



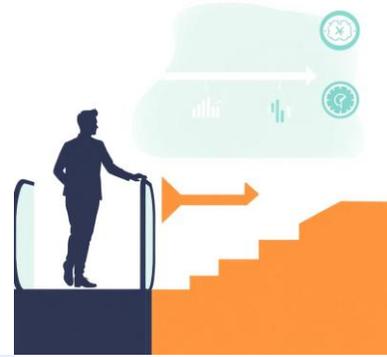
PRO UND CONTRA: ROBOTER VS. SABR WANN IST WAS AM BESTEN?

Sascha Ahyai

Vorstand der Urologie

Universitätsklinikum Graz

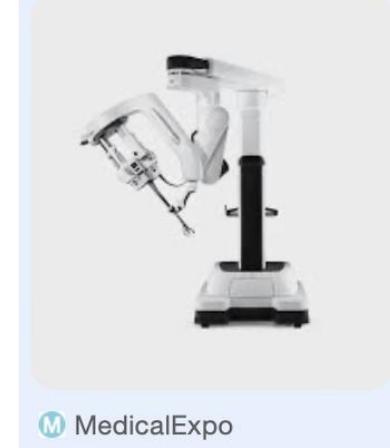
Warum benutzen wir Chirurg*innen/ Radioonkolog*innen Roboter?



1. Ethische Perspektive:

Das *Leitbild* moderner Therapie ist:

Minimierung der Invasivität bei gleichzeitiger Steigerung:
der Präzision & therapeutischen Effektivität.



2. Biologisch Perspektive: (Law of effort - Minimierung des Energieaufwands)

Robotik ist ein Ausdruck des menschlichen Strebens nach Effizienz:

Nach dem Prinzip des geringsten Aufwands werden Technologien fortlaufend so entwickelt, dass sie dieselben funktionalen Ergebnisse mit reduziertem körperlichem, zeitlichem und kognitivem Aufwand erreichen.

Präzision, Ergonomie, Visualisierung (3D, vergrößerte Ansicht), Reduziertes Trauma und kürzere Erholungszeit für Patient:innen

Integration der KI bei Roboter-Systemen wird die Prozesse optimieren

Technologische Evolution



Das Telefon als Beispiel der funktionellen Kontinuität:

- ▶ Das Prinzip der Sprachkommunikation über Distanz bleibt bestehen, während die Geräte (kabelgebunden, drahtlos, mobil) sich entwickeln.

..das Drehscheibentelefon ist ein Relikt des prädigitalen Zeitalters!

- ▶ **Chirurgie:** Das Ziel operativer Interventionen (Gewebemanipulation, Rekonstruktion usw.) bleibt unverändert, während die verwendeten Techniken sich von offenen über minimalinvasive bis hin zu robotergestützten Verfahren weiterentwickeln.



Open vs Robotic rad. prostatectomy



„Pentafactor`s evidence“

Factor	ORP	RARP	Evidence	Winner
<u>Oncologic Control</u>	Excellent long-term cancer control when performed by experienced surgeons.	Comparable oncologic outcomes; some studies show slightly lower positive margin and biochemical recurrence rates.	Meta-analyses show <u>oncologic equivalence</u>	RARP <u>may have slight advantage in high-volume centers</u> (Novara et al., 2021; Kim et al., 2025).
<u>Perioperative Outcomes</u> (blood loss, hospital stay, pain)	Higher blood loss and transfusion rates; longer hospital stay and pain.	Significantly reduced blood loss, shorter LOS, less pain, quicker recovery.	Strong and <u>consistent evidence favoring RARP</u>	RARP (Howard et al., 2021; Wang et al., 2023).
<u>Complication Profile</u>	Low but slightly higher rates of major complications; wider incision-related morbidity.	Fewer minor complications; similar or lower major complication rates.	RARP <u>associated with improved safety</u>	RARP (Also in large <u>registry data</u>)
<u>Functional Recovery</u> (continence, potency)	Recovery often slower; higher early incontinence and erectile dysfunction rates.	Faster return of continence and sexual function in most studies; differences narrow over time.	Early <u>functional recovery significantly better after RARP</u>	RARP (Nahas et al., 2024; Ficarra et al., 2018).
<u>Cost & Accessibility</u>	Lower <u>capital and maintenance costs</u> ; <u>broadly accessible in resource-limited settings</u> .	High initial and maintenance costs; <u>cost-effectiveness depends on high case volume</u> .	<u>Cost disadvantage for RARP</u>	ORP (unless <u>efficiency and case throughput are high</u> (Martin et al., 2022))

Unter Verwendung des Pentafaktor-Gerüst:
 1. RARP übertrifft ORP in periop & funkt. Ergebnissen
 2. zeigt mindestens äquivalente onkologische Kontrolle
 3. bei geringerer Morbidität
 4. aber höheren Kosten

Yaxley et al., 2016
 Loughlin et al, 2018
 Ficarra et al., 2018
 Novara et al., 2021
 Martin et al., 2022
 Wang et al., 2023
 Nahas et al., 2024
 Kim et al., 2025

Laprotrial n>3500 prospektive multizenter Studie

EUROPEAN UROLOGY ONCOLOGY xxx (xxxx) xxx–xxx



> *Eur Urol Oncol.* 2025 May 23:S2588–9311(25)00127–0. doi: 10.1016/j.euo.2025.05.004.
Online ahead of print.



Robotic Versus Open Radical Prostatectomy, Differences in Prostate Cancer–specific Survival—12 Years of Follow-up in the LAParoscopic Prostatectomy Robot Open Trial

Anna Lantz^{a,b,c,*}, Ying Li^{d,e}, Stefan Carlsson^{a,b}, Johan Stranne^{f,g}, Eva Angenete^{d,h},
Olof Akre^{a,b}, Anders Bjartell^{i,j}, Mehbod Mansoori^{i,j}, Carolina Ehrencrona^d, Peter Wiklund^{a,b,k},
Eva Haglind^{d,h}

PCa specific mortality lower in RARP vs. ORP

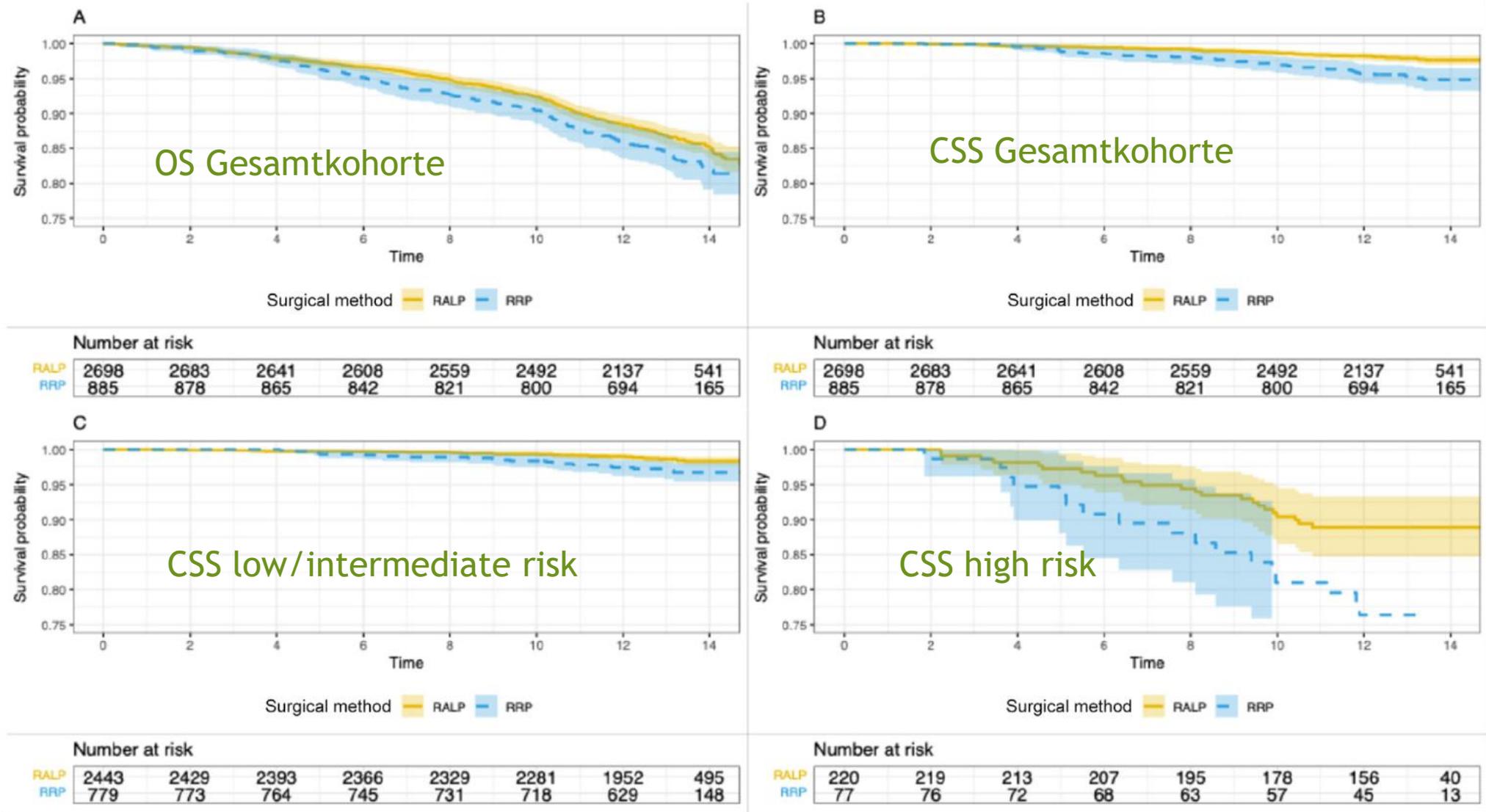
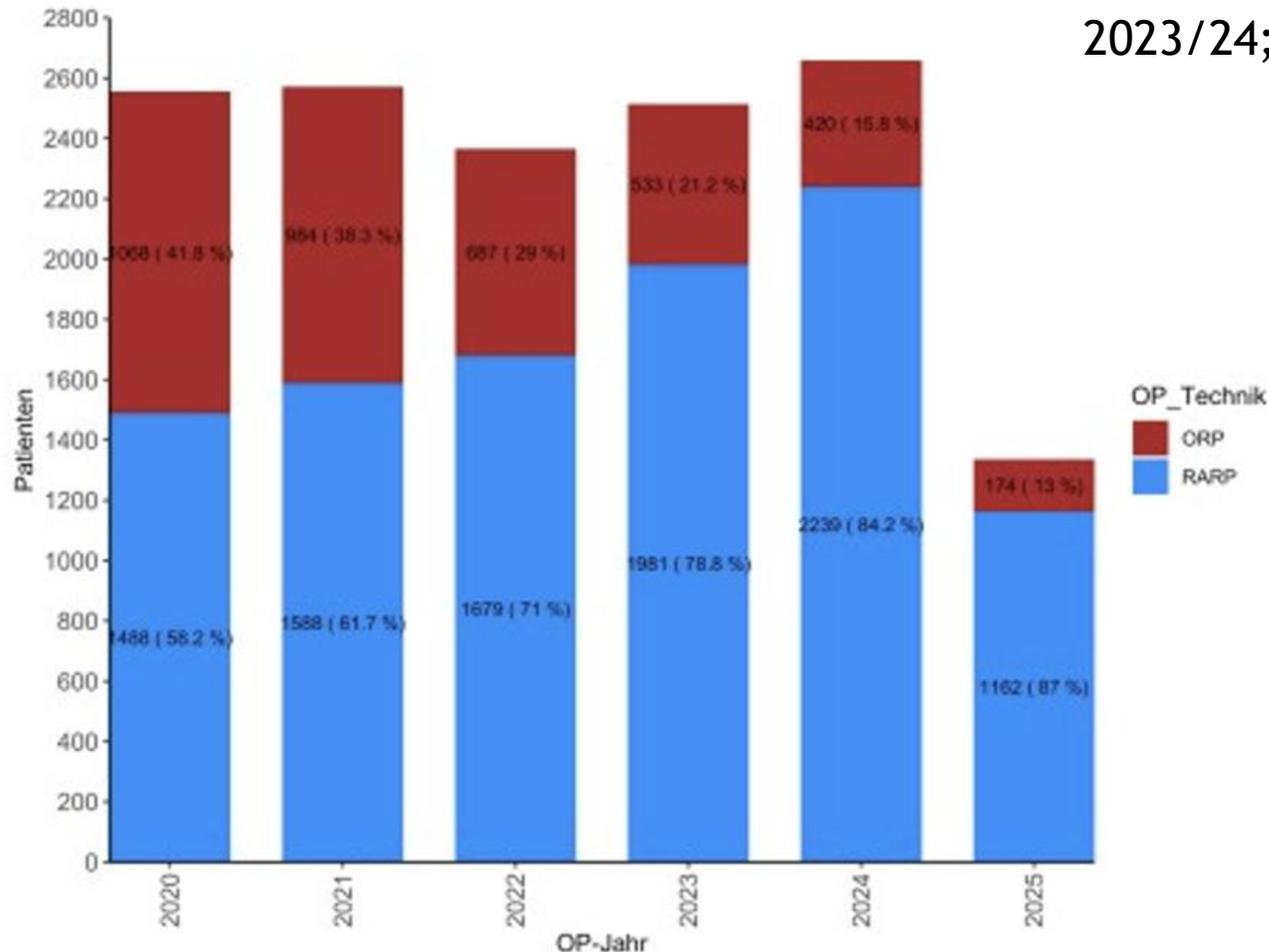


Fig. 2 – (A) All-cause mortality for RALP versus RRP. Prostate cancer–specific mortality for (B) RALP versus RRP and for D’Amico (C) low- and intermediate risk, and (D) high-risk groups. RALP = robot-assisted laparoscopic prostatectomy; RRP = open retropubic radical prostatectomy.

