



# Research and Invention of New Nerve-Sparing Surgical Technique Using ICG Fluorescence Navigation System in Robot-Assisted Radical Prostatectomy

Naotaka Gunge

Fumihiro Yamazaki

Chizuru Nakagawa

Masahiro Tachibana

Kosuke Tominaga

Yuichiro Fukuhara

Takeshi Miyazaki

Yu Okabe

Kazuna Tsubouchi

Hiroshi Matsuzaki

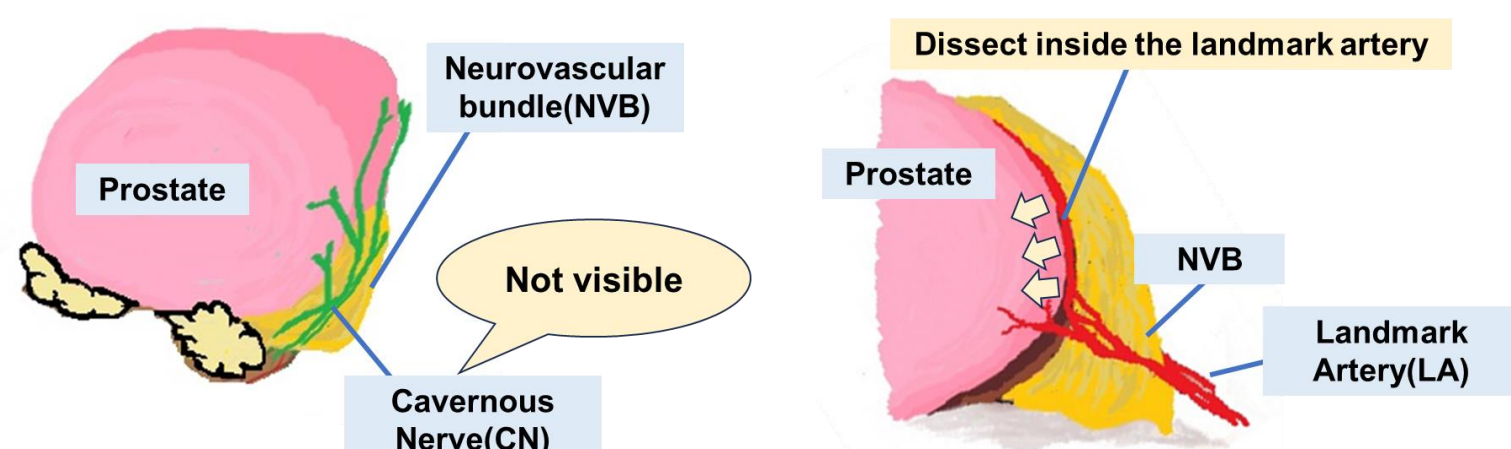
Nobuyuki Nakamura

Nobuhiro Haga

Department of Urology, Faculty of Medicine, Fukuoka University, Fukuoka, Japan

## BACKGROUND

**Nerve-Sparing Procedure in Robot-Assisted Radical Prostatectomy (NS RARP) technique**



### Difficulty of NS RARP technique

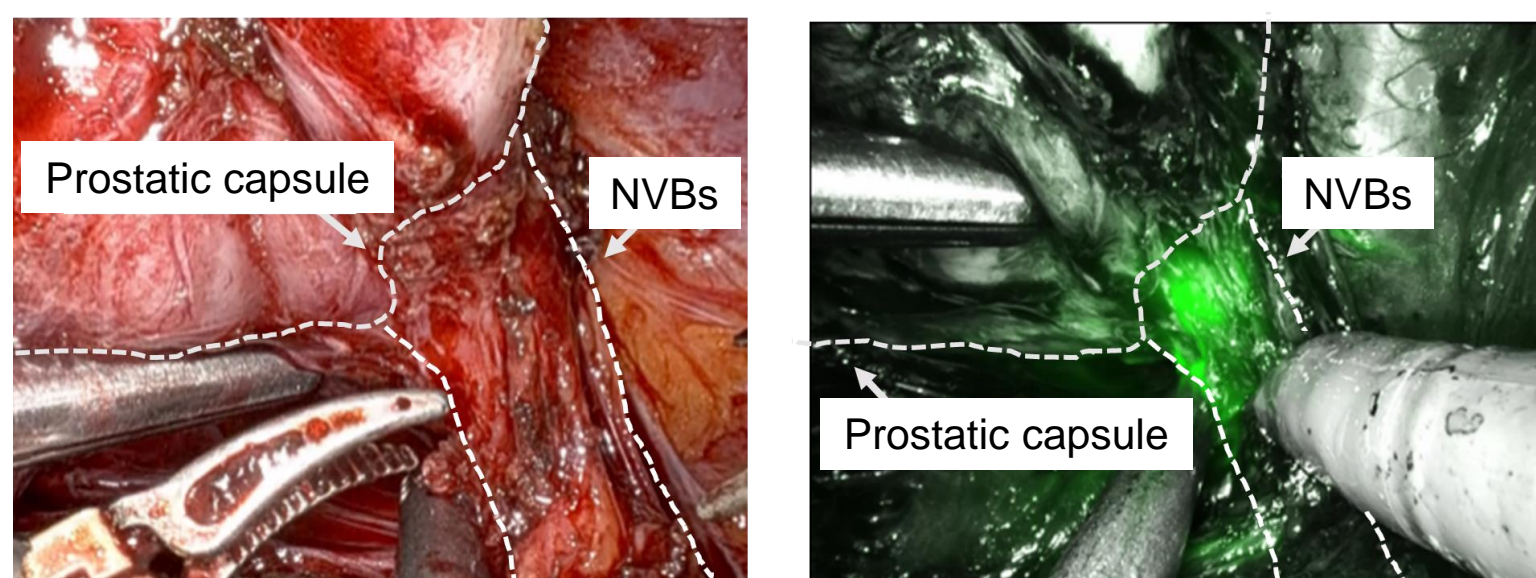
**Individual differences in prostate morphology**

- Prostate size
- Median lobe hypertrophy
- Prostate hardness

Difficulty visualizing LA

Visualization of NVB using the FireFly system of Da Vinci Xi

