

Supplementary Table 1 - Surgical complications reported with Clavien-Dindo for in-hospital complications and 90 Days Alive and out-of-hospital.

	ORP (n=723)	RARP (n=1679)
In-hospital complications		
Clavien-Dindo, <i>n</i> (%)		
1	21 (2.9)	21 (1.3)
2	21 (2.9)	19 (1.1)
3a	3 (0.4)	16 (1.0)
3b	5 (0.7)	7 (0.4)
4a	-	1 (0.1)
4b	-	-
5	-	-
90 Days Alive and Out-of-Hospital		
Clavien-Dindo, <i>n</i> (%)		
1	23 (3.2)	34 (2.0)
2	22 (3.0)	58 (3.5)
3a	13 (1.8)	75 (4.5)
3b	15 (2.1)	18 (1.1)
4a	-	3 (0.2)
4b	-	-
5	-	-

Supplementary Table 2 – Short-term outcomes, long-term oncological outcomes, and mortality rates for patients undergoing ORP versus RARP. Odds ratios and hazard ratios that are statistically significant are highlighted in **bold**. A) Main analysis B) Adjusted for the learning curve and D’amico Risk Group

A)

Outcomes	Main analysis	
	<u>Overall</u>	
	ORP (n=723)	RARP (n=1679)
In-hospital complications*		
Length of hospital stay, <i>median days (IQR)</i>	2 (2-3)	1 (1-1)
Clavien-Dindo ≥ 2 , <i>n (%)</i>	29 (4.0)	43 (2.6)
Odds Ratio (95%)		
Unadjusted	-	0.53 (0.36-0.77)
Adjusted ^a	-	0.58 (0.39-0.86)
Adjusted ^{a+caseload/year}	-	0.60 (0.40-0.90)
90 days alive and out-of-hospital*		
Days, <i>median (IQR)</i>	87 (87-88)	89 (88-89)
Patients readmitted, <i>n (%)</i>	73 (10)	188 (11)
Clavien-Dindo ≥ 2 , <i>n (%)</i>	51 (70)	154 (82)
Odds Ratio (95%)		
Unadjusted	-	1.12 (0.84-1.49)
Adjusted ^a	-	1.32 (0.98-1.77)
Adjusted ^{a+caseload/year}	-	1.36 (1.01-1.84)

Outcomes	Main Analysis	
	<u>Overall</u>	
	RP (n=1759)	RARP (n=1718)
Surgical margins		
Positive, <i>n (%)</i>	636 (36)	445 (26)
Odds Ratio (95%)		
Unadjusted	-	0.62 (0.54-0.72)
Adjusted ^b	-	1.17

		(0.91-1.50)
Adjusted ^{b+caseload/year}	-	1.17 (0.91-1.49)
Biochemical failure		
<i>n</i> (%)	602 (34)	392 (19)
Hazard Ratio (95%)		
Unadjusted	-	0.82 (0.72-0.93)
Adjusted ^c	-	0.93 (0.76-1.33)
Adjusted ^{c+caseload/year}	-	0.96 (0.79-1.19)
Prostate cancer-specific death		
<i>n</i> (%)	92 (5.2)	15 (0.9)
Hazard Ratio (95%CI)		
Unadjusted	-	0.52 (0.29-0.93)
Adjusted ^c	-	0.64 (0.31-1.32)
Adjusted ^{c+caseload/year}	-	0.70 (0.34-1.45)
Other causes of death		
<i>n</i> (%)	405 (23)	111 (6.5)
Hazard Ratio (95%CI)		
Unadjusted	-	1.09 (0.86-1.37)
Adjusted ^c	-	0.95 (0.71-1.29)
Adjusted ^{c+caseload/year}	-	0.96 (0.70-1.31)

B)