Time changes - Data from the Martini-clinic decreasing number of open radical prostatectomies (ORP)

Abbildung 1. Patientenzahlen 2020-2025 für offene (ORP) und robotische (RARP) radikale Prostatektomien (RP)

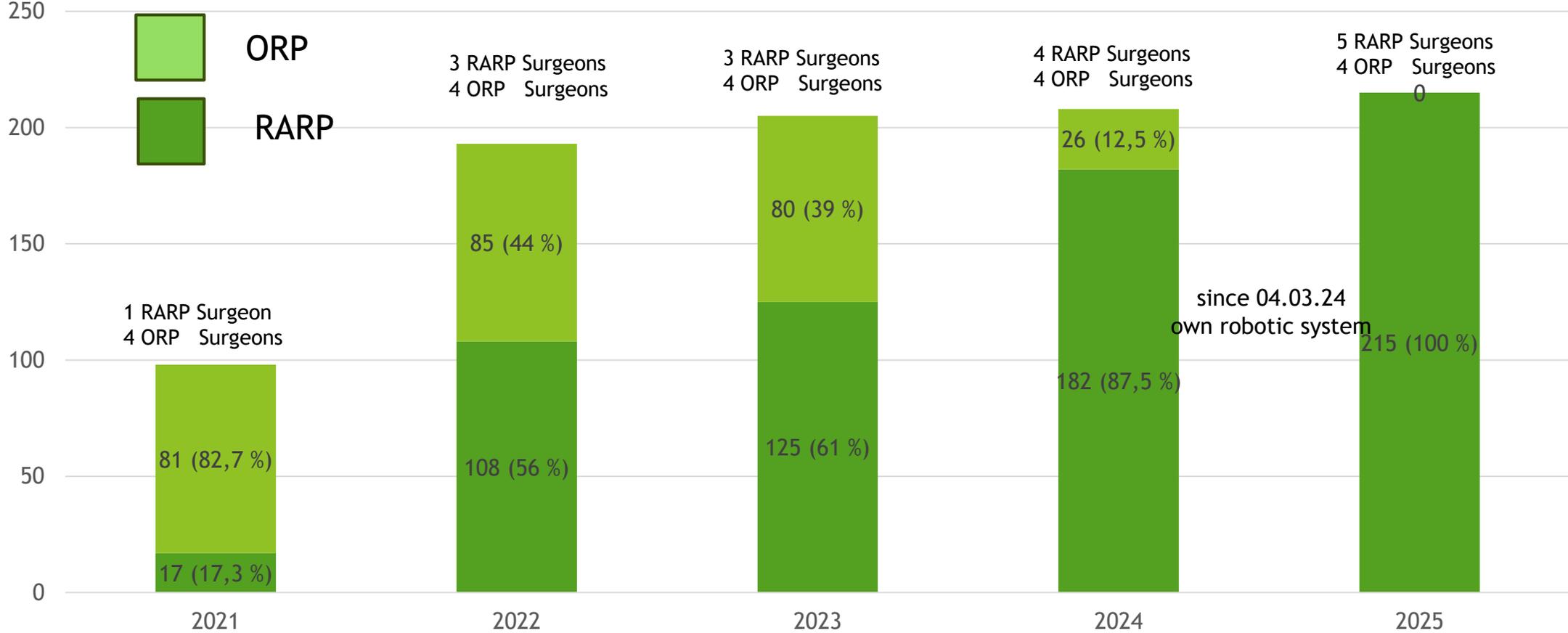


2023/24; 5th and 6th robotic system installed

2024
n=2679
15% ORP

2025
n>2000
13% =ORP

Inverser Trend von ORP und RARP Daten von Graz 2021-2025



Trad. Proctoring → intergenerational mentorship → stopped training ORP → reverse mentoring

Dual-competency teaching teams (open + robotic expertise) bridge generational skill gaps

Facts First: Vorteile der RARP vs. SABR - 9 zu 2!



	RARP		SABR	
Prostatavol.	Kein Limit	✓	limitiert	
Prostataobstruktion	Kein Limit	✓	Nicht möglich	
Neoadj. Therapie	Nicht indiziert	✓	Teils notwendig	
Patholog. TNM	Vorhanden	✓	Fehlt	
PSA Monitoring	Einfach	✓	Komplexer	
Salvage Prozedur	Salvage-RTX	✓	Salvage-Chirurgie schwierig	
CSS	Gleich		Gleich	
Urogenitale Toxicity	Selten	✓	Höher	
Harninkontinenz	Höheres Risiko		Niedrigeres Risiko	✓
Erekt. Dysfunktion	Früh, meist signif.		Später, kumulativ	✓
Gastrointest. Sympt	Selten	✓	Häufiger	
Dauer	Stat. 4 Tage		Amb. 2 Wochen	
Kosten	Niedriger	✓	Höher	

RARP - Prostatagröße, LUTS & Harnverhalt

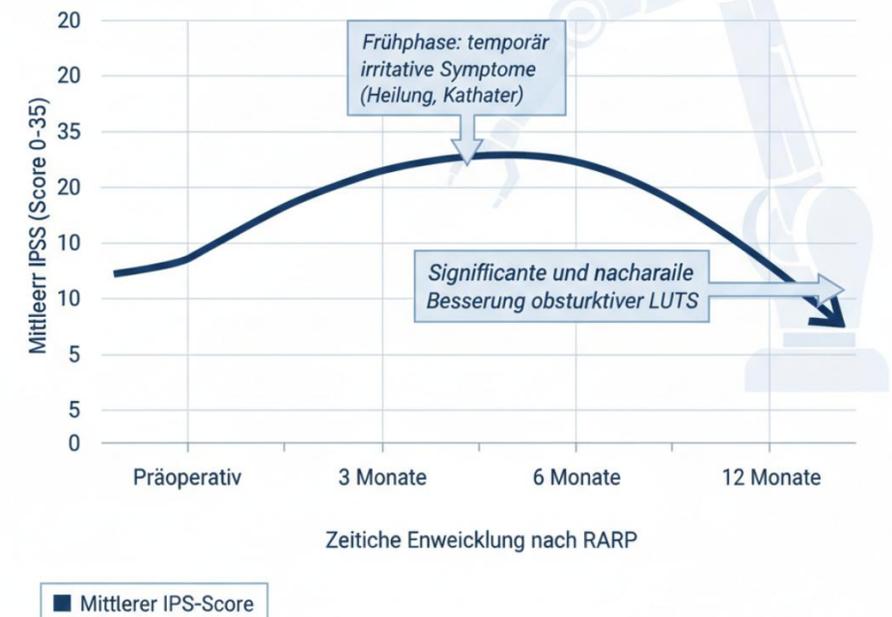
Tewari AK et al., 2020

Titel: *Large prostate volume does not compromise cancer control or functional recovery after robotic prostatectomy.*
Zeitschrift: *World J Urol.* 2020; 38(5): 1147-1154*

Mearini L et al., 2018 - World J Urol

“*Impact of preoperative urinary retention on early outcomes after robotic radical prostatectomy.*”
DOI: 10.1007/s00345-018-2321-x

*nur etwa 20-30% mehr OP-Zeit und Blutverlust



RARP & Neoadjuvante Therapie

Cancer Treatment Reviews (2009) 35, 9–17



TUMOUR REVIEW

A systematic review and meta-analysis of randomised trials of neo-adjuvant hormone therapy for localised and locally advanced prostate carcinoma

M.D. Shelley ^{a,*}, S. Kumar ^{b,f}, T. Wilt ^{c,g}, J. Staffurth ^{d,h}, B. Coles ^{e,j},
M.D. Mason ^{d,i}

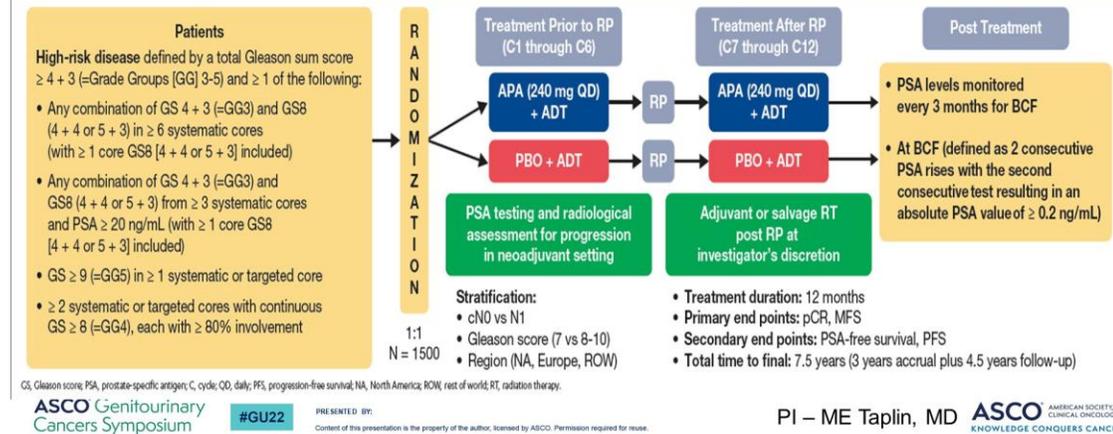
- geringere ↓ R1-Rate bei Pat. + NAT (RR: 0,49, 95%CI: 0,42-0,56, $p < 0,001$)
- höhere Wahrscheinlichkeit für Organ-Begrenzung (RR 1.63, 95% 1.36-1.95, $p < 0.001$)
- Weniger LNI (RR 0.49, 95% CI 0.42-0.56, $p < 0.02$).

Aber:

- 5 Jahre
- kein Vorteil bzgl. Rezidivfreiheit (RR: 1,04, 95%CI: 0,93-1,16, $p = 0,48$)
- kein Überlebensvorteil im Vergleich zu ohne NAT (RR: 1,00, 95%CI: 0,98-1,03, $p = 0,77$)

Proteus

Randomized, Double-blind, Placebo-Controlled, Phase 3 Study of Apalutamide in Subjects with High-risk, Localized or Locally Advanced Prostate Cancer Who are Candidates for Radical Prostatectomy



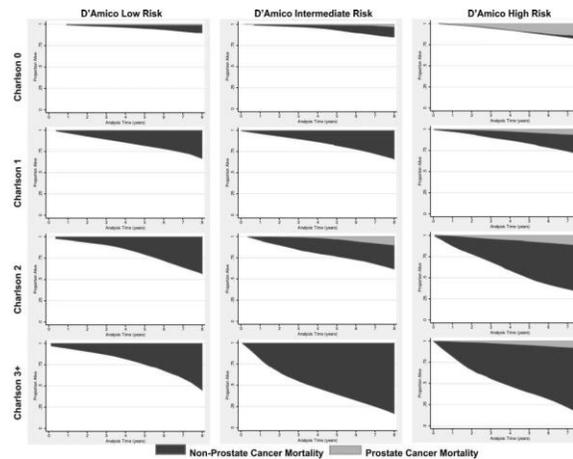
RARP & High risk PCa

Cornford P, et al. Eur Urol. 2024

6.3.3.4 Guidelines for radical and palliative treatment of high-risk localised disease*

Recommendations	Strength rating
Watchful Waiting (WW)	
Offer WW to asymptomatic patients with life expectancy < ten years.	Strong
Radical prostatectomy (RP)	
Offer RP to selected patients as part of potential multi-modal therapy.	Weak
Extended pelvic lymph node dissection (ePLND)	
In patients undergoing a lymph node dissection you should perform an extended PLND.	Strong
Do not perform a frozen section of nodes during RP to decide whether to proceed with, or abandon, the procedure (see Section 6.2.4.1).	Strong
Radiotherapeutic treatment	
Offer patients intensity-modulated radiation therapy (IMRT)/volumetric modulated arc therapy (VMAT) plus image-guided radiation therapy (IGRT) with 76–78 Gy in combination with long-term androgen deprivation therapy (ADT) (2 to 3 years).	Strong
Offer focal boosting to MRI-defined dominant intra-prostatic tumour when using normo-fractionated IMRT/IGRT (1.8-2.0 Gy per fraction) ensuring that Organ at Risk constraints are not exceeded.	Weak
Offer patients with good urinary function IMRT/VMAT plus IGRT with brachy-therapy boost (either high-dose rate or low-dose rate), in combination with long-term ADT (2 to 3 years).	Weak

There is no consensus regarding the optimal treatment of men with high-risk PCa.



High risk/ locally advanced



Testosteron hat einen Kardio-protectiven Effekt → Androgenentzug hat negative CV Auswirkungen.
ADT + 2. Generations ARI → erhöht nochmals kardiales Risiko.

After radical prostatectomy for high-risk prostate cancer:

- ~40-50 % are cured with surgery alone!!!
- ~40-60 % Require combined RT + ADT (multi-modality)

MaxRP vs. MaxRT

(RP+adjuvant RT+ADT vs. EBRT, Brachytherapy, and ADT)



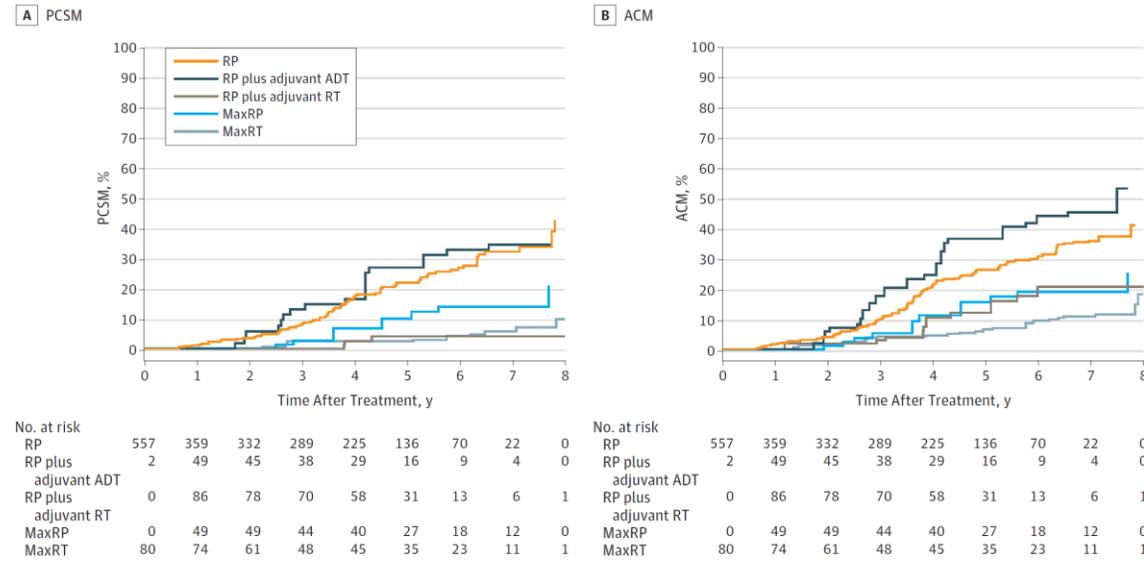
JAMA Oncology | Original Investigation

Surgery vs Radiotherapy in the Management of Biopsy Gleason Score 9-10 Prostate Cancer and the Risk of Mortality

JAMA Oncology, 2018

Derya Tilki, MD; Ming-Hui Chen, PhD; Jing Wu, PhD; Hartwig Huland, MD; Markus Graefen, MD, PhD; Michelle Braccioforte, MPH; Brian J. Moran, MD; Anthony V. D'Amico, MD, PhD

Figure. Adjusted Estimates of Prostate Cancer-Specific Mortality (PCSM) and All-Cause Mortality (ACM)



A and B, Pairwise *P* values for PCSM are as follows: *P* = .002 for MaxRT vs RP, *P* < .001 for MaxRT vs RP plus adjuvant RT, *P* = .41 for MaxRT vs RP plus adjuvant EBRT, and *P* = .29 for MaxRT vs MaxRP. Pairwise *P* values for ACM are as follows: *P* = .09 for MaxRT vs RP, *P* = .003 for MaxRT vs RP plus adjuvant RT,

P = .52 for MaxRT vs RP plus adjuvant EBRT, and *P* = .95 for MaxRT vs MaxRP. ACM indicates all-cause mortality; ADT, androgen deprivation therapy; EBRT, external beam radiotherapy; MaxRP, RP and both adjuvant RT and ADT; MaxRT, EBRT, brachytherapy, and ADT; RP, radical prostatectomy; and RT, radiotherapy.

- Between 1992 and 2013, 80 men were treated with MaxRT, while 559 men were treated with RP and PLND.

- There was no significant difference in the risk of PCa-specific mortality and overall mortality when comparing men who received MaxRP compared to those who received MaxRT.