### Development of new NS techniques through visualization of NVB



After administering ICG, the NVBs glowed green, clearly defining the boundary between the prostatic capsule and the NVBs

## OBJECTIVES

The aim of the present study was to investigate the efficacy of our developed NS RARP.

## MATERIALS AND METHODS

Patients underwent NS RARP at our institution between April 2019 and April 2021

**ICG administered group (ICG group)**  
n=23

**Non-administered group (non-ICG group)**  
n=20

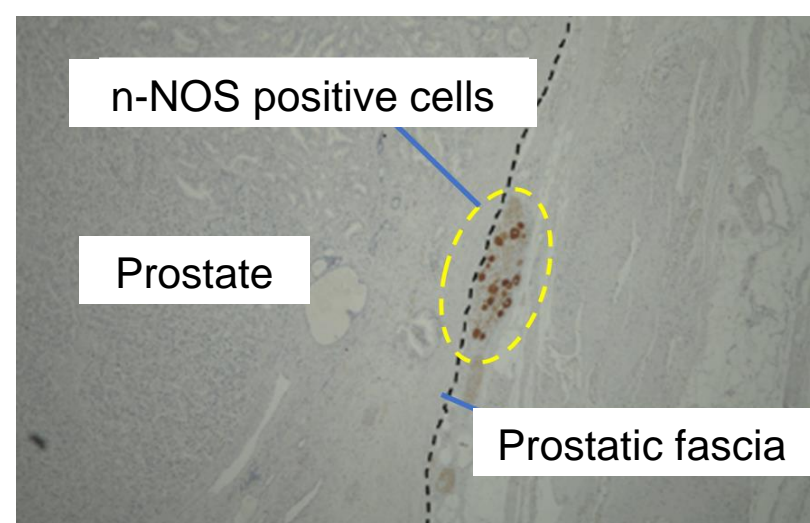
### Primary outcome

The primary outcome is to compare the residual nerves in prostate specimens between the ICG group and the non-ICG group.

### Evaluation methods

Immuno-stain with nNOS

Prostate specimens  
base/middle/apex



- Count the number of nNOS-positive cells in the prostate specimens
- Samples with fewer nNOS-positive cells yield higher quality NS

### Secondary outcome

The secondary outcome is to compare LUTS, postoperative erectile function and urinary incontinence between the two groups.

