Evaluation of MRI-US Fusion-Guided Prostate Biopsy in Our Institution

地域とともに
ウェルビーイングを創造する
岡崎市民病院
Okazaki City Hospital

Department of Urology, Okazaki city Hospital
Yuta Kashiwagi, Yui Fujimura
Yuki Tanaka, Koya Morishita
Satoshi Katsuno, Tatsuya Nagai

The 113 th Annual Meeting of the Japanese Urological Association COI Disclosure Information

Department of Urology, Okazaki city Hospital
Yuta Kashiwagi

The authors declare no conflicts of interest related to this presentation.

Background

- The EAU guidelines strongly recommend pre-biopsy MRI. When suspicious lesions are identified, combined MRI-targeted and systematic biopsy is recommended.

- MRI–US fusion-guided biopsy enables precise targeting and may improve cancer detection.

Methods

- We retrospectively analyzed 119 patients who underwent transperineal MRI–US fusion-guided biopsy between March and December 2025.
- Both targeted and systematic biopsies were performed.
- Clinically significant prostate cancer (csPCa) was defined as Grade Group ≥2.

Results

Patient characteristics

Variable	Value
Number of patients	n=119
Age, median (IQR)	74 (54-88) years
PSA, median (IQR)	7.72 (2.31-162) ng/ml
Prostate volume, median (IQR)	36.1 (12.7-118.5) ml
PSA density, median (IQR)	0.2 (0.06-4.08)
Initial biopsy	96 (80.6%)
Repeat biopsy	23 (19.4%)
PI-RADS3	42 (35.2%)
PI-RADS4	44 (36.9%)
PI-RADS5	15 (12.6%)
Target lesion per patient, median (IQR)	2 (1-4)

- The cohort was representative of a typical MRI-targeted biopsy population.

Results

csPCa was defined as
Grade Group ≧2(Gleason score ≧3+4)

Detection of prostate cancer by Grade Group

Grade Group	Target biopsy	Systematic biopsy	Combine
GG1(3+3)	7	13	11
GG2(3+4)	19	29	28
GG3(4+3)	9	15	17
GG4-5(≧8)	21	15	24
Total cancer	56	72	80
csPCa(GG≧2)	49	59	69

- MRI-targeted biopsy improved detection of clinically significant cancer.
- Overall csPCa detection rate was 57.9%.

csPCa detection according to PSAD

PSAD	csPCa
<0.15	13
≧0.15	56

- Higher PSAD was associated with increased csPCa detection.