Functional Outcomes and Quality of Life in High-risk Prostate Cancer Patients Treated by Robot-assisted Radical Prostatectomy with or Without Adjuvant Treatments

Wout Devlies^{a,b,*}, Geert Silversmit^c, Filip Ameye^d, Peter Dekuyper^d, Thierry Quackels^e, Thierry Roumeguère^e, Ben Van Cleynenbreugel^a, Nancy Van Damme^c, Frank Claessens^f, Wouter Everaerts^{a,g}, Steven Joniau^{a,b}, on behalf of Be-RALP: the Belgian RALP Consortium

^a Department of Urology, KU Leuven, Leuven, Belgium; ^b Department of Development and Regeneration, KU Leuven, Leuven, Belgium; ^c Belgian Cancer Registry, Brussels, Belgium; ^d Department of Urology, Maria Middelaers Hospital, Ghent, Belgium; ^e Department of Urology, Université Libre De Bruxelles, Brussels, Belgium; ^f Laboratory of Molecular Endocrinology, KU Leuven, Leuven, Belgium; ^g Department of Cellular and Molecular Medicine, KU Leuven, Belgium

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 26 March 2024
 Accepted 23 Apri



- Sexual Activity/ Function and IIEF-5:

- ▶ less after adj. treatment
- ▶ statistically significant

- LUTS and ICIQ (Incontinence):

- ▶ marginal differences
- ▶ not signifikant

- Global QoL:

- ▶ no difference

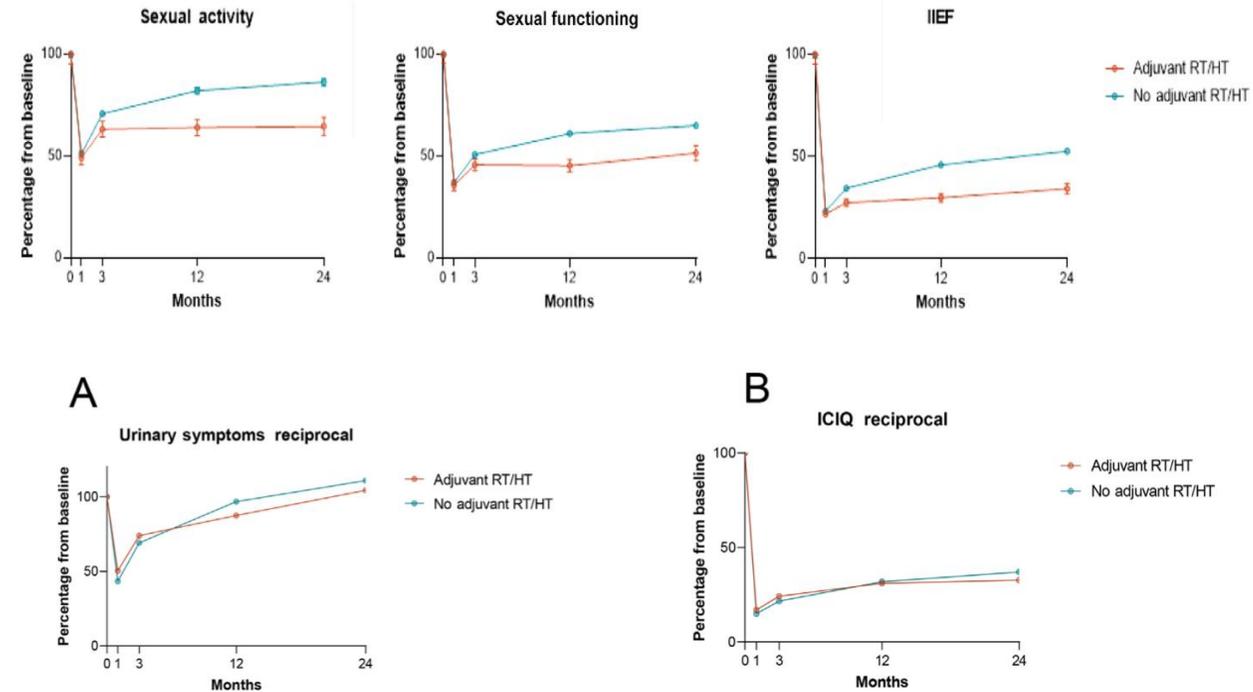


Fig. 4 – Mixed-model explorations of urinary function and quality of life: graphical representation of interaction terms from the mixed-model analysis on (A and B) urinary function and (C and D) quality of life. Time interacted with postoperative treatment (A–C) and risk (D). Both urinary outcome measures were transformed reciprocally. HT = hormone therapy; ICIQ = Incontinence Modular Questionnaire–Urinary Incontinence; RT = radiotherapy.

Therapie bei cN1 PCa



Only limited evidence exists supporting RP for cN1 patients.

Two RCTs from the STAMPEDE platform protocol reported on men with de novo high-risk/locally advanced M0 disease. Thirty-nine percent of patients were N1 on conventional imaging. **Given the survival benefits observed in the overall population, combined ADT and additional abiraterone should be a SOC in cN1 patients.**

EAU - EANM - ESTRO - ESUR - ISUP - SIOG Guidelines on Prostate Cancer

P. Cornford (Chair), D. Tilki (Vice-chair), R.C.N. van den Bergh, E. Briers, Patient Advocate (European Prostate Cancer Coalition/Europa UOMO), D. Eberli, G. De Meerleer, M. De Santis, S. Gillessen, A.M. Henry, G.J.L.H. van Leenders, J. Oldenburg, I.M. van Oort, D.E. Oprea-Lager, G. Ploussard, M. Roberts, O. Rouvière, I.G. Schoots, J. Stranne, T. Wiegel

6.3.4.4 Guidelines for radical- and palliative treatment of locally-advanced disease*

Recommendations	Strength rating
Offer IMRT/VMAT plus IGRT to the prostate plus pelvis in combination with long-term ADT and two years of abiraterone to cN1M0 patients.	Strong
Therapeutic options outside surgery or radiotherapy	
Do not offer whole gland treatment or focal treatment.	Strong

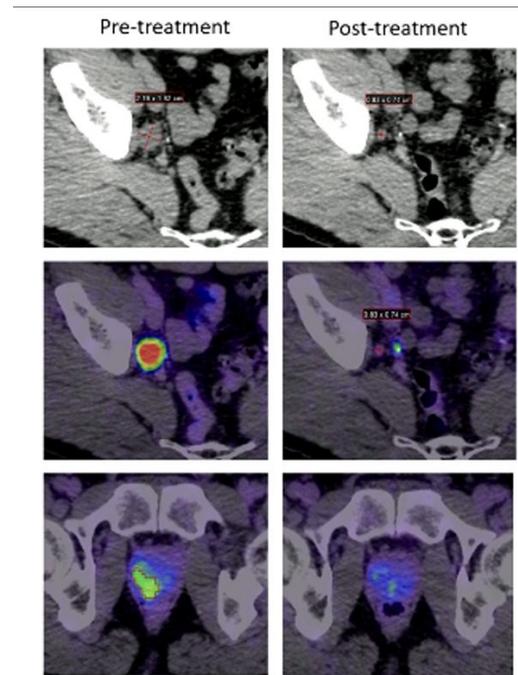
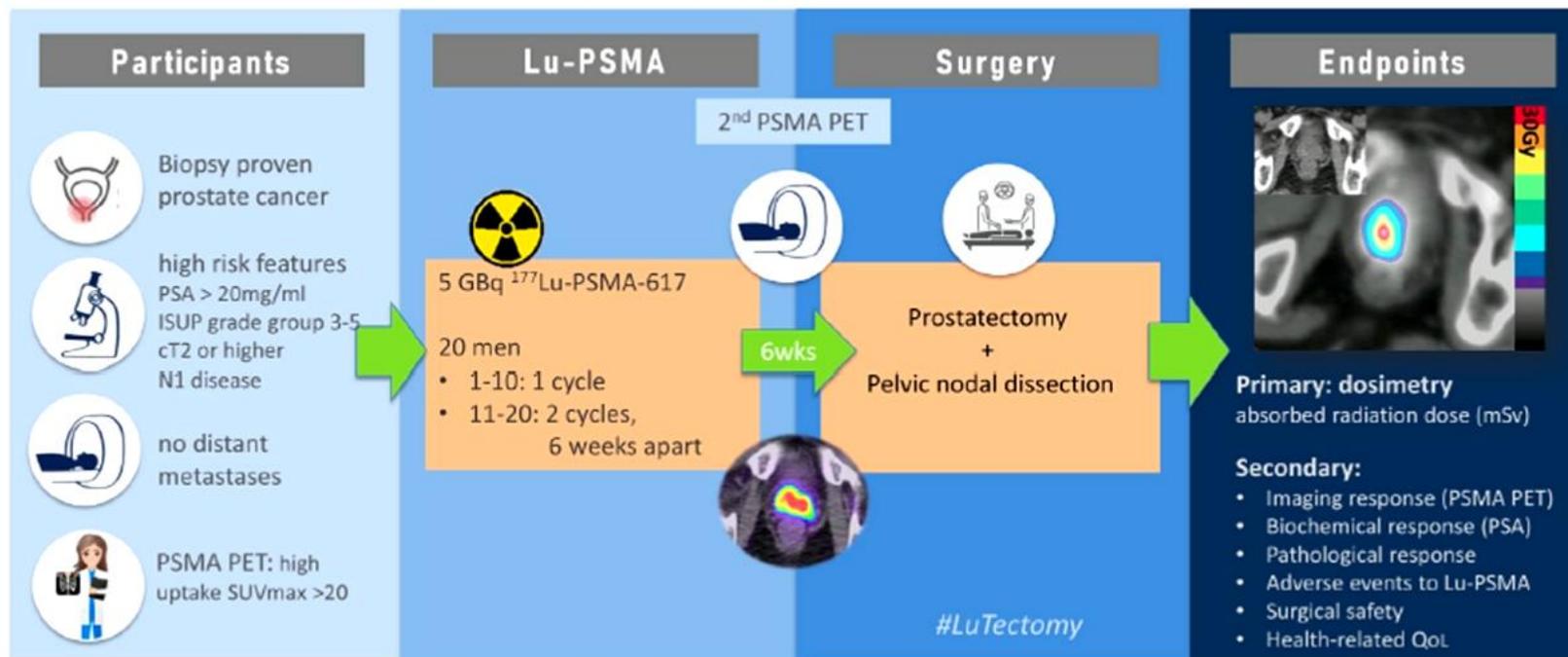
*All recommendations are based on conventional imaging with isotope bone scan and CT/MR abdomen/pelvis.

Cornford P, et al. Eur Urol. 2024

*All recommendations are based on conventional imaging with isotope bone scan and CT/MR abdomen/pelvis.

Neoadjuvant Therapy before rad. Prostatectomy in high-risk-PCa/LAPC

LuTectomy | A prospective Phase I/II study of LuPSMA prior to surgery



Neoadjuvant PSMA-targeted radioligand therapy (“LuTectomy”) is an innovative investigational strategy giving Lu-177-PSMA before prostatectomy. Early studies show feasibility, biological activity, and safety, but its effect on long-term oncologic outcomes remains under evaluation.

Fifteen-Year Outcomes after Monitoring, Surgery, or Radiotherapy for Prostate Cancer

F.C. Hamdy, J.L. Donovan, J.A. Lane, C. Metcalfe, M. Davis, E.L. Turner, R.M. Martin, G.J. Young, E.I. Walsh, R.J. Bryant, P. Bollina, A. Doble, A. Doherty, D. Gillatt, V. Gnanapragasam, O. Hughes, R. Kockelbergh, H. Kynaston, A. Paul, E. Paez, P. Powell, D.J. Rosario, E. Rowe, M. Mason, J.W.F. Catto, T.J. Peters, J. Oxley, N.J. Williams, J. Staffurth, and D.E. Neal, for the ProtecT Study Group*

Nach D'Amico Kriterien:

Studienstart → 76% Low risk PCa

Heutzutage → 24% Intermediate risk
PCa, 10% High risk
PCa

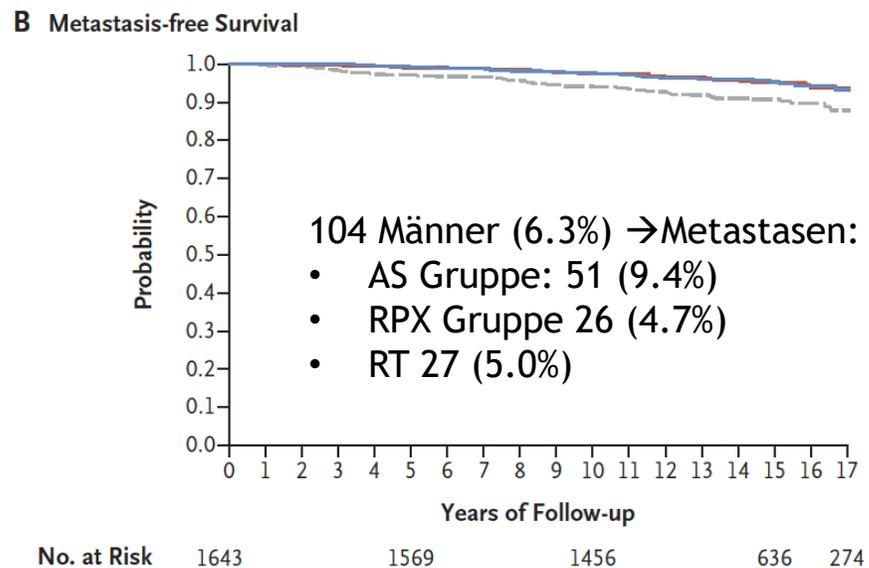
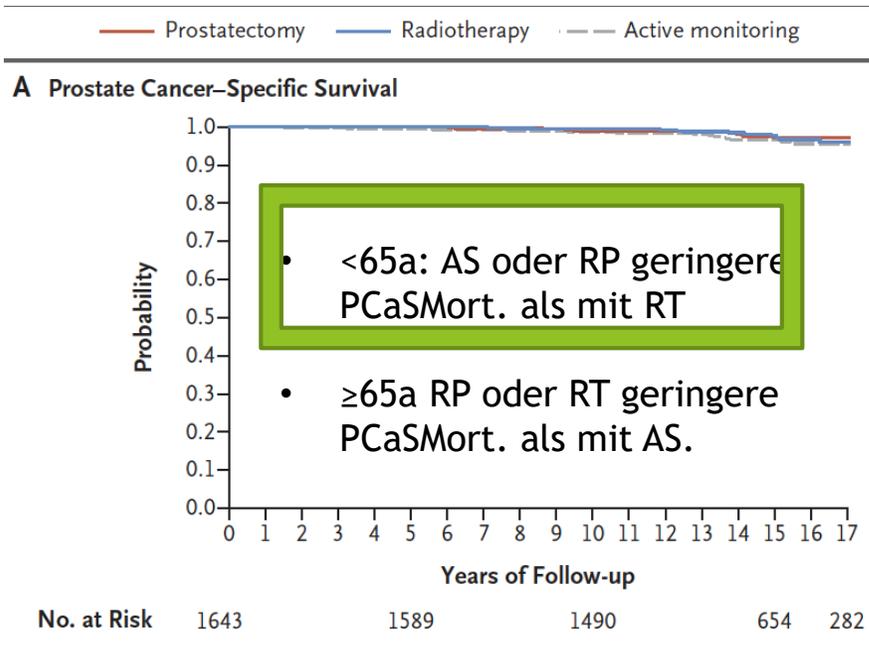
Nach CAPRA Kriterien (Cancer of the Prostate Risk Assessment score):

- Low risk 71% scores of 0-2
- Intermediate risk 26.4% scores of 3-5
- High risk 2.5% scores 6-10

(Herlemann et al. 2024)

	Active monitoring (n=545)	Radiotherapy (n=545)	Radical prostatectomy (n=553)
PSA (µg/L)			
3.0-5.9	373 (68%)	373 (68%)	371 (67%)
6.0-9.9	116 (21%)	121 (22%)	123 (22%)
≥10.0	56 (10%)	51 (9%)	59 (11%)
Median PSA (range; µg/L)	4.6 (3.0-20.9) [†]	4.6 (3.0-18.8)	4.7 (3.0-18.4)
Gleason score			
6	421 (77%)	423 (78%)	422 (76%)
7	111 (20%)	108 (20%)	120 (22%)
8-10	13 (2%)	14 (3%)	10 (2%)
Missing	0	0	1 (<1%)
Clinical stage			
T1c	410 (75%)	429 (79%)	410 (74%)
T2	135 (25%)	116 (21%)	143 (26%)

Keine formal vorgegebene AS Strategie:



45 PCa assoziierte Todesfälle!

Table 2. Prostate Cancer Survival.*

Trial Group	Survival (95% CI)	
	At 10 Yr	At 15 Yr
	<i>percentage of patients</i>	
Active monitoring	98.7 (97.2–99.4)	96.6 (94.4–98.0)
Prostatectomy	99.0 (97.7–99.6)	97.2 (94.8–98.5)
Radiotherapy	99.4 (98.2–99.8)	97.7 (95.5–98.8)

PACE A -RCT

EUROPEAN UROLOGY 86 (2024) 566–576

available at www.sciencedirect.com
journal homepage: www.europeanurology.com



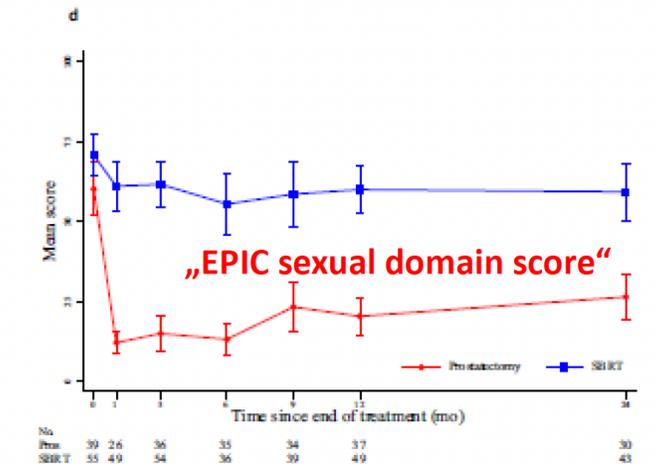
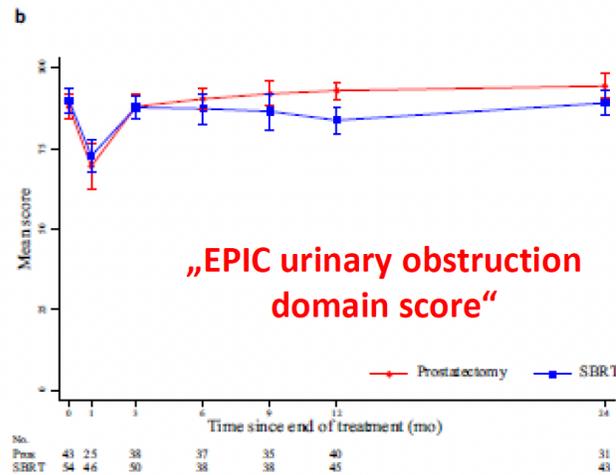
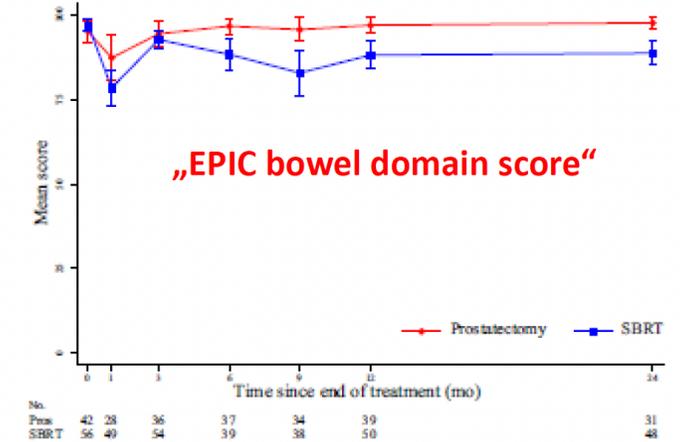
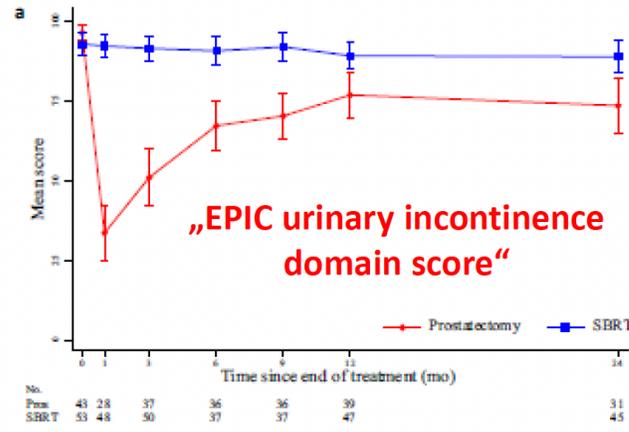
Original Article – Editor's choice

Editorial by Markus Graefen, Alberto Bossi on pp. 577–578 of this issue

Radical Prostatectomy Versus Stereotactic Radiotherapy for Clinically Localised Prostate Cancer: Results of the PACE-A Randomised Trial

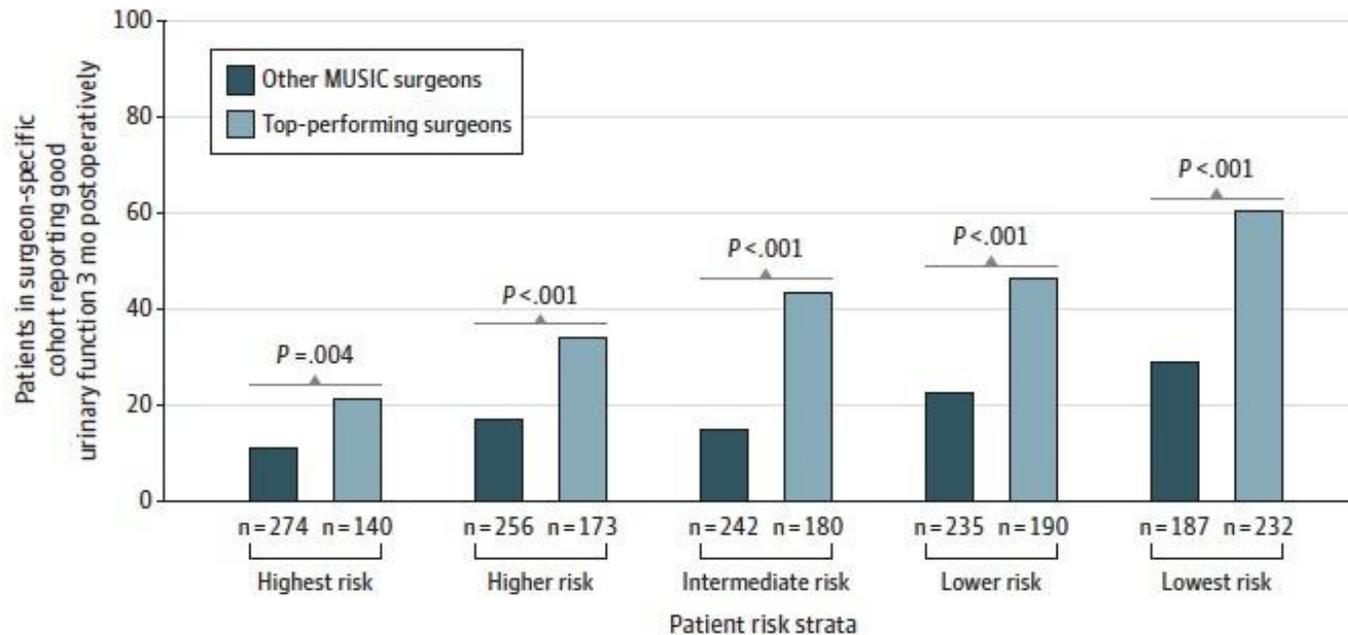
Nicholas van As^{a,b,*}, Binnaz Yasar^{a,b}, Clare Griffin^b, Jaymini Patel^b, Alison C. Tree^{a,b}, Peter Ostler^c, Hans van der Voet^d, Daniel Ford^e, Shaun Tolan^f, Paula Wells^g, Rana Mahmood^h, Mathias Winklerⁱ, Andrew Chan^j, Alan Thompson^a, Chris Ogden^a, Olivia Naismith^{a,k}, Julia Pugh^b, Georgina Manning^b, Stephanie Brown^b, Stephanie Burnett^b, Emma Hall^b

Kategorie cT1c bis cT2c N0/X M0/X
Gleason Score ≤ 3+4 und PSA ≤ 20ng/ml
No ADT
ECOG 0-2 und OP-fähig



Einfluss Chirurg*in und Kontinenz

- ▶ *Auffenberg Jama Surgery 2021*
- ▶ N = 4582 RP, 95 surgeons (Michigan data base) Prospective (2014-2018) Self administered questionnaires



And top surgeons

- Less margins

- More CR @3 months

GU Toxicity - PACE B

Phase 3 Trial of Stereotactic Body Radiotherapy in Localized Prostate Cancer



Authors: Nicholas van As, M.D., Clare Griffin, M.Sc., Alison Tree, M.D., Jaymini Patel, Ph.D., Peter Ostler, F.R.C.R., Hans van der Voet, M.D., Andrew Loblaw, M.D., +20, and Emma Hall, Ph.D. [Author Info & Affiliations](#)

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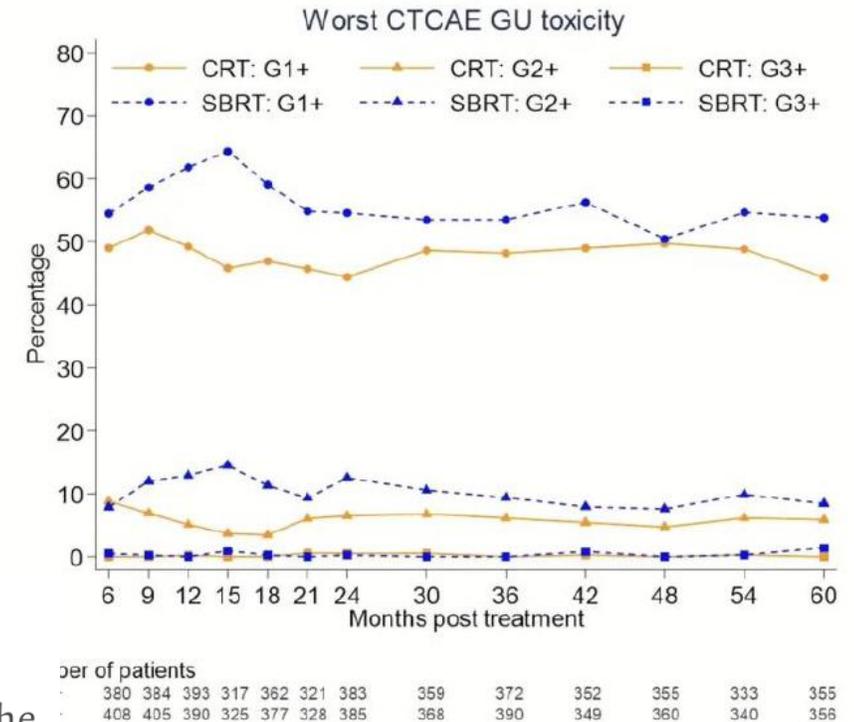
CTCAE GU toxicity – up to 5 years

Grad 2+ Toxizität = merkliche Beschwerden

beim Wasserlassen bis hin zu Blut im Urin
Keine PROMs verwendet!

CTCAE GU at 5 years	CRT N (%)	SBRT N (%)	P-value
Grade 0/1	335 (94.1)	325 (91.5)	0.19
Grade 2+	21 (5.9)	30 (8.5)	

SBRT. At 5 years, the cumulative incidence of late Radiation Therapy Oncology Group (RTOG) grade 2 or higher genitourinary toxic effects was 26.9% (95% CI, 22.8 to 31.5) with SBRT and 18.3% (95% CI, 14.8 to 22.5) with control radiotherapy (P<0.001), and the cumulative incidence of late RTOG grade 2 or higher gastrointestinal toxic effects was 10.7% (95% CI, 8.1 to 14.2) and 10.2% (95% CI, 7.7 to 13.5), respectively (P=0.94).



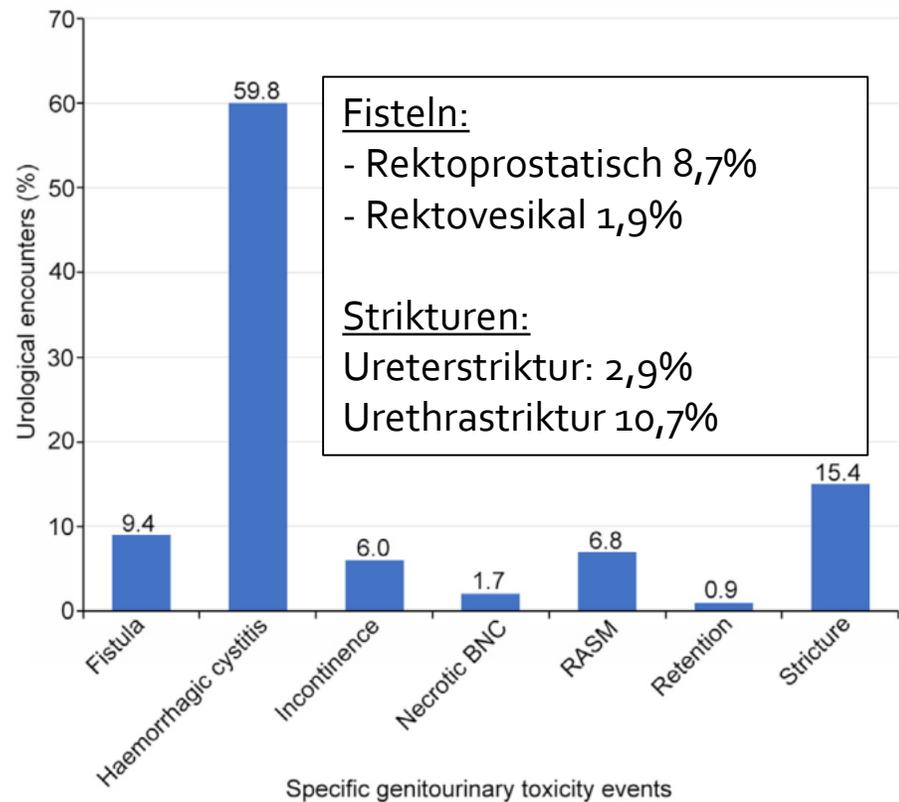
GU Toxicity

Original Article

Genitourinary toxicity after pelvic radiation: Prospective review of complex urological presentations

Rowan V. David ^{a,b,*}, Asif Islam ^a, John Miller ^a,
Michael E. O'Callaghan ^{a,b}, Arman A. Kahokehr ^{a,b}

- Prospektiv, Subgruppenanalyse Radiatio Prostata-Ca
- n= 117 Krankenhauskontakte (n=46 Patienten), hpts ERBT
- 2018-2019, Australia
- > 5y-Follow-Up



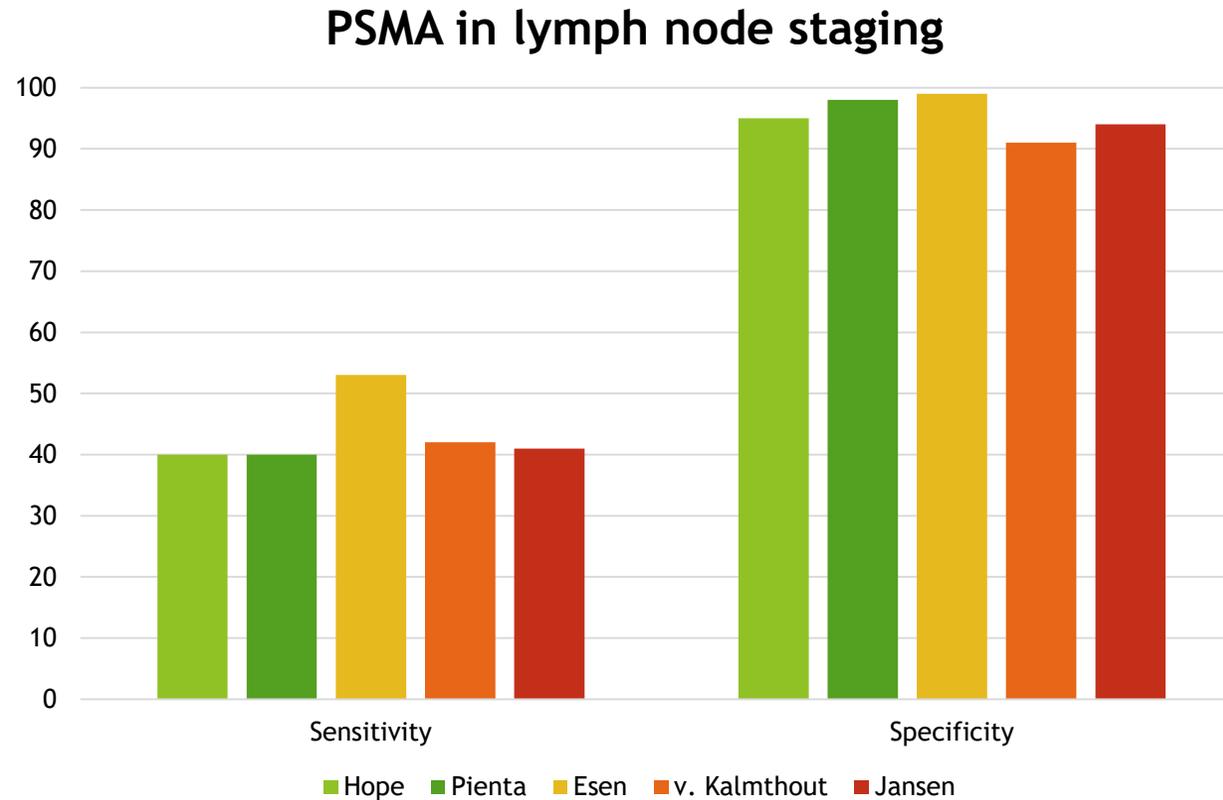
There were 52 (44.4%) admissions for GU toxicity, which accounted for 3.4% of the total 1524 urological admissions at our tertiary centre over the study period. Of the 52 ad-

Conclusion: There is a high burden of elective and emergency urology workload attributed to late pelvic radiation toxicity. Late GU toxicity occurring ≥ 5 years after radiotherapy is common and often more severe.