**LUTS** : International Prostate Symptom Score (IPSS) and Quality of Life (QOL) index

**Erectile function** : Sexual Health Inventory for Men (SHIM) score

**Urinary incontinence** : \*Incontinence rate on the day following removal of the urethral catheter

\* Incontinence rate = amount of urinary leakage / total daily urine volume

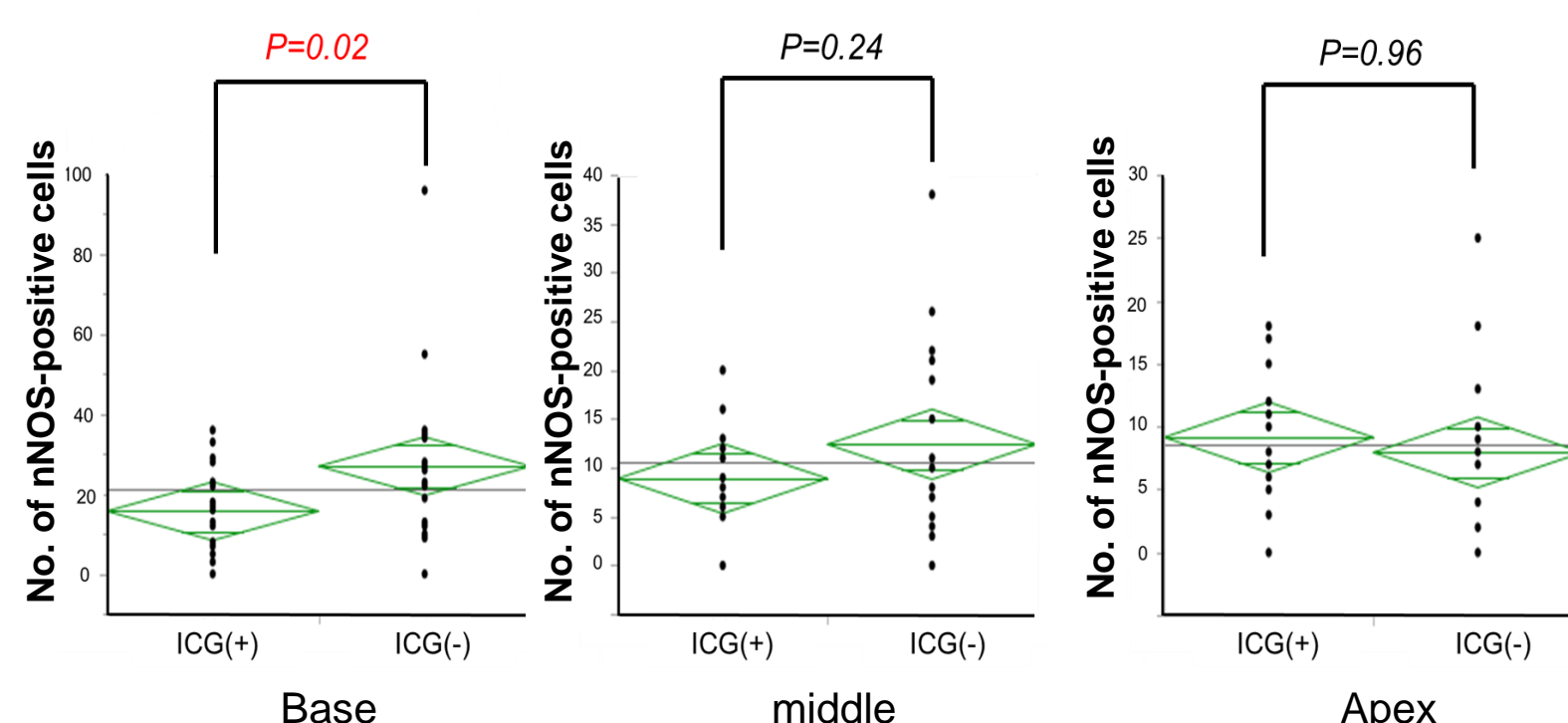
## Patients' characteristics

	ICG group	non-ICG group	P
n	23	20	
Age(y)	66 ( $\pm$ 7.6)	66.9 ( $\pm$ 3.9)	0.51
Prostate size (g)	39.4 ( $\pm$ 9.1)	34.8 $\pm$ 11.1)	0.33
IPSS total score	13.6 ( $\pm$ 4.9)	12.6 ( $\pm$ 6.6)	0.46
QOL index	3.5 ( $\pm$ 1.2)	2.8 ( $\pm$ 1.3)	0.06
PSA (ng/mL)	9.7 ( $\pm$ 4.7)	6.4 ( $\pm$ 3.5)	0.05

There were no significant differences between the two groups.

