless and without plateau.



Number at risk:

1152	639	319	79	5	0
2940	2101	1381	836	407	146
1575	1175	766	562	420	215
696	437	279	157	89	63
1402	896	644	416	254	123

Original article

A short-term cost-effectiveness study comparing robot-assisted laparoscopic and open retropubic radical prostatectomy

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Keywords:
Prostatectomy – Cost effectiveness – Economic evaluation – Prostatic neoplasm – Retropubic – Robotics

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Abstract

Objective:
To evaluate cost effectiveness and cost utility comparing robot-assisted laparoscopic prostatectomy (RALP) versus retropubic radical prostatectomy (RRP).

Methods:
In a retrospective cohort study a total of 231 men between the age of 50 and 69 years and with clinically localised prostate cancer underwent radical prostatectomy (RP) at the Department of Urology, Aarhus University Hospital, Skejby from 1 January 2004 to 31 December 2007, were included.

The RALP and RRP patients were matched 1:2 on the basis of age and the D'Amico Risk Classification of Prostate Cancer; 77 RALP and 154 RRP.

An economic evaluation was made to estimate direct costs of the first postoperative year and an incremental cost-effectiveness ratio (ICER) per successful surgical treatment and per quality-adjusted life-year (QALY). A successful RP was defined as: no residual cancer (PSA <0.2 ng/ml, preserved urinary continence and erectile function. A one-way sensitivity analysis was made to investigate the impact of changing one variable at a time.

Results:
The ICER per extra successful treatment was €64,343 using RALP. For indirect costs, the ICER per extra successful treatment was €13,514 using RALP. The difference in effectiveness between RALP and RRP procedures was 7% in favour of RALP. In the present study no QALY was gained 1 year after RALP, however this result is uncertain due to a high degree of missing data. The sensitivity analysis did not change the results noticeably.

Limitations:
The study was limited by the design resulting in a low percentage of information on the effect of medication for erectile dysfunction and only short-term quality of life was measured at 1 year postoperatively.

Conclusion:
RALP was more effective and more costly. A way to improve the cost effectiveness may be to perform RALP at fewer high volume urology centres and utilise the full potential of each robot.

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European Association of Urology

Prostate Cancer

Cost Comparison of Robotic, Laparoscopic, and Open Radical Prostatectomy for Prostate Cancer

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Additional costs 2698-5200 Euro per procedure

Table 1. Assessment of cost components in the economic evaluation.

	Euro	Ref.
Fixed costs per da Vinci procedure yearly*	3,456	
Equipment costs per operation:		
RALP	1,884	[14]
RRP	316	[14]
Average hourly rate:		
Surgeon	63	[15]
Specialist registrar, urology	43	[15]
Anaesthesiologist	61	[15]
RN at operation and recovery ward	28	[15]
RN at anaesthesiology ward	29	[15]
'Hotel' – costs per day†	281	[16]
Blood transfusion each	135	[17]
Outpatient visit per visit (mean)	267	[18]
Re-admission at hospital per day (mean)	892	[18]
Consultation at GP‡	33	[19]
Pad each	0.5	[20,21]
Absence from work per day	186	[22]
Home visit by community nurse, per hour	67	[23]
Medical treatment, erectile dysfunction:		
Injection Caverject, each§	20	[24]
Injection Invicorp, each	20	[24]
Tablet viagra, each	12	[24]
Tablet cialis, each	13	[24]
Tablet Levitra, each¶	11	[24]
Treatment, recurrence:		
Tablet Casodex 150 mg apiece	16	[24]
Profylax mammae radiation therapy	380	[16]
Radiation therapy, 39 fractions	29,678	[16]

*Based on 110 operations yearly; †Stay at the ward: all costs and gross salary including pay supplement; ‡Fee for a consultation of 10 min; §Average price of 10 and 20 μg; ¶Average price of 5, 10 and 20 μg. RALP, robot-assisted laparoscopic radical prostatectomy; RRP, retropubic radical prostatectomy; RN, registered nurse; GP, general practitioner.