Outcomes	Sub-group analysis Surgeon Learning Curve [^]		Sub-group Analysis D'Amico Risk Group					
	Overall		Low Risk		Intermediate Risk		High Risk	
	ORP (n=677)	RARP (n=1576)	ORP (n=285)	RARP (n=321)	ORP (n=942)	RARP (n=999)	ORP (n=532)	RARP (n=398)
In-hospital complications*								
Length of hospital stay, median days (IQR)	2 (2-3)	1 (1)	2 (2-3)	1 (1)	2 (2-3)	1 (1)	2 (2-3)	1 (1)
Clavien-Dindo ≥ 2 , n (%)	30 (6.4)	57 (3.8)	1 (1.5)	8 (2.6)	19 (5.6)	23 (2.4)	9 (2.8)	12 (3.0)
Odds Ratio (95%)								
Unadjusted	-	0.57 (0.36-0.90)	-	<10 events	-	0.41 (0.25-0.69)	-	0.76 (0.40-1.44)
Adjusted ^a	-	0.63 (0.40-1.01)	-	<10 events	-	0.44 (0.26-0.75)	-	0.78 (0.41-1.49)
Adjusted ^{a+caseload/year}	-	0.73 (0.44-1.21)	-	<10 events	-	0.44 (0.26-0.75)	-	1.10 (0.53-2.28)
90 days alive and out-of-hospital*								
Days, median (IQR)	87 (87-88)	89 (88-89)	88 (87-88)	89 (89)	87 (87-88)	89 (88-89)	87 (86-88)	89 (88-89)
Patients readmitted, n (%)	66 (9.7)	177 (11)	7 (11)	29 (9.3)	35 (10)	105 (11)	31 (9.7)	54 (14)
Clavien-Dindo ≥ 2 , n (%)	47 (6.9)	202 (13)	4 (5.7)	24 (8.3)	28 (8.0)	85 (8.1)	19 (6.1)	45 (8.3)
Odds Ratio (95%)								
Unadjusted	-	1.17 (0.87-1.58)	-	0.86 (0.36-2.07)	-	1.05 (0.70-1.57)	-	1.47 (0.92-2.35)
Adjusted ^a	-	1.37 (1.01-1.87)	-	1.07 (0.42-2.70)	-	1.27 (0.84-1.94)	-	1.45 (0.91-2.33)
Adjusted ^{a+caseload/year}	-	1.41 (1.03-1.93)	-	1.14 (0.45-2.90)	-	1.25 (0.82-1.90)	-	1.75 (1.04-2.92)

Outcomes	Sub-group analysis Surgeon Learning Curve [^]		Sub-group Analysis D'Amico Risk Group					
	<u>Overall</u>		<u>Low Risk</u>		<u>Intermediate Risk</u>		<u>High Risk</u>	
	ORP (n=1442)	RARP (n=1609)	ORP (n=285)	RARP (n=321)	ORP (n=942)	RARP (n=999)	ORP (n=532)	RARP (n=398)
Surgical margins								
Positive, <i>n</i> (%)	500 (35)	419 (26)	80 (28)	65 (20)	350 (37)	242 (24)	206 (39)	138 (35)
Odds Ratio (95%)								
Unadjusted	-	0.88 (0.84-0.93)	-	0.66 (0.45-0.96)	-	0.54 (0.45-0.66)	-	0.85 (0.65-1.11)
Adjusted ^b	-	1.15 (0.89-1.48)	-	1.59 (0.77-3.27)	-	0.91 (0.65-1.28)	-	1.24 (0.78-1.98)
Adjusted ^{b+caseload/year}	-	1.15 (0.89-1.48)	-	1.44 (0.67-3.06)	-	0.88 (0.62-1.23)	-	1.24 (0.74-2.06)
Biochemical failure								
<i>n</i> (%)	408 (28)	371 (23)	55 (19)	28 (8.7)	284 (30)	201 (20)	263 (49)	163 (41)
Hazard Ratio (95%)								
Unadjusted	-	1.11 (0.84-1.46)	-	0.67 (0.42-1.08)	-	0.54 (0.45-0.66)	-	0.85 (0.65-1.11)
Adjusted ^c	-	0.92 (0.74-1.13)	-	1.44 (0.77-2.68)	-	0.93 (0.40-2.15)	-	0.80 (0.59-1.08)
Adjusted ^{c+caseload/year}	-	0.94 (0.76-1.12)	-	1.41 (0.72-2.78)	-	0.85 (0.35-2.10)	-	0.93 (0.65-1.33)
Prostate cancer-specific death								
<i>n</i> (%)	63 (4.4)	15 (0.9)	5 (1.8)	-	37 (3.9)	5 (0.5)	50 (9.4)	10 (2.5)
Hazard Ratio (95%CI)								
Unadjusted	-	0.50 (0.28-0.90)	-	<10 events	-	0.51 (0.19-1.39)	-	0.91 (0.44-1.89)
Adjusted ^c	-	0.64 (0.30-1.33)	-	<10 events	-	1.02 (0.26-4.04)	-	0.69 (0.28-1.74)
Adjusted ^{c+caseload/year}	-	0.68 (0.33-1.43)	-	<10 events	-	1.28 (0.25-6.46)	-	1.17 (0.44-3.11)

Other causes of death								
<i>n (%)</i>	288 (20)	104 (6.5)	60 (19)	13 (4.0)	254 (27)	69 (6.9)	91 (17)	29 (7.3)
Hazard Ratio (95%CI)								
Unadjusted	-	1.04 (0.81-1.32)	-	0.81 (0.42-1.59)	-	1.02 (0.75-1.37)	-	1.72 (1.08-2.75)
Adjusted ^c	-	0.99 (0.72-1.35)	-	0.99 (0.39-2.50)	-	0.72 (0.49-1.08)	-	1.86 (1.04-3.35)
Adjusted ^{c+caseload/year}	-	0.98 (0.71-1.36)	-	0.62 (0.20-1.97)	-	0.78 (0.50-1.20)	-	1.94 (1.10-3.41)

[^] The subgroup analysis excludes the first 50 cases of each surgeon for both surgical approaches to account for the impact of the learning curve.