## Results : Comparison of nNOS-positive cells

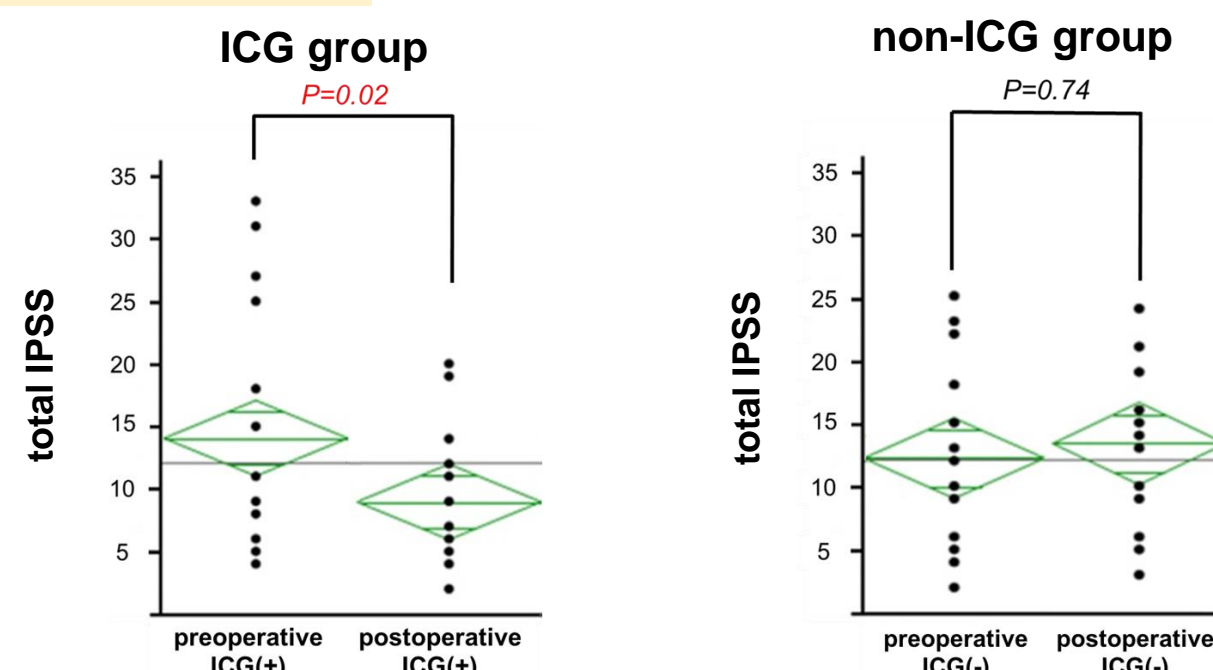
### Primary outcome



In the ICG group, there was a significant decrease in nNOS-positive cells at the base of the prostate.