Table 3. Mean costs, effects, and incremental cost-effectiveness ratio per successful operation 1 year postoperatively. The parameters are calculated as direct costs and indirect costs (direct costs including absences from work), respectively.

	RALP ($n=77$)			RRP ($n=154$)			ICER (€)
	Mean (€)	95% CI	Effect* (%)	Mean (€)	95% CI	Effect* (%)	per successful operation*
Direct costs	8,369	[7,742–9,320]	34	3,863	[3,437–4,478]	27	64,343
Indirect costs	13,411	[11,320–17,264]	34	12,465	[9,611–15,318]	27	13,514

Total costs open RRP = 16 328 Euro
Total costs RALP= 21 780 Euro

Difference 5 452 Euro

Table 3. Mean Cost of Each Primary Therapy Among Medicare Enrollees, Stratified by Year of Diagnosis

	$						
Year	3DCRT	IMRT	Brachy	Brachy+ 3DCRT	Brachy+ IMRT	Open RP	MIRP
2002	22,394	37,125	21,117	28,770	43,723	18,070	29,989
2003	23,542	37,418	19,476	27,320	43,364	17,423	21,325
2004	22,023	33,237	18,308	26,756	39,453	16,930	17,645
2005	20,588	31,574	17,076	26,006	36,795	16,469	16,762
P trend	< .001	< .001	< .001	< .001	< .001	< .001	.001

Abbreviations: 3DCRT, three-dimensional conformal radiation therapy; IMRT, intensity-modulated radiation therapy; Brachy, brachytherapy; Open RP, open radical prostatectomy; MIRP, minimally invasive radical prostatectomy.

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Platinum Priority – Prostate Cancer

Editorial by XXX on pp. x–y of this issue

Work Disability After Robot-assisted or Open Radical Prostatectomy: A Nationwide, Population-based Study

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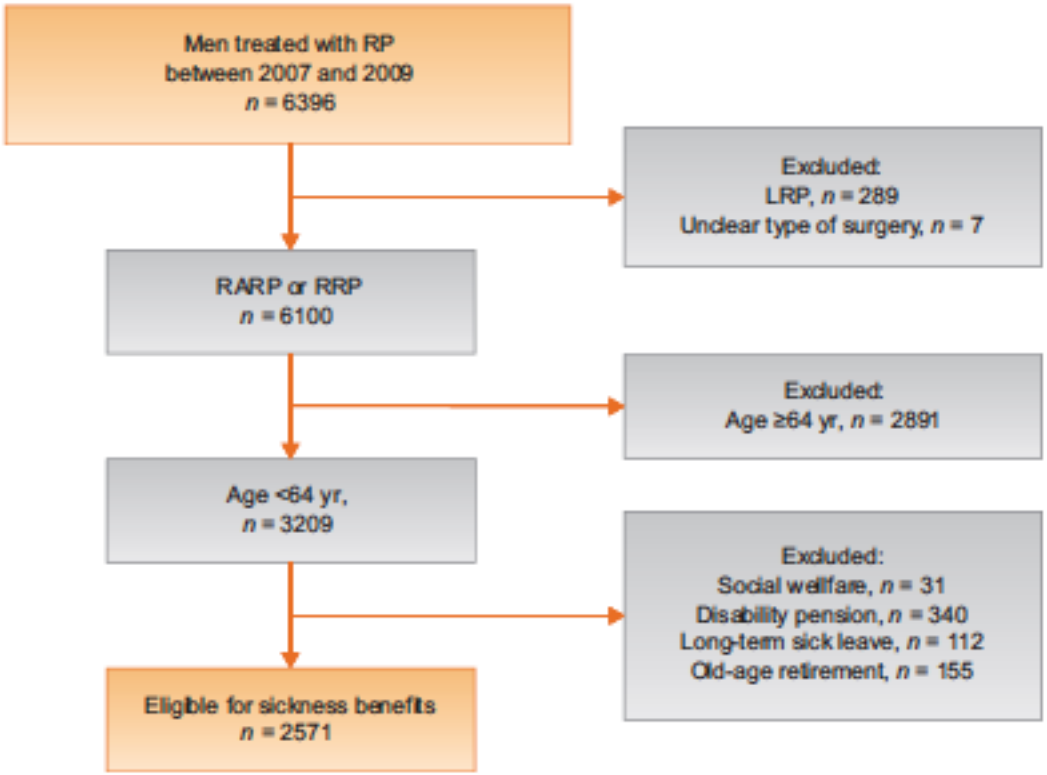


