

Evaluation of the urinary status and urinary continence after robot assisted radical prostatectomy using hinotori: comparison with da Vinci surgical system



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Hypothesis / aims of study

Robotic-assisted surgery has been spreading rapidly in recent years, and the trend is similar in Japan. Furthermore, a variety of new robots are now available in addition to the previously mainstream da Vinci surgical system. In Japan, new surgical robots such as hinotori (Fig 1) and hugo RAS system are available. In a previous report, there was no difference in surgical results between da Vinci and hinotori in robot assisted radical prostatectomy (RARP), which is the most common procedure in urology. On the other hand, there are no detailed reports on urinary status and urinary continence after RARP. Our institution started RARP with hinotori in 2022. The purpose of this study was to determine whether there is a difference in postoperative voiding status and urinary continence between da Vinci and hinotori RARP at our institution.

Study design, materials and methods

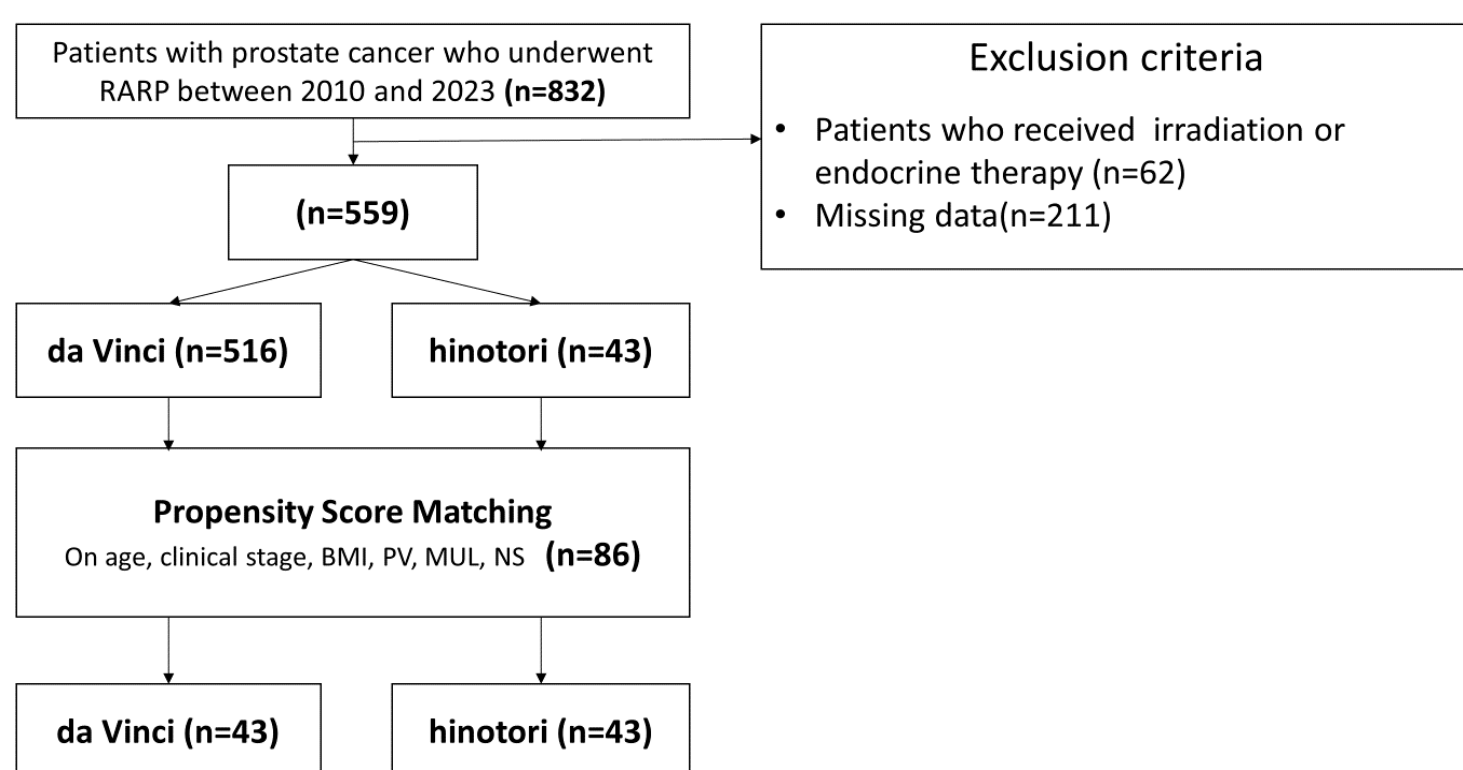
Patients who underwent non-nerve-sparing RARP between October 2010 and December 2023 at our department for prostate cancer (stages cT1–cT3 N0 M0) were included in the present study. All patients consented after being fully informed in accordance with the ethics committee at our institution. All study data were analyzed retrospectively. Age, BMI, prostate-specific antigen (PSA), prostate volume (PV), membranous urethral length (MUL), clinical stage, Gleason score (GS), total surgical time, console time, and estimate blood loss were recorded. The International Prostate Symptom Score (IPSS), the International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF), QOL index were evaluated before RARP and at 1, 3, 6, and 12 months after RARP. Data are presented as median value and interquartile range (IQR). To exclude possible influences on urinary continence after RARP other than differences in robotic equipment, 1:1 propensity score matching was conducted. Propensity scores were estimated by multivariable logistic regression using variables such as age, clinical stage, BMI, PV, MUL, and nerve sparing (NS). (Fig 2) Demographic factors were evaluated using the Mann-Whitney U test, chi-square test. Values of $p < 0.05$ were considered significant. Statistical analyses were performed using EZR, which is a modified version of R Commander.