^a Adjusted for age at surgery, lymphadenectomy

^b Adjusted for preoperative PSA, pathological lymph node stage, pT-category, tumor percentage, ISUP score, age at surgery, year of surgery

^c Adjusted for ^b + positive surgical margins

*Subanalysis for patients from 2010-2023

Supplementary Table 3 - Number of total cases and the 5-year cumulative incidence of biochemical failure for ORP and RARP between 2009-2018.

	Cases with biochemical recurrence after surgery between 2009-2018		Cumulative incidence of Biochemical failures at 5 years	
	<u>ORP</u> <i>n=931</i>	<u>RARP</u> <i>n=1125</i>	<u>ORP</u>	<u>RARP</u>
	<i>n (%)</i>		<i>Cumulative incidence (95% CI)</i>	
Total	291 (31)	256 (23)	0.25 (0.23-0.28)	0.18 (0.15-0.20)
D'Amico Risk group				
Low	66 (33)	46 (22)	0.27 (0.21-0.33)	0.16 (0.11-0.21)
Intermediate	157 (30)	143 (23)	0.24 (0.20-0.28)	0.18 (0.15-0.21)
High	68 (33)	67 (24)	0.28 (0.22-0.34)	0.18 (0.13-0.22)

Supplementary Table 4 - Outcomes for patients undergoing ORP versus RARP differentiated by performing surgeon.

Outcomes	Surgeon 1		Surgeon 2		Surgeon 3		Surgeon 4		Surgeon 5		Surgeon 6		Surgeon 7	
	ORP P (n=39)	RARP P (n=294)	ORP (n=145)	RARP P (n=477)	ORP (n=21)	RARP (n=0)	ORP (n=196)	RARP (n=0)	ORP (n=175)	RARP (n=0)	ORP P (n=0)	RARP (n=58)	ORP (n=145)	RARP P (n=817)
In-hospital complications*														
Days, median (IQR)	2 (2-3)	1 (1-1.3)	2 (2-3)	1 (1)	3 (3-4)	-	2 (2-3)	-	3 (2-3)	-	-	1 (1)	2 (2-3)	1 (1)
Clavien-Dindo ≥2, n (%)	3 (7.7)	8 (2.7)	4 (2.8)	8 (1.7)	3 (14)	-	6 (3.1)	-	11 (6.3)	-	-	1 (1.7)	2 (1.4)	26 (3.2)
90 days alive and out-of-hospital*														
Days, median (IQR)	88 (88)	89 (88-89)	88 (87-88)	89 (89)	87 (85.3-87)	-	88 (87-88)	-	87 (86-88)	-	-	89 (88-89)	87 (87-88)	89 (88-89)
Patients readmitted, n (%)	5 (13)	44 (15)	13 (9.0)	37 (7.8)	1 (4.8)	-	21 (11)	-	17 (9.7)	-	-	6 (10)	14 (9.7)	97 (12)
Clavien-Dindo ≥2, n (%)	1 (2.6)	38 (13)	10 (15)	29 (6.1)	1 (4.8)	-	16 (8.2)	-	10 (18)	-	-	4 (6.9)	12 (8.3)	79 (9.7)

Outcomes	Surgeon 1		Surgeon 2		Surgeon 3		Surgeon 4		Surgeon 5		Surgeon 6		Surgeon 7	
	ORP P (n=39)	RARP P (n=294)	ORP (n=366)	RARP P (n=477)	ORP (n=138)	RARP (n=0)	ORP (n=744)	RARP (n=0)	ORP (n=212)	RARP (n=0)	ORP P (n=0)	RARP (n=58)	ORP (n=223)	RARP P (n=817)
Surgical margins														
Positive, n (%)	13 (33)	84 (29)	118 (32)	146 (28)	74 (54)	-	306 (41)	-	44 (21)	-	-	20 (35)	66 (30)	191 (23)
Missing, n (%)	-	1 (0.3)	-	1 (0.2)	-	-	-	-	-	-	-	-	-	2 (0.2)
Biochemical failure														
n (%)	18 (46)	66 (22)	96 (26)	100 (20)	64 (46)	-	265 (37)	-	66 (31)	-	-	14 (24)	81 (36)	208 (26)
Missing, n (%)	-	-	4 (1.1)	2 (0.4)	-	-	4 (0.5)	-	1 (0.5)	-	-	-	-	2 (0.2)

*Subanalysis for patients from 2010-2023