Fig. 1 – Flow chart of the study population selection. Long-term sick leave was defined as ongoing sick leave starting <2 mo before surgery. The standard age of retirement in Sweden is 65 yr.
LRP = laparoscopic radical prostatectomy; RARP = robot-assisted radical prostatectomy; RP = radical prostatectomy; RRP = retropubic radical prostatectomy.

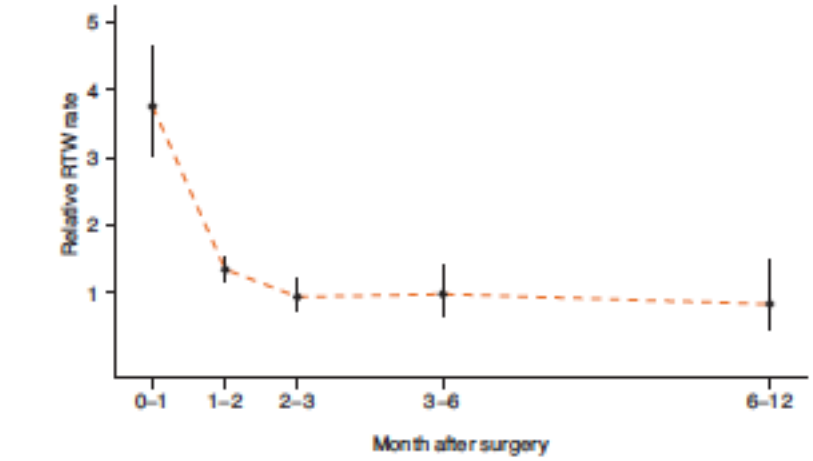


Fig. 2 – Outcome 1: Interval-specific relative return to work (RTW) rates and 95% confidence intervals (vertical lines) comparing robot-assisted radical prostatectomy (RARP) with retropubic radical prostatectomy (RRP) in men with sick leave (>14 d) after surgery (n = 2052). A relative RTW rate >1 is interpreted as an earlier RTW; a relative RTW rate <1 is interpreted as a later RTW among men treated with RARP compared with men treated with RRP. Estimates are adjusted for age, tumour risk category, lymph node dissection, income, education, occupation, and sick leave in the year before surgery.
CI = confidence interval; RTW = return to work.

Table 2 – Outcome 1: Proportion of men with sick leave (>14 d) after surgery and duration of sick leave according to surgical method and tumour risk category

	RARP				RRP				*p* value*
	Sick leave after surgery		Duration of sick leave (d)		Sick leave after surgery		Duration of sick leave (d)		
	n	%	Median	IQR	*n*	%	Median	IQR	
All men	828	78	35	28–52	1322	88	48	39–68	<0.001
Risk category:									
Low	451	79	34	28–50	616	88	48	38–65	<0.001
Intermediate	317	75	36	28–53	545	87	47	39–68	<0.001
High	60	87	43	31–60	161	88	55	41–86	<0.001

IQR = interquartile range; RARP = robot-assisted radical prostatectomy; RRP = retropubic radical prostatectomy.
* For the comparison of duration of sick leave between RARP and RRP.