Figure 2 Specific genitourinary toxicity events related to urological encounters. RASM, radiation-associated secondary malignancy; BNC, bladder neck contracture.

PSMA - PET CT and regional nodal staging?

Studien
mit
n= 100+

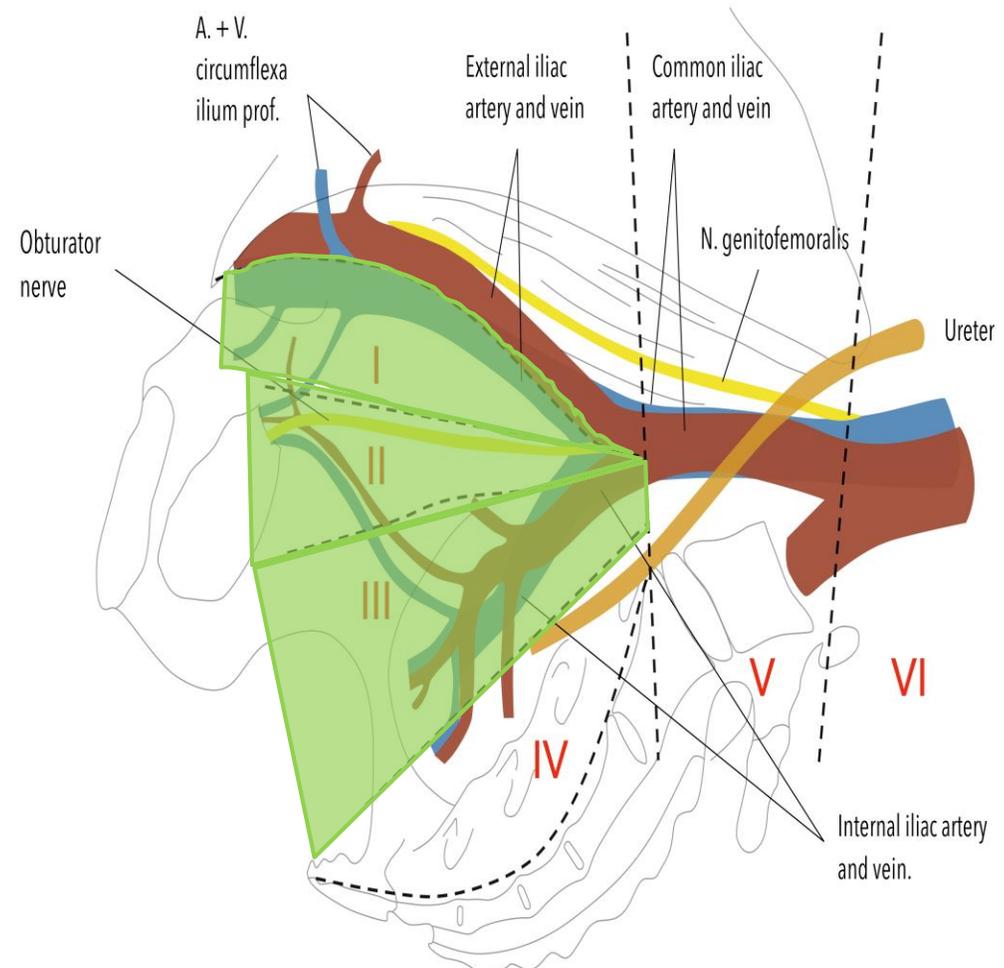


Hope et al., JAMA Oncol 2021; Pienta et al., Jurool 2021;
Esen et al., EurUrolFocus 2021;
van Kalmthout et al., Jurool 2020

Efficacy of LN-Dissection

Extended vs. Superextended

▶ 94% correctly staged

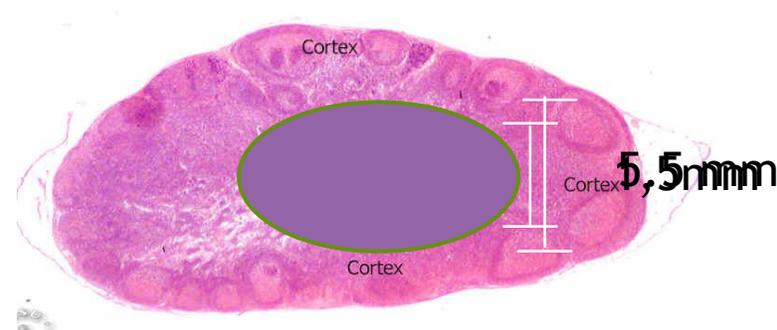


^{18}F -DCFPyL-PSMA in primary staging: SALT trial

Size of lymph node metastases:

- ▶ Detected : 5.5mm
- ▶ Undetected : 1.5mm

Jansen et al., EJNMMI 2021



A negative PSMA-PET-CT can not replace LND

The possible benefit of extended LND

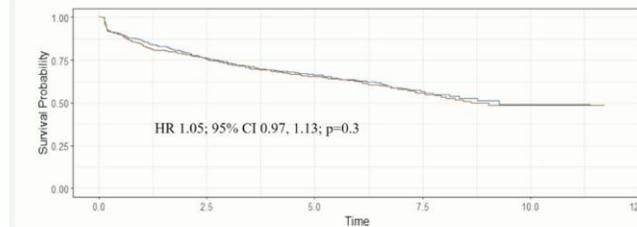


Touier KA, Sjoberg DD, Benfante N, et al. Limited versus Extended Pelvic Lymph Node Dissection for Prostate

Cancer: A Randomized Clinical Trial. Eur Urol Oncol. 2021;4(4): 532-539.

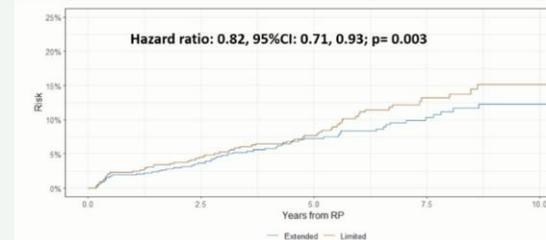
h 4.2 years of follow-up, still demonstrates that there is no significant benefit with extended nodal dissection for biochemical recurrence:

Update with FU 4.2 yrs: No effect on BCR



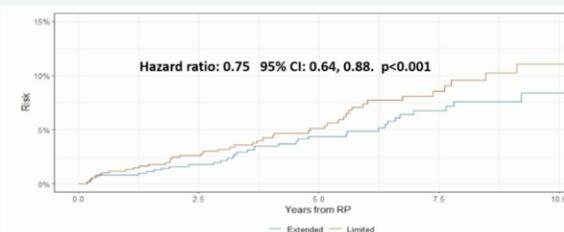
However, patients undergoing an extended lymph node dissection had a reduced incidence of metastases (HR: 0.82, 95% CI: 0.71–0.93, p=0.003).

Extended PLND Reduces Incidence of Metastasis



This measure of effect is even more pronounced when analysis is limited to the outcome of distant metastases (HR: 0.75, 95% CI: 0.64–0.88, p<0.001).

Extended PLND Reduces Incidence of Distant Metastasis



Notably, the greatest distant metastasis-free survival benefit effect appears to be present in patients with pathologic node-positive disease (HR: 0.49, 95% CI: 0.37–0.65, p<0.001).

Best Systemic Therapy With or Without Radical Prostatectomy in the Management of Men With Oligometastatic Prostate Cancer: The RAMPP Randomised Controlled Trial



- ▶ Multizentrischer Randomized controlled trial (39 Zentren)
- ▶ 2015-2018
- ▶ n = 132 (frühzeitig gestoppt)
- ▶ 1-5 Knochenmetastasen
- ▶ RP (Radical Prostatectomy) + BST (Best systemic therapy) vs. BST allein

- ▶ 5-Jahres-CSM:
 - ▶ RP + BST: 13 %
 - ▶ BST: 23 %

- ▶ HR 0,39 (95 % CI 0,16-0,98)

- ▶ p = 0,037

→ **signifikant**

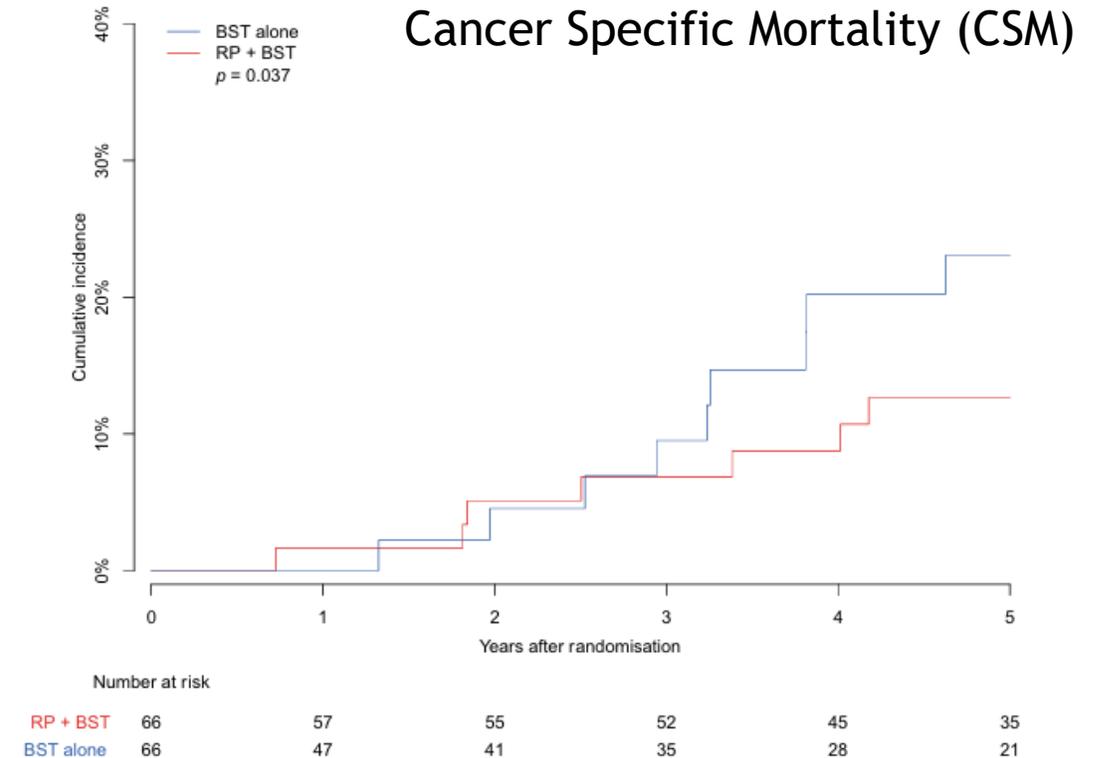


Fig. 1 - Cumulative incidence of cancer-specific mortality in the RP + BST and BST alone groups (n = 132). BST = best systemic therapy; RP = radical prostatectomy.

Chirurgische Morbidität

- ▶ Clavien-Dindo \geq III Komplikationen: 14 %
- ▶ Häufigste Komplikationen:
 - ▶ Blutung Normales Kollektiv
1-(3)%
 - ▶ Anastomosenleck/-striktur 1-6%
 - ▶ Lymphozele 2-5%
- ▶ Keine OP-assoziierten Todesfälle



Treatment Decision Making

Treatment choice hinges on age, comorbidities, life expectancy (>10y), and personal priorities.

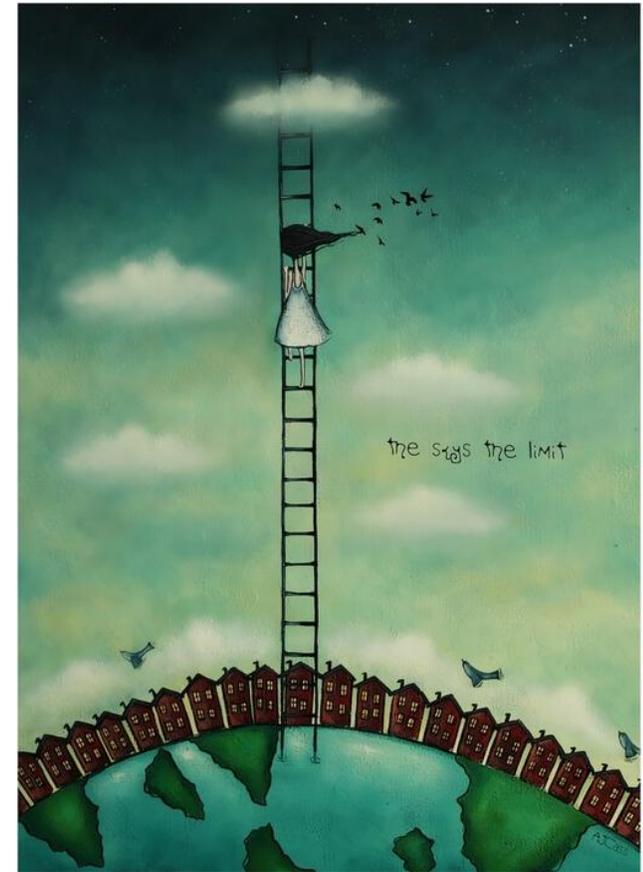


	RARP		SABR	
Prostatavol.	Kein Limit	✓	limitiert	
Prostataobstruktion	Kein Limit	✓	Nicht möglich	
Neoadj. Therapie	Nicht indiziert	✓	Teils notwendig	
Patholog. TNM	Vorhanden	✓	Fehlt	
PSA Monitoring	Einfach	✓	Komplexer	
Salvage Prozedur	Salvage-RTX	✓	Salvage-Chirurgie schwierig	
CSS	Gleich		Gleich	
Urogenitale Toxicity	Selten	✓	Höher	
Harninkontinenz	Höheres Risiko		Niedrigeres Risiko	✓
Erekt. Dysfunktion	Früh, meist signif.		Später, kumulativ	✓
Gastrointest. Sympt	Selten	✓	Häufiger	
Dauer	Stat. 4 Tage		Amb. 2 Wochen	
Kosten	Niedriger	✓	Höher	

Vorteile der RARP:

1. Minimalinvas. Verfahren
2. kurzen stat. Aufenthalt
3. Histo Staging
4. Verzicht auf eine ADT
5. einfache PSA Nachsorge
6. Mögliche RTX
7. keine Bowl bzw. GU Tox

Take home and Mission statement:
The sky is the limit as long as you can dock
the robot!