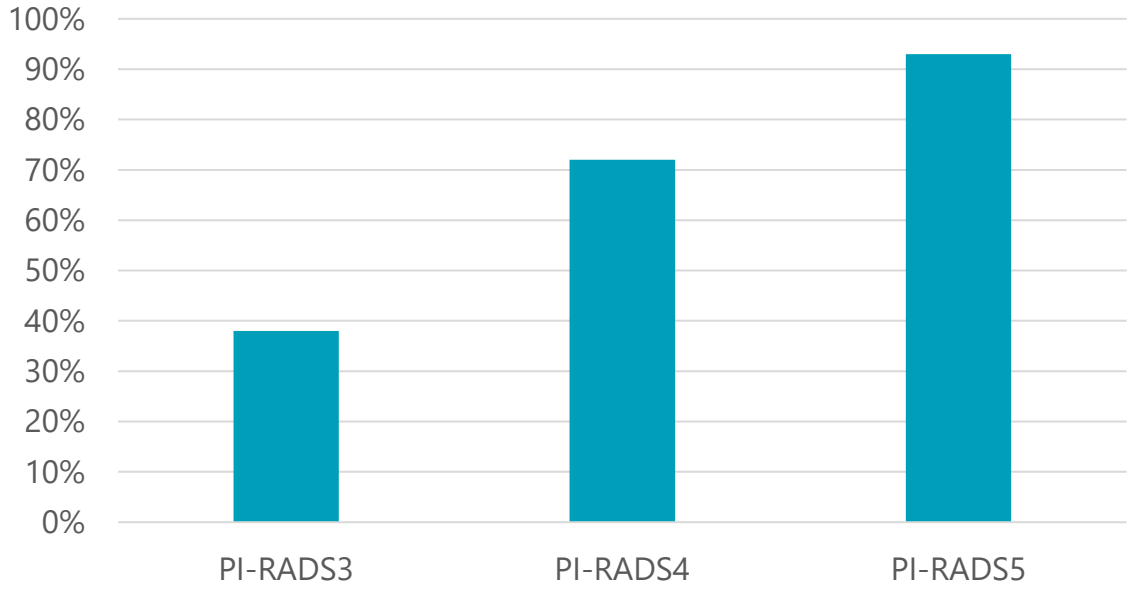
Results

csPCa Detection pattern

Detection patterns	Number of patients
Target only	7
Systematic only	16
Both	46

・Combined biopsy minimized missed clinically significant cancers.

csPCa detection according to PI-RADS

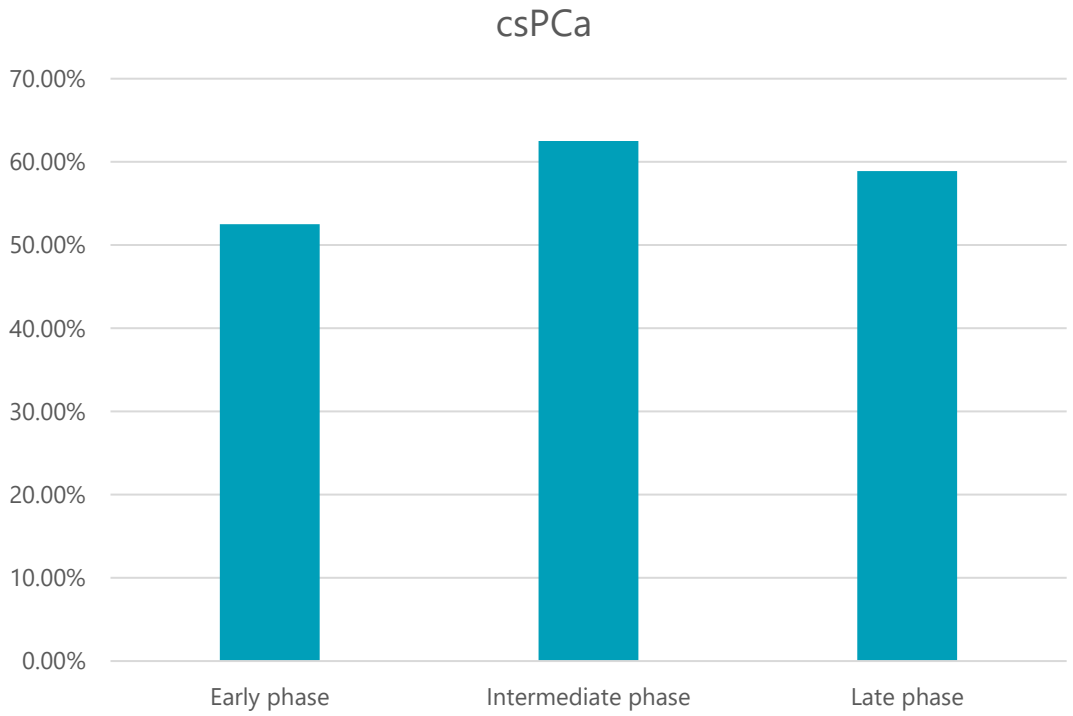


・Higher PI-RADS scores were strongly associated with csPCa detection.