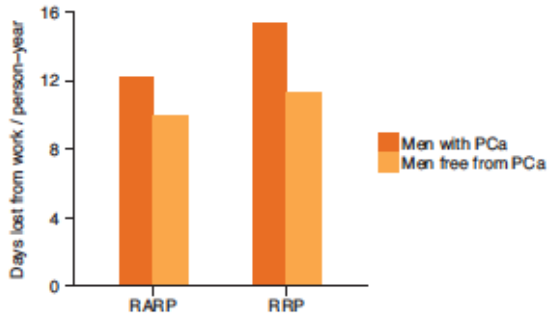


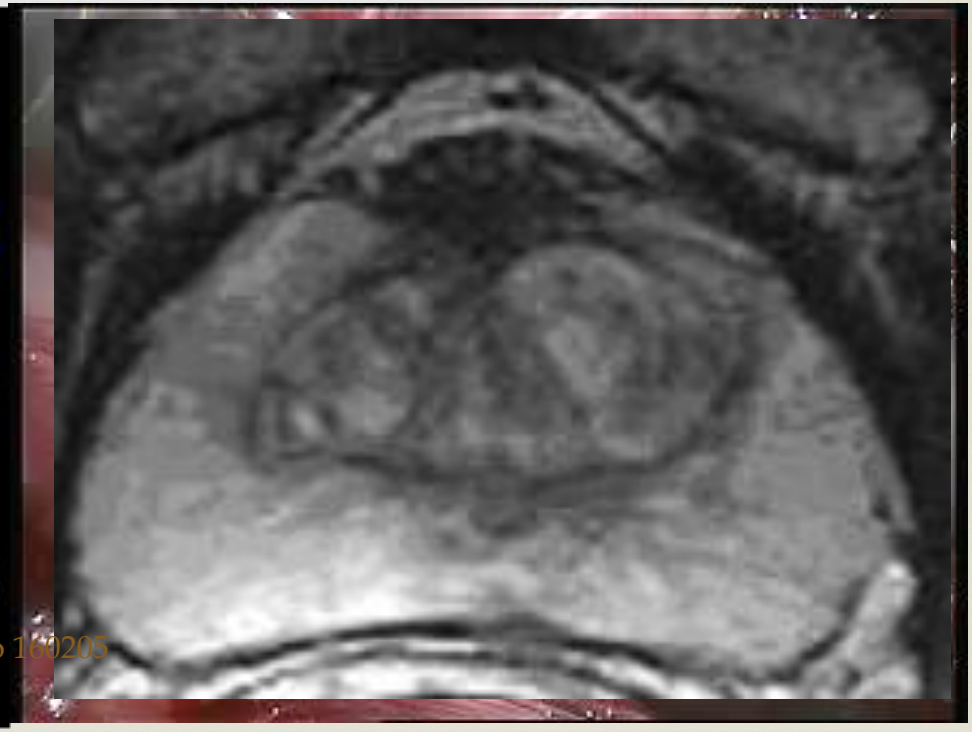
Fig. 3 – Outcome 2: Days lost from work because of sick leave and disability pension per person-year after return to work according to surgical method (*n* = 2561) and in comparison with age- and residency-matched men free from prostate cancer (*n* = 9483).
PCa = prostate cancer; RARP = robot-assisted radical prostatectomy; RRP = retropubic radical prostatectomy.

Evolution goes on: image guided surgery

“picture-in-picture“
Ultrasound

“picture-in-picture“

Image fusion / image overlay



Conclusions

- RALP is associated with less bleeding and fewer short terms complications
- Oncological outcome is comparable to open RRP
- Functional outcome is more dependent upon the identity of surgeon than technique, there is a tendency to better continence in open surgery and better potency after robot-assisted surgery
- RALP is considerably more expensive than open RRP
- New technical improvements will come with RALP not with RRP

Remaining questions

- Is the learning curve for RALP shorter than for open RRP?
- Is sick leave shorter in RALP?
- What is the optimal number of operations per surgeon and center?
- Costs evaluated as Quality adjusted life years

- LAPPRO will report during 2015, a prospective Swedish study comparing open RRP with RALP with almost 4000 patients.