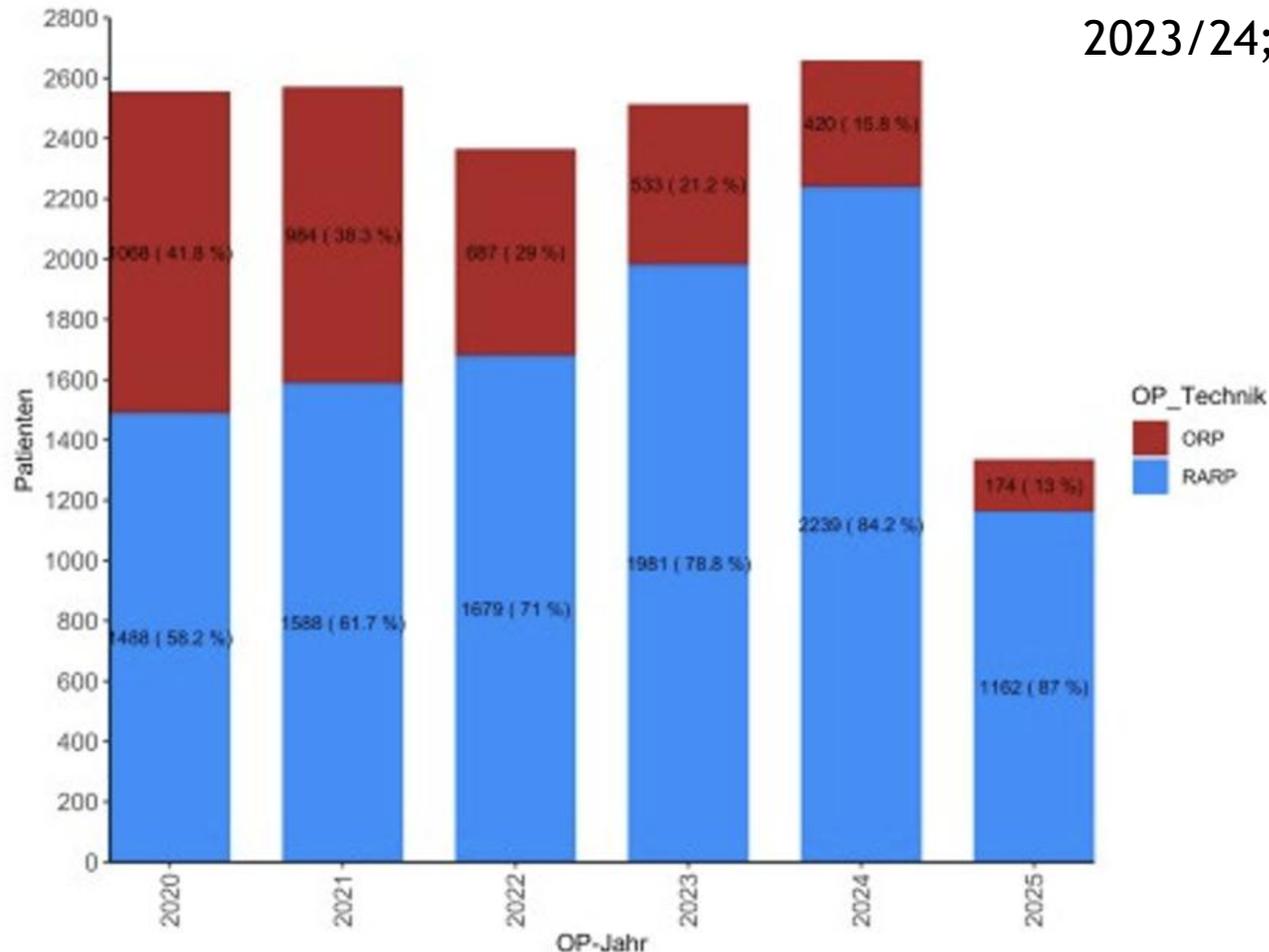


At the center of our mission stands the human being.
We combine medical excellence with empathy and innovation

Time changes - Data from the Martini-clinic decreasing number of open radical prostatectomies (ORP)



Abbildung 1. Patientenzahlen 2020-2025 für offene (ORP) und robotische (RARP) radikale Prostatektomien (RP)



2023/24; 5th and 6th robotic system installed

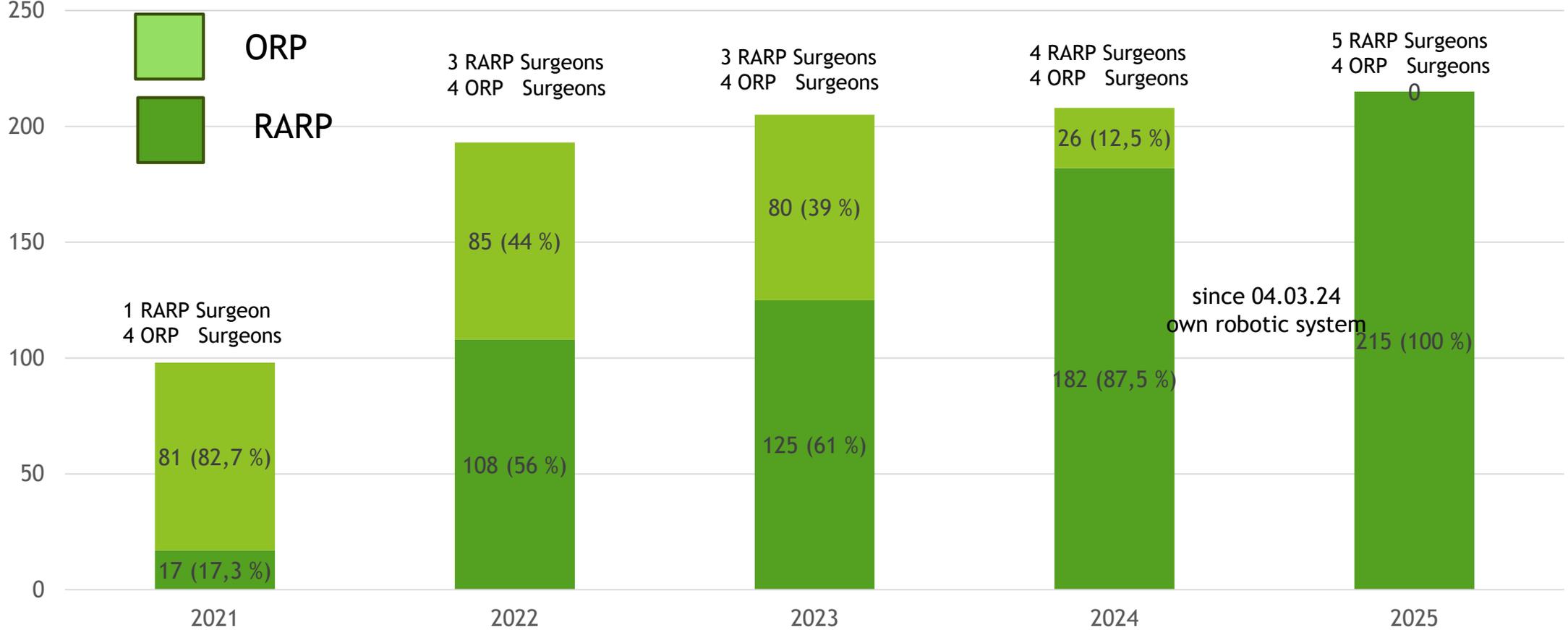
2024
n=2679
15% ORP

2025
n>2000
13% =ORP



Inverse trend of ORP and RARP

Data from Graz 2021-2025



Trad. Proctoring → intergenerational mentorship → stopped training ORP → reverse mentoring

Dual-competency teaching teams (open + robotic expertise) bridge generational skill gaps

ORP necessary in special subgroups?



Elderly men

Obese men

JOURNAL OF ENDOUROLOGY
Volume 32, Number 2, February 2018
Mary Ann Liebert, Inc.
Pg. 106–110
DOI: 10.1089/end.2017.0512

Laparoscopy and Robotic Surgery

Outcome of Robotic Radical Prostatectomy in Men Over 74

Burkhard Ubrig, PhD^{1,2}, Anselm Boyl, Markus Heiland¹, and Alexander Roosen, PhD^{1,3}

TABLE 1. PREOPERATIVE PATIENT DEMOGRAPHICS AND OPERATIVE AND HISTOPATHOLOGICAL OUTCOMES

	<75	≥75	Sign.
Age	64.75 ± 6.54 [46–74]	76.92 ± 2.23 [75–88]	
OP-type			
Open	2.4%	14.1%	
Laparoscopic	7.4%	0%	
DaVinci-assisted	90.2%	85.9%	
BMI	27.60 ± 4.12	25.86 ± 3.51	<i>p</i> < 0.01
ASA			
ASA 1	9.6%	3.1%	
ASA 2	69.4%	66.2%	
ASA 3	21.0%	26.3%	
PSA	10.36 ± 9.93	11.27 ± 7.51	
TUR-P			
Yes	7.3%	12.1%	
No	92.7%	87.9%	
IPSS	8.70 ± 7.42	13.28 ± 9.24	<i>p</i> < 0.01
IIEF-15	35.90 ± 23.56	21 ± 18.84	<i>p</i> < 0.01
Bilateral nerve sparing	44.10%	43.40%	
pT			
1a	0.2%	0.0%	
1b	0.4%	0.0%	
1c	1.6%	0.0%	
2a	2.4%	4.3%	
2b	3.7%	1.4%	
2c	18.3%	23.2%	
3a	44.1%	46.4%	
3b	9.3%	15.9%	
4	19.9%	8.7%	
Gleason			
<7	22.7%	13.8%	
7a	22.0%	22.4%	
7b	27.8%	31.0%	
>7	27.5%	32.8%	
Margins			<i>p</i> < 0.5
R1	19.5%	30.4%	
R0	80.5%	69.6%	
pN			
N1	7.1%	11.8%	
N0	92.9%	88.2%	
Complications (C-D)			
III	1.6%	1.3%	
≤II	22.8%	26.3%	
No	75.7%	72.4%	

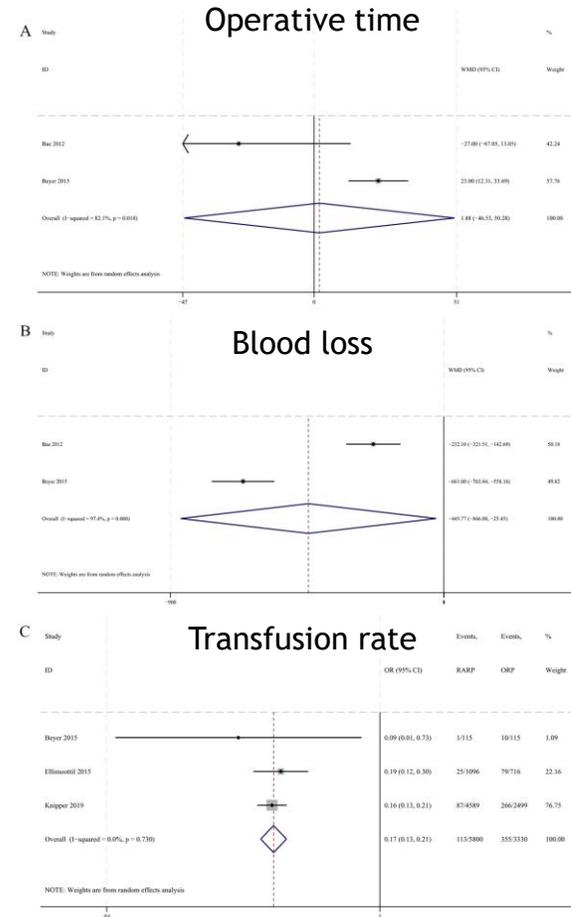
Journal of Robotic Surgery (2024) 18:248
https://doi.org/10.1007/s11701-024-02010-9

REVIEW



Comparative analysis of perioperative outcomes in obese patients undergoing robot-assisted radical prostatectomy (RARP) versus open radical prostatectomy (ORP): a systematic review and meta-analysis

Chong-jian Wang¹ · Cai-xia Chen¹ · Yang Liu¹ · Zhi Wen¹ · Hong-yuan Li¹ · Hao-tian Huang¹ · Xue-song Yang^{1,2}



ORP necessary in special subgroups?



Elderly men

Obese men

Salvage prostatectomy

JOURNAL OF ENDOUROLOGY
Volume 32, Number 2, February 2018
May Arin Libert, Inc.
Pg. 106-110
DOI: 10.1097/end.0000000000000512

Laparoscopy and Robotic Surgery

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in Men Over 74

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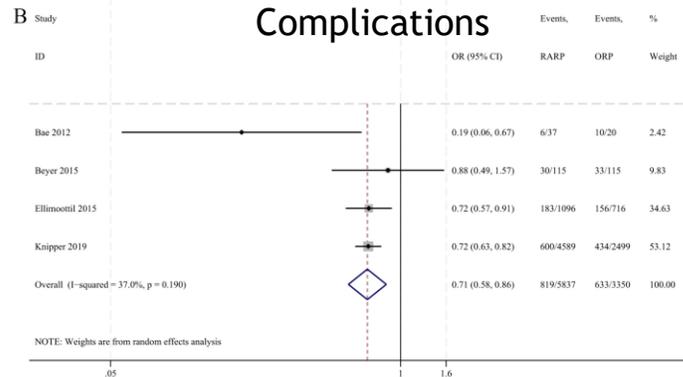
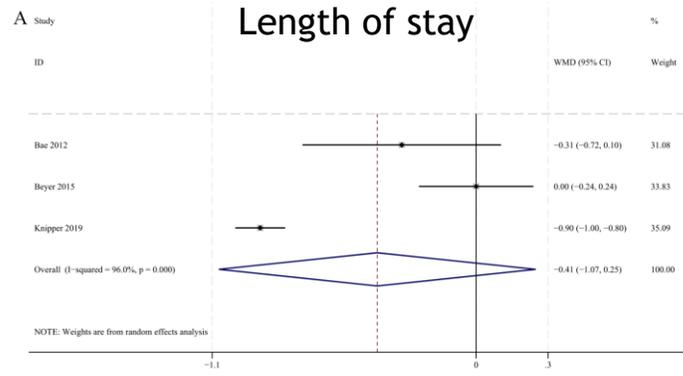
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REVIEW



Comparative analysis of perioperative outcomes in obese patients undergoing robot-assisted radical prostatectomy (RARP) versus open radical prostatectomy (ORP): a systematic review and meta-analysis

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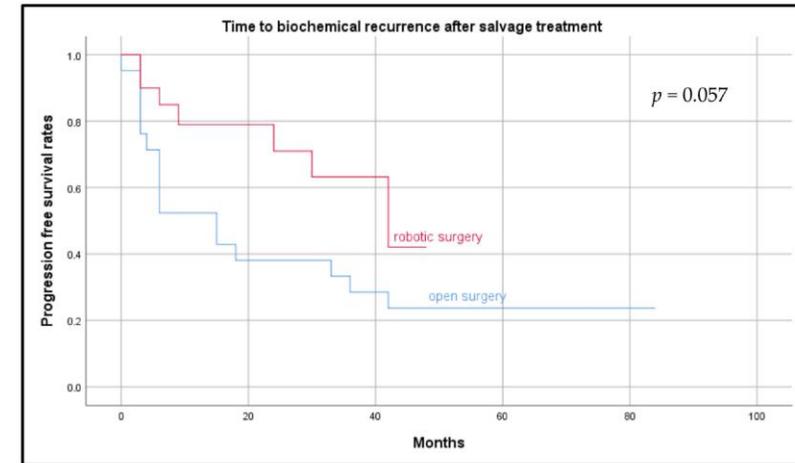
Journal of Clinical Medicine



Article

Evolution of Salvage Radical Prostatectomy from Open to Robotic and Further to Retzius Sparing Surgery

Viktoria Schuetz^{1,*}, Philipp Reimold¹, Magdalena Goertz¹, Luisa Hofer¹, Svenja Dieffenbacher¹, Joanne Nyarangi-Dix¹, Stefan Duensing^{1,2}, Markus Hohenfellner¹ and Gencay Hatiboglu^{1,*}



ORP necessary in special subgroups?