(A) Patient cart
 (B) surgeon's cockpit
 (C) docking-free design
 (D) instruments :
 (a) monopolar curved scissors, (b) bipolar Maryland forceps,
 (c) bipolar fenestrated forceps, (d) needle holder, (e) wide needle holder
 (f) Croce grasping forceps

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Fig 2



Results and interpretation

Six surgeons performed RARP both da Vinci and hinotori. In Table 1, patients' characteristics and perioperative outcome are presented. The number of patients in the da Vinci group was 43 and hinotori group was 43. Median age, BMI, PV, and MUL for the da Vinci and hinotori groups were 72 and 71 years, 23.0 and 22.8 kg/m², 32.2 and 31.5 ml, and 11.5 and 12.0 mm, respectively. There was no significant difference in patients' characteristics and surgical outcomes between the two groups. Table 2 showed ICIQ-SF total score, question 1, 2, 3, IPSS total score, and QOL index between two groups. There were no significant differences in ICIQ-SF total score, question 1, 2, 3, IPSS total score, and QOL index between the two groups at 1, 3, 6, and 12 months.

Table 1 Patients characteristics and perioperative outcome (da Vinci : n = 43, hinotori : n = 43)

	da Vinci	hinotori	P-value
Age, years median (IQR)	72 (66.0-74.0)	71 (66.5-74.0)	0.97
BMI, kg/m ² median (IQR)	23 (21.5-24.0)	22.8 (21.5-25.5)	0.868
PSA, ng/mL median (IQR)	8.8 (6.9-11.3)	9.1 (6.2-13.0)	0.812
PV, mL median (IQR)	32.2 (22.8-37.9)	31.5 (21.0-42.6)	0.862
MUL, mm median (IQR)	11.5 (8.5-13.5)	12 (9.5-14.0)	0.221
cT stage T1c/T2/≥T3	5/22/10	6/23/8	0.846
Gleason score 6/7/≥8	7/16/20	5/18/20	0.798
Total surgical time, min median (IQR)	315.5 (299.5-355.5)	320 (275.5-344.0)	0.372
Console time, min median (IQR)	230.5 (220.0-277.5)	238 (210.0-280.5)	0.212
Estimate blood loss, ml median (IQR)	100 (70.5-215.0)	135 (105.0-217.5)	0.192
LND no / yes	8 / 35	11 / 32	0.435
Nerve sparing no / yes	33 / 10	33 / 10	

Table 2 Changes in ICIQ-SF and IPSS



Conclusions

Despite the limitation, RARP with hinotori was comparable to da Vinci in terms of surgical outcome, postoperative urinary status, and postoperative urinary continence. In the future, it is considered necessary to increase the number of cases and to conduct long-term follow-up.

References

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- Kohjimoto Y, et al. J Robot Surg. 18;18(1):130. 2024.