## Results : LUTS

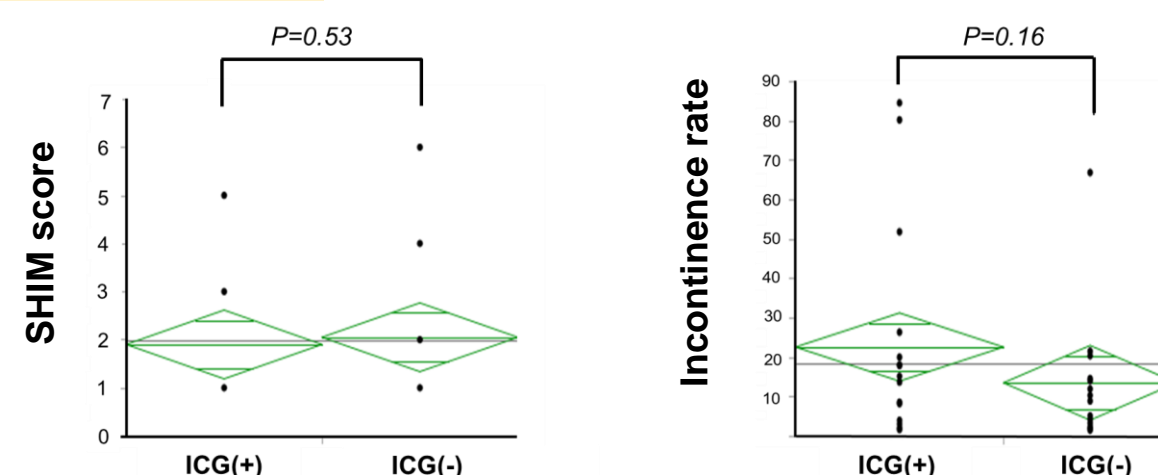
### Secondary outcome



In the ICG group, significant improvements were observed in IPSS.

## Results : Erectile function / Urinary incontinence

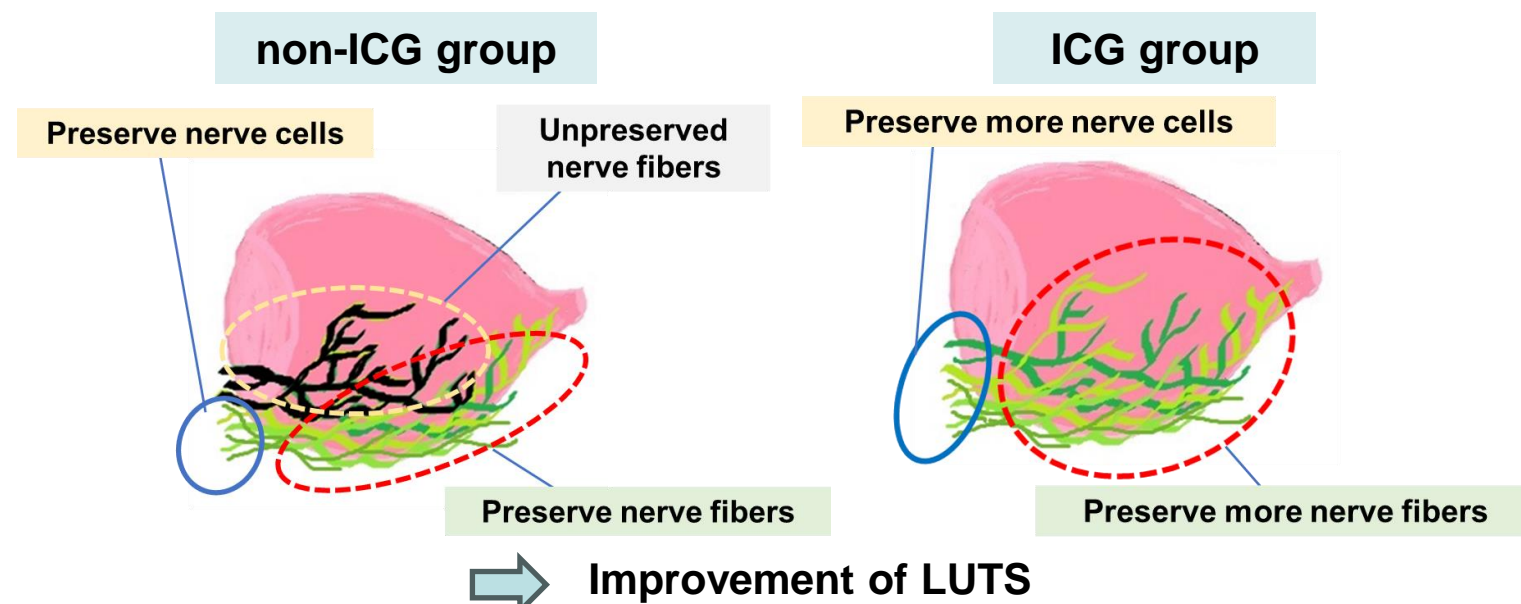
### Secondary outcome



There were no significant differences between the two groups.

## The reason for the improvement of LUTS in the ICG group

The fibers of the CN are distributed from the posterior-lateral aspect of the prostate forward.



## CONCLUSIONS

Our innovative approach, which enhances the visualization of prostatic boundaries, suggests the potential for reliable and straightforward NS procedures, leading to a significant improvement in LUTS.

## References

- P.C. Walsh . Semin Oncol. 1994.  
Tewari A, et al. BJU Int. 1998