Locally advanced

Shin and Lee *BMC Urology* 2022, 22(1):49
<https://doi.org/10.1186/s12894-022-00998-6>

BMC Urology

RESEARCH

Open Access

Robot-assisted radical prostatectomy in the treatment of patients with clinically high-risk localized and locally advanced prostate cancer: single surgeons functional and oncologic outcomes

Tae Young Shin^{1,4} and Yong Seong Lee^{2,3*}

Table 2 Data on continence and potency recovery during 1-year follow-up after RARP

Time	Patients achieving continence, N (%)	Patients achieving potency, N (%)
1 month	102 (54.3%)	21 (11.2%)
3 months	130 (69.2%)	35 (18.6%)
6 months	148 (78.7%)	72 (38.3%)
12 months	166 (88.3%)	106 (56.4%)

Table 3 Intraoperative, histopathologic, and postoperative data of 188 patients with high-risk localized and locally advanced prostate cancer undergoing RARP

Parameters	N = 188
Operative time, median (IQR), minutes	185 (130–260)
Blood loss, median (IQR), ml	200 (150–450)
Blood transfusion	1 (0.5%)
PLND	
Extended PLND	170 (90.4%)
Limited PLND	18 (9.6%)
Nodal involvement	12 (6.4%)
Complications	
Clavien grade I, II	22 (11.7%)
Clavien grade ≥ III	5 (2.7%)
Pathologic stage	
High-risk localized (≤ pT2c)	63 (33.5%)
High-risk locally advanced	125 (66.5%)
pT3a	75 (39.9%)
≥ pT3b	50 (26.6%)
Pathologic Gleason score	
7	81 (43.1%)
8	74 (39.4%)
≥ 9	33 (17.6%)
PSMs	
Overall	50 (26.6%)
In pT2 cancer	16 (8.5%)
In pT3 cancer	34 (18.1%)
Adjuvant treatment	
Overall	63 (33.5%)
Radiotherapy	25 (13.3%)
Hormonal therapy	38 (20.2%)
Salvage treatment	
Overall	35 (18.6%)
Radiotherapy	10 (5.3%)
Hormonal therapy	15 (8.0%)
Secondary after adjuvant therapy	10 (5.3%)
Follow-up duration, median (IQR), month	66.5 (13–94)
BCR	42 (22.3%)
Time to BCR, median (IQR)	10.5 (3.5–26)

Transplant

Surgery in Motion

Robotic Radical Prostatectomy for Prostate Cancer in Renal Transplant Recipients: Results from a Multicenter Series

Giancarlo Marra^{a,b,c,*}, Marco Agnello^a, Andrea Giordano^a, Francesco Soria^a, Marco Oderda^a, Charles Dariane^d, Marc-Olivier Timsit^d, Julien Branchereau^e, Oussama Hedli^e, Benoit Mesnard^e, Derya Tilki^{f,g,h}, Jonathon Olsburghⁱ, Meghana Kulkarniⁱ, Veeru Kasivisvanathan^{i,j}, Alberto Breda^k, Luigi Biancone^l, Paolo Gontero^a, collaborators^l

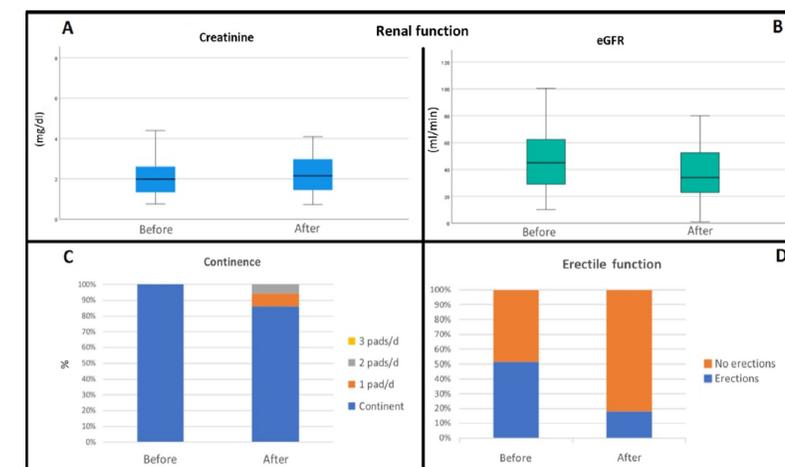
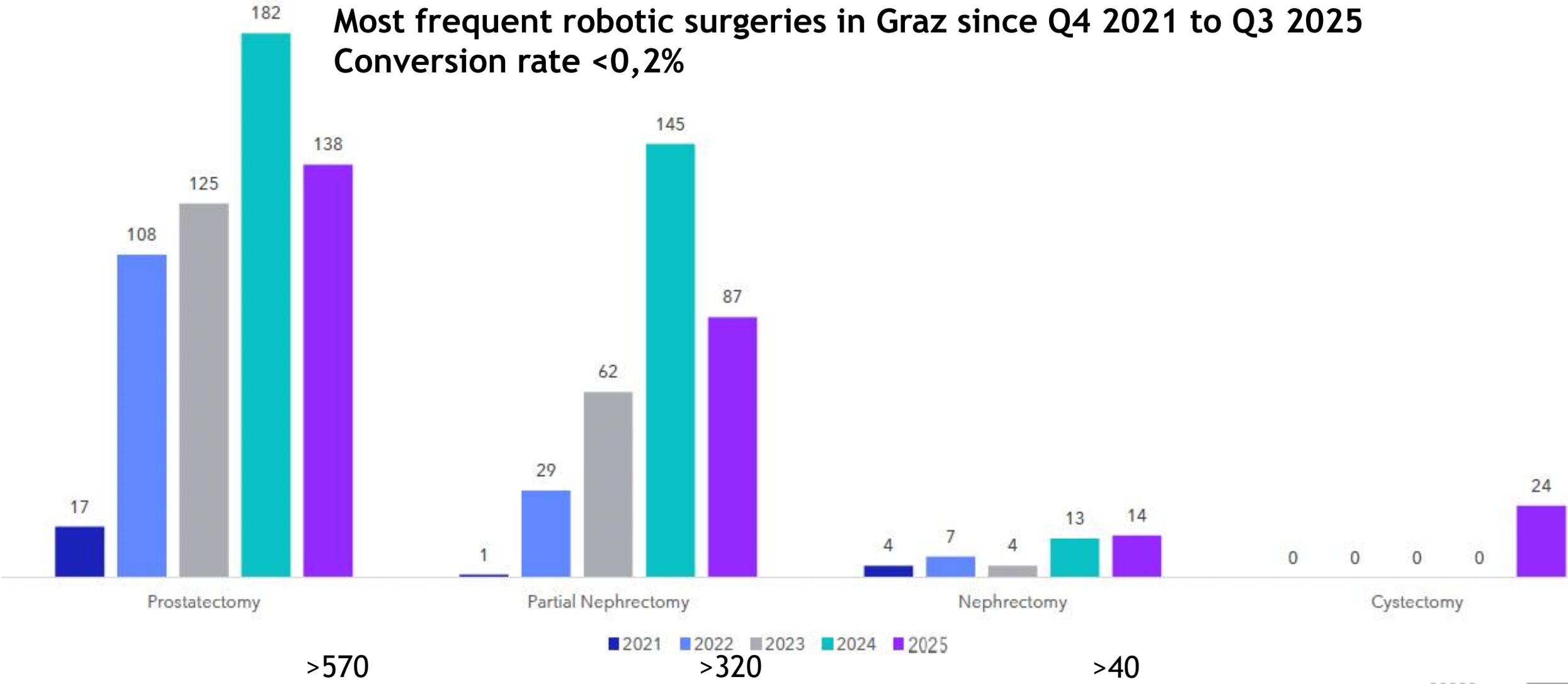


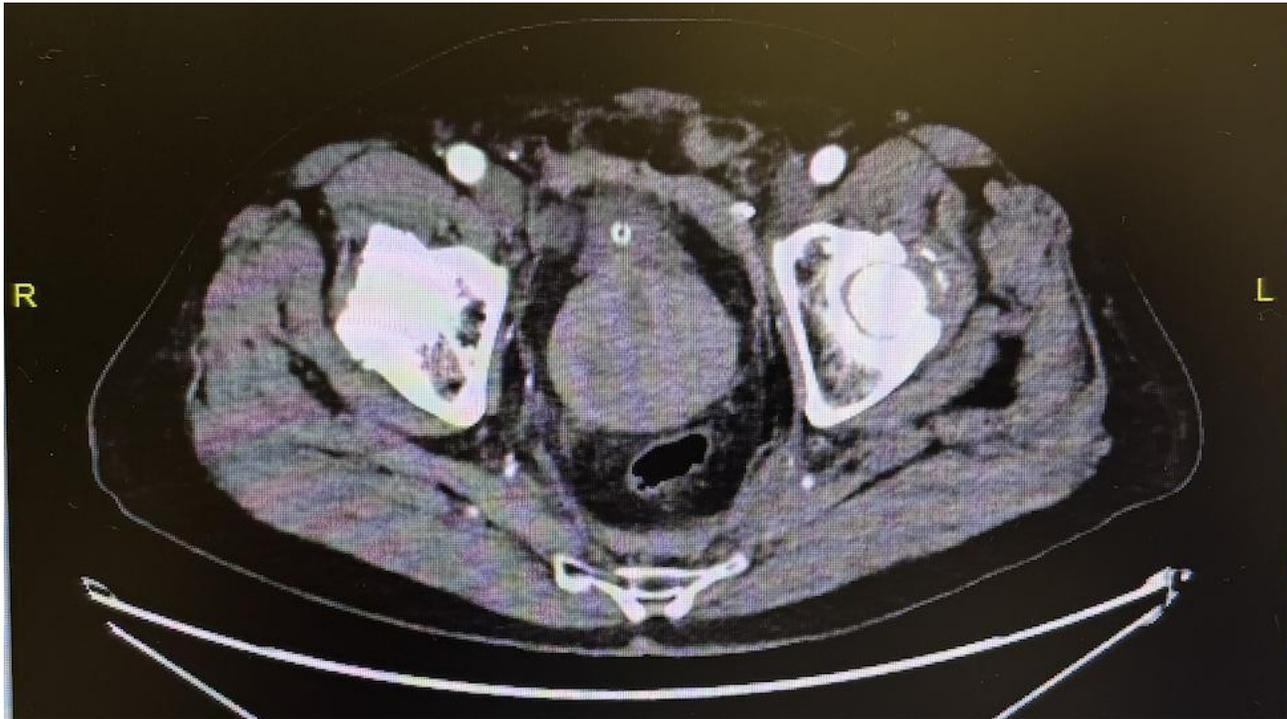
Fig. 2 – Renal function in terms of (A) creatinine and (B) estimated glomerular filtration rate (eGFR). (C) Continence and (D) erectile functional outcomes.

Is open surgery a “must have” for conversion?

Most frequent robotic surgeries in Graz since Q4 2021 to Q3 2025
Conversion rate <0,2%



Is open surgery a “must have” in emergency settings?



In Graz:
1 Emergency Revision
performed robotically
if not by interventional radiologists

Z.n. Roboter assistierter radikaler Prostatektomie am 17.03.2025.

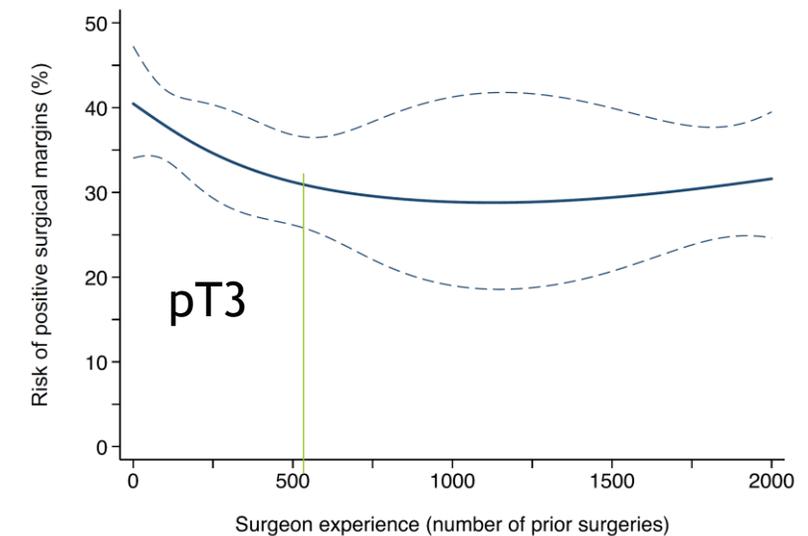
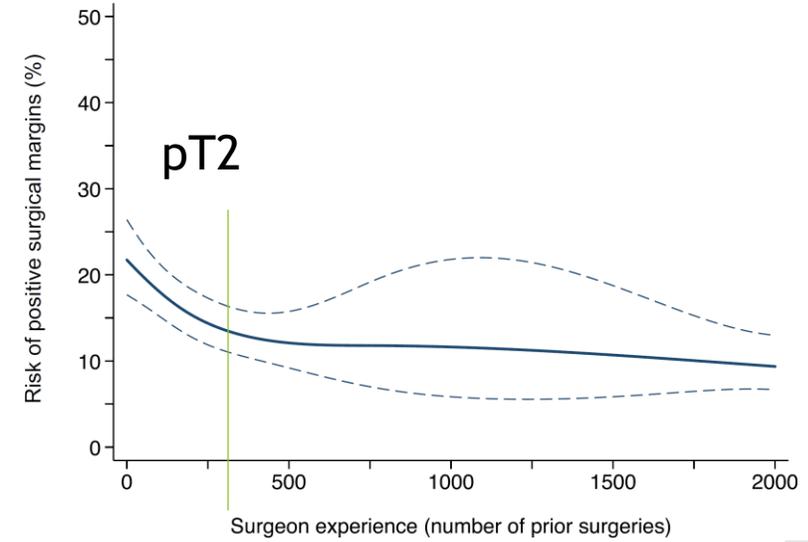
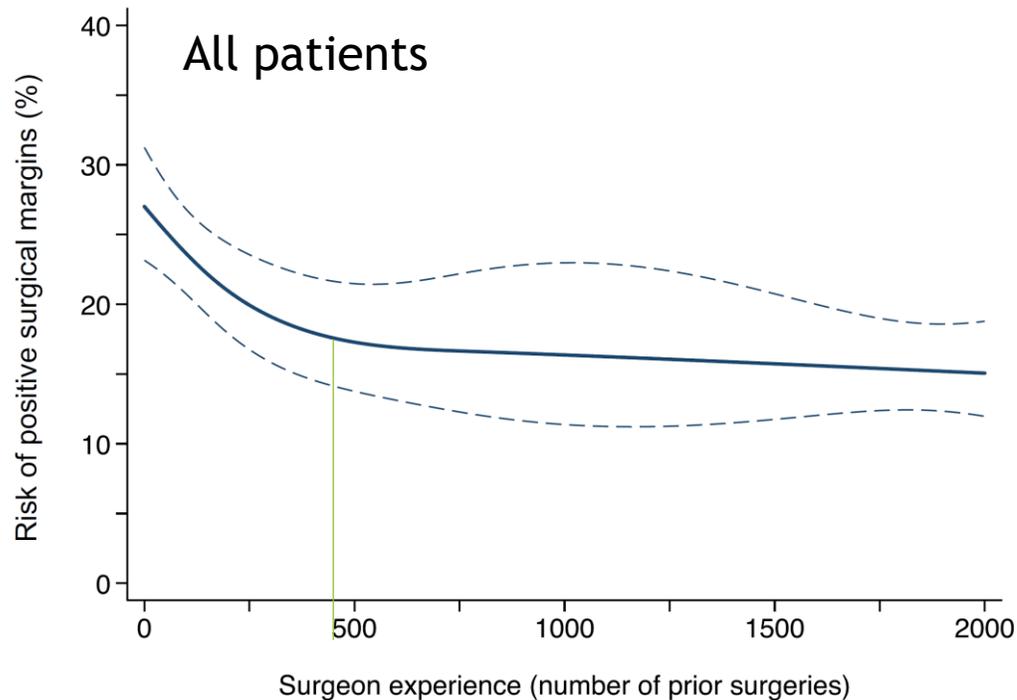
1. In der ehemaligen Prostataloge zeigt sich eine gemischte, heterogen konfigurierte, überwiegend hyperdens dargestellte Raumforderung auf einer Ausdehnung von 17 x 60 x kraniokaudal 82 mm. In der früharteriellen Phase zeigt sich im apikalen Aspekt eine punktförmige Hyperdensität, in erster Linie **vereinbar mit aktiver, (arterieller) Blutung** mit Pooling in der venösen Phase und Ausbildung einer deutlichen Kontrastmittelfahne, differenzialdiagnostisch ist eine rein venöse Blutung ebenfalls denkbar bei doch dezent abgrenzbarer früharteriellem Enhancement.