Results

Learning curve

Period	Patients	csPCa
Early phase	1-40	21(52.5%)
Intermediate phase	41-80	25(62.5%)
Late phase	81-119	23(58.9%)

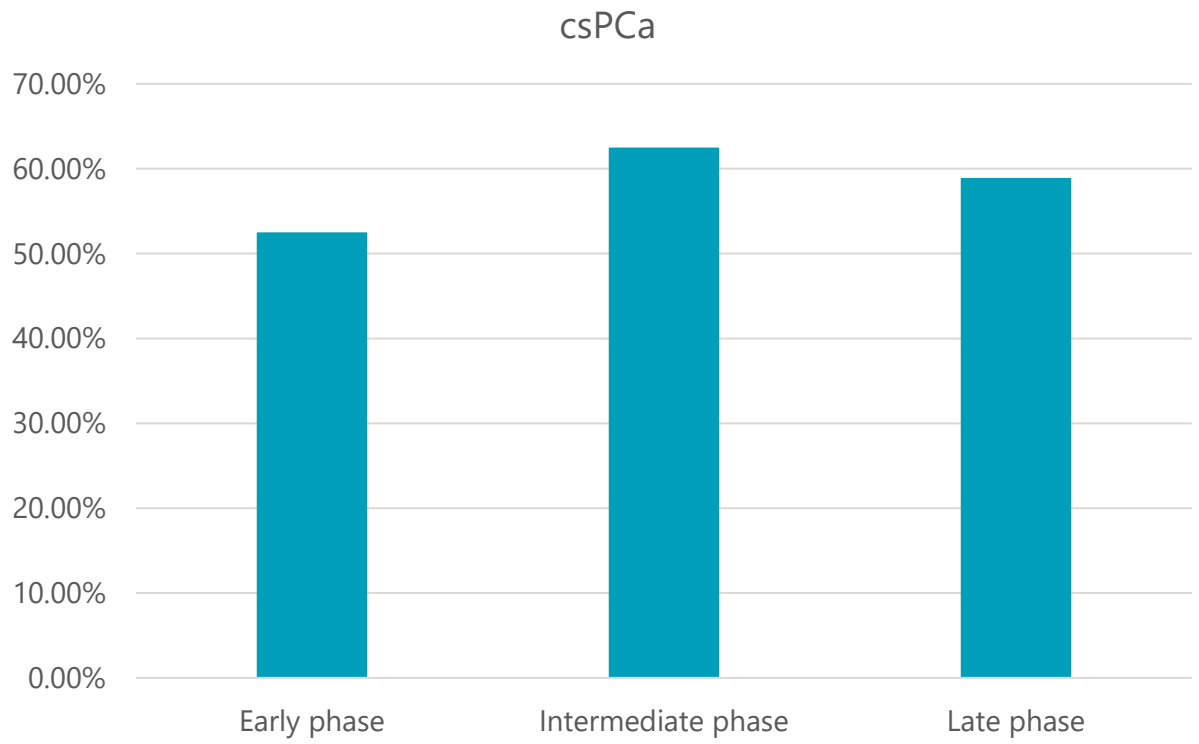


- A learning curve was observed in csPCa detection.

Results

Target detection rate

Period	Detection rate of csPCa
Early phase	16(40%)
Intermediate phase	15(37.5%)
Late phase	19(48.7%)