Learning curve (PSM) for RARP

Positive Surgical Margins After Anterior Robot-assisted Radical Prostatectomy: Assessing the Learning Curve in a Multi-institutional Collaboration

Carlo A. Bravi^{a,b,c,*}, Paolo Dell'Oglio^{d,e,f}, Pietro Piazza^g, Simone Scarcella^{h,i}, Lorenzo Bianchi^g, Ugo Falagario^j, Filippo Turri^k, Iulia Andras^l, Fabrizio Di Maida^m, Ruben De Groot^{b,c}, Federico Piramideⁿ, Marcio Covas Moschovas^o, Nazareno Suardi^{p,q}, Carlo Terrone^p, Giuseppe Carrieri^j, Vipul Patel^o, Riccardo Autorino^r, Francesco Porpigliaⁿ, Andrew Vickers^s, Alberto Briganti^t, Francesco Montorsi^t, Alexandre Mottrie^{b,c}, Alessandro Larcher^t, on behalf of the Junior ERUS/Young Academic Urologist Working Group on Robot-assisted Surgery[†]



Learning curve (PSM) ORP

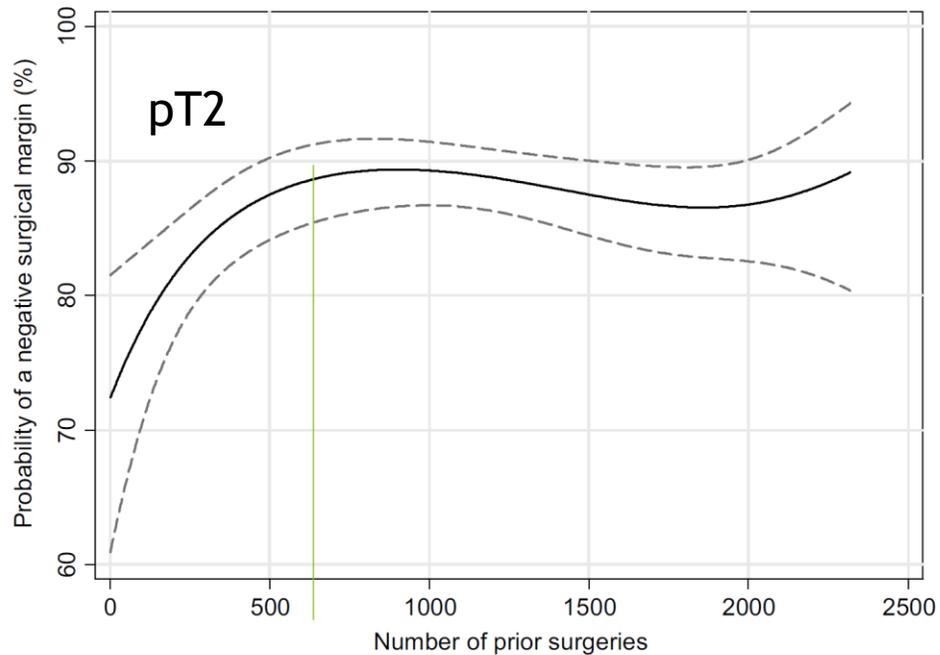


World J Urol (2015) 33:1721–1727
DOI 10.1007/s00345-015-1540-5

ORIGINAL ARTICLE

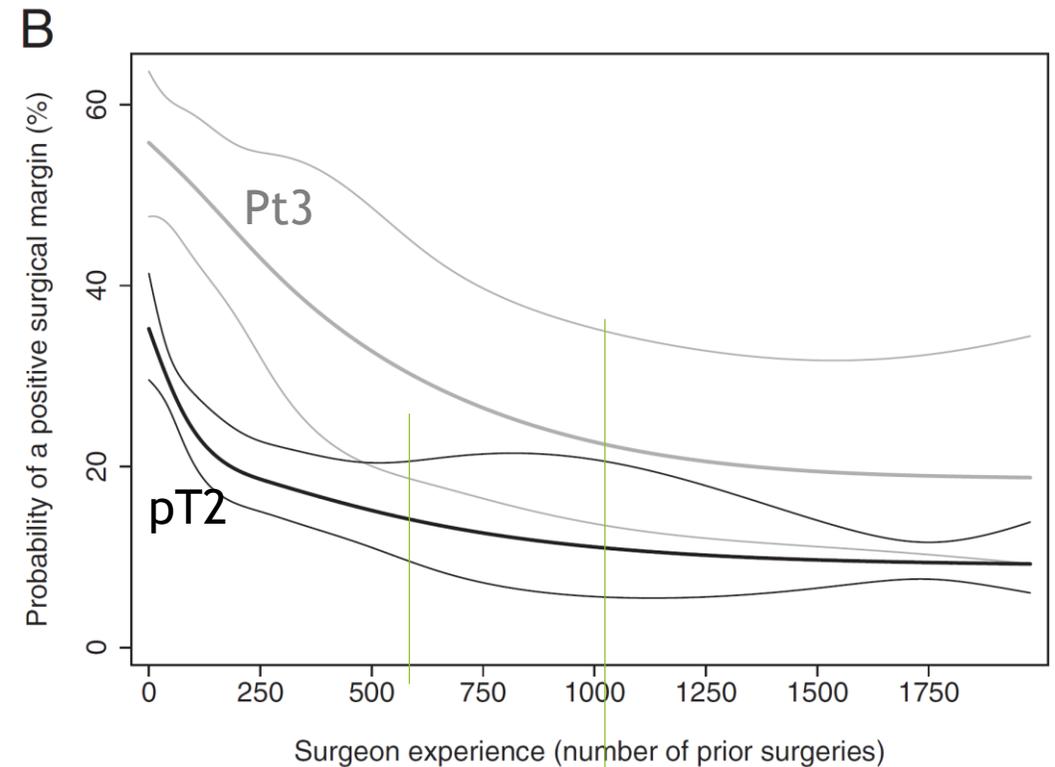
Surgical learning curve for open radical prostatectomy: Is there an end to the learning curve?

Alexander Kretschmer¹ · Philipp Mandel¹ · Alexander Buchner¹ · Christian G. Stief¹ ·
Derya Tilki¹



The Learning Curve for Surgical Margins After Open Radical Prostatectomy: Implications for Margin Status as an Oncological End Point

Andrew Vickers,* Fernando Bianco, Angel Cronin, James Eastham, Eric Klein,†
Michael Kattan and Peter Scardino



Conclusion

The **discontinuation of ORP training** does not represent a rupture or paradigm shift, but rather a **paradigmatic evolution**— a natural progression within the same conceptual framework.

This trend is not unprecedented in surgical history, as seen in transitions such as open to laparoscopic cholecystectomy or simple open prostatectomy to HoLEP.

Having dual competency (open and robotic) remains essential during the transition toward **full robotic proficiency**, enhanced by ongoing technological evolution and AI integration.

The **current volume** of patients suitable for open surgery is **too low** to ensure proper training of future open surgeons.

To maintain open surgical skills, innovative training models are required — such as **centralized open surgery training, cadaver courses, and rotations** through general/vascular surgery units.

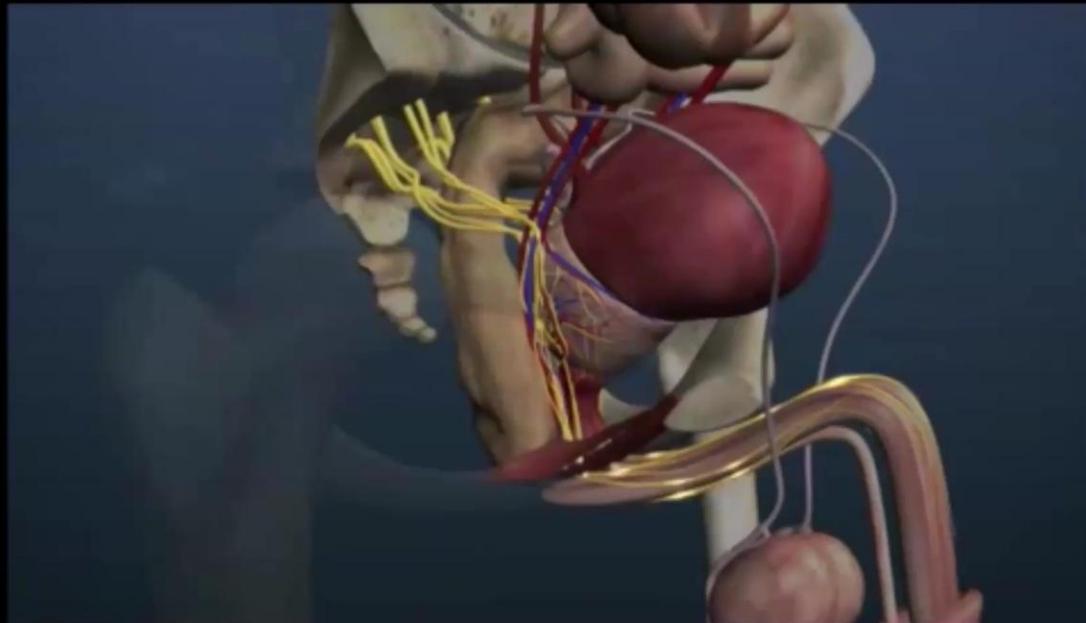


Neurosafe

> Eur Urol. 2012 Aug;62(2):333-40. doi: 10.1016/j.eururo.2012.04.057. Epub 2012 May 10.

Neurovascular structure-adjacent frozen-section examination (NeuroSAFE) increases nerve-sparing frequency and reduces positive surgical margins in open and robot-assisted laparoscopic radical prostatectomy: experience after 11,069 consecutive patients

Thorsten Schlomm¹, Pierre Tennstedt, Caroline Huxhold, Thomas Steuber, Georg Salomon, Uwe Michl, Hans Heinzer, Jens Hansen, Lars Budäus, Stefan Steurer, Corinna Wittmer, Sarah Minner, Alexander Haese, Guido Sauter, Markus Graefen, Hartwig Huland



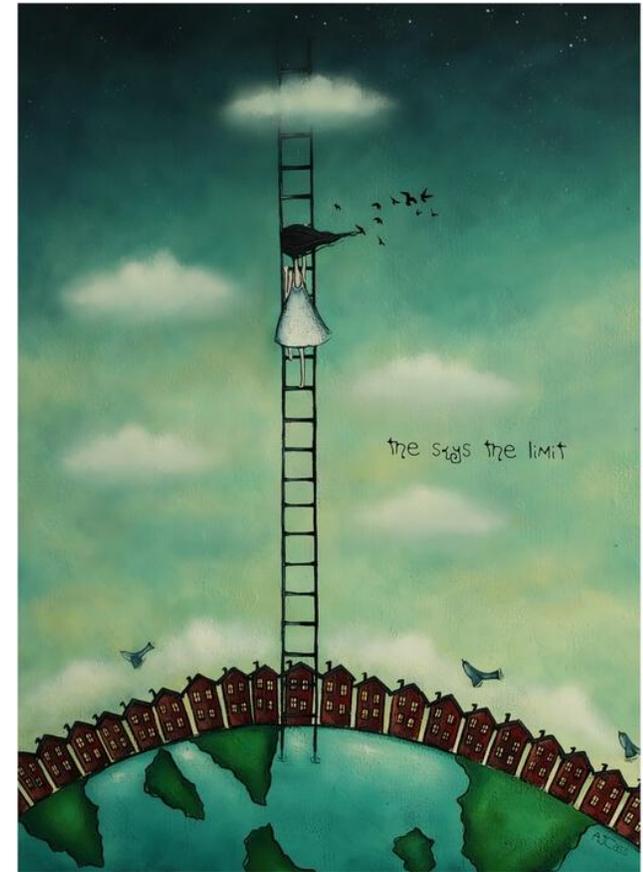
> Prostate Cancer Prostatic Dis. 2025 Jun;28(2):483-489. doi: 10.1038/s41391-024-00851-x. Epub 2024 Jun 11.

Nerve-sparing radical prostatectomy using the neurovascular structure-adjacent frozen-section examination (NeuroSAFE): results after 20 years of experience

Francesca Ambrosini^{1 2}, Felix Preisser¹, Derya Tilki^{1 3}, Hans Heinzer¹, Georg Salomon¹, Uwe Michl¹, Thomas Steuber¹, Tobias Maurer¹, Felix K H Chun⁴, Lars Budäus¹, Randi M Pose¹, Carlo Terrone², Thorsten Schlomm⁵, Pierre Tennstedt¹, Hartwig Huland¹, Markus Graefen¹, Alexander Haese⁶

Outcome	Result / Observation
Nerve-sparing feasibility	Achieved in >90% of cases (bilateral in ~75%)
Frozen-section positivity	~12% required secondary resection after intraoperative pathology
Final positive surgical margin (PSM)	~10%, comparable with non-NeuroSAFE series
Biochemical recurrence (BCR)	No negative impact from nerve-sparing guided by NeuroSAFE
Prostate cancer-specific survival (PCSS)	Equivalent to standard RP results across the same risk profile
Functional outcomes	Significantly improved potency preservation (especially in low/intermediate-risk groups)
Oncologic safety	Maintained — no increase in local recurrence or metastatic progression

Take home and Mission statement:
The sky is the limit as long as you can dock
the robot!



At the center of our mission stands the human being.
We combine medical excellence with empathy and innovation