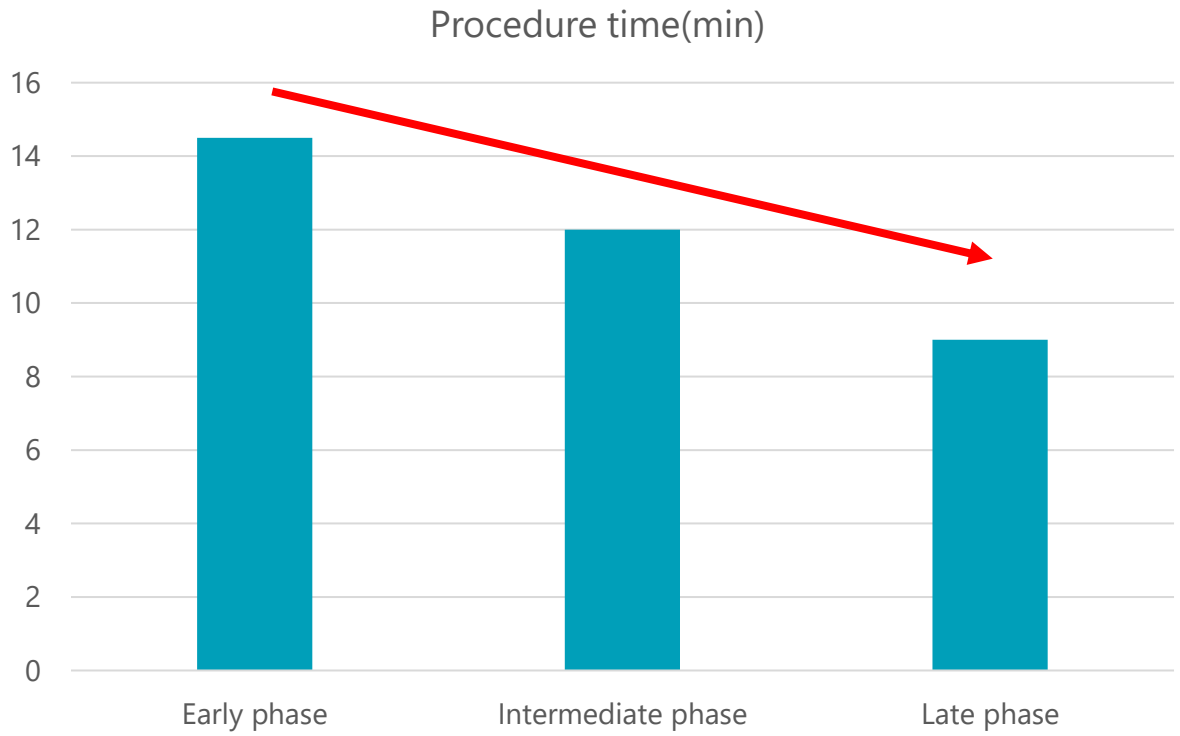


・Detection of csPCa improved with experience.

Results

Procedure time

Period	Procedure time(min)
Early phase	14.5(5-35)
Intermediate phase	12(6-28)
Late phase	9(4-27)



・Procedure time decreased with experience.

Results

Complications

Complication	rate
Sepsis	**0(0%)**
Fever	**1(0.8%)**
Urinary retention	11(9.2%)
Hematuria	18(15.1%)

- The procedure was safe, with no cases of sepsis or severe complications.

Discussion

MRI-first strategy and our results

MRI-Target or Standard Biopsy for Prostate-Cancer Diagnosis
V.Kasivisvanathan et al, N Engl J Med 2018;378:1767-1777

- MRI-targeted biopsy is superior to standard biopsy in detecting clinically significant prostate cancer.
- In our cohort, csPCa detection rate was also high, supporting the clinical utility of MRI–US fusion-guided biopsy.
- These findings are consistent with previous randomized evidence.

Discussion

Role of systematic biopsy in high PI-RADS lesions

Accuracy of MRI-ultrasound fusion-guided and systematic biopsy of the prostate
Thomas in de Braekt et al, BJR, 2024, 97, 1132-1138

- Previous reports suggest that systematic biopsy provides limited additional value in PI-RADS 5 lesions.
- In our study, csPCa detection increased with higher PI-RADS scores.
- This suggests that targeted biopsy plays a central role, particularly in high-risk lesions.

Discussion

Learning curve of fusion biopsy

Learning Curve of Transperineal MRI/US Fusion Prostate Biopsy: 4-Year Experience
Po-Fan Hsieh et al, Life(Basal). 2023 Feb 24; 13(3):638

- Previous studies have demonstrated that experience improves detection rates in fusion biopsy.
- In our analysis, both target detection rate and procedure time improved over time.
- This indicates the presence of a learning curve in our institution as well.

Conclusion

- MRI–US fusion-guided biopsy showed potential to improve cancer detection.
- A learning curve is required to optimize procedural efficiency and detection rates.
- Further studies are needed.