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Abstract no.: MP. 1-6

Diagnostic accuracy and risk factors of pathological upgrading and upstaging in low-risk carcinoma of prostate – a 10-year retrospective study

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Aim

- An accurate grading and staging of prostate cancer (PCa) at diagnosis is essential for risk stratification and treatment decision.
- This study evaluates the **diagnostic accuracy** of prostate biopsy and **possible risk factors** for upgrading upstaging

Patients and Methods

- All patients with radical prostatectomy (RP) for low-risk PCa
- Defined as prostate specific antigen (PSA) <=10mg/ml, clinical T1-2a, and Gleason score (GS) = 6 on biopsy
- Between 2013 and 2023 in Queen Mary Hospital
- GS and T staging of biopsy and RP specimens were compared
- Upgrade is defined as GS >6
- Upstage is defined as T staging ≥pT3
- Baseline characteristics, biochemical tests, imaging and biopsy data, and final histopathology were compared between Upgrade/ upstage (Group 1) and No upgrade/ upstage (Group 2)

Results

- 134 patients
- Upgrade – N=64 (**48%**)
- Upstage – N=15 (**11%**)
- **Absolute concordance rate** (GS=6 and pathological T stating <pT3) was N=66 (**49.3%**)
- **Perineural invasion** is associated with pathological upgrading/ upstaging
- In sub-group analysis, free PSA, PHI, perineural invasion, lymphovascular permeation and extracapsular extension are important risk factors for pathological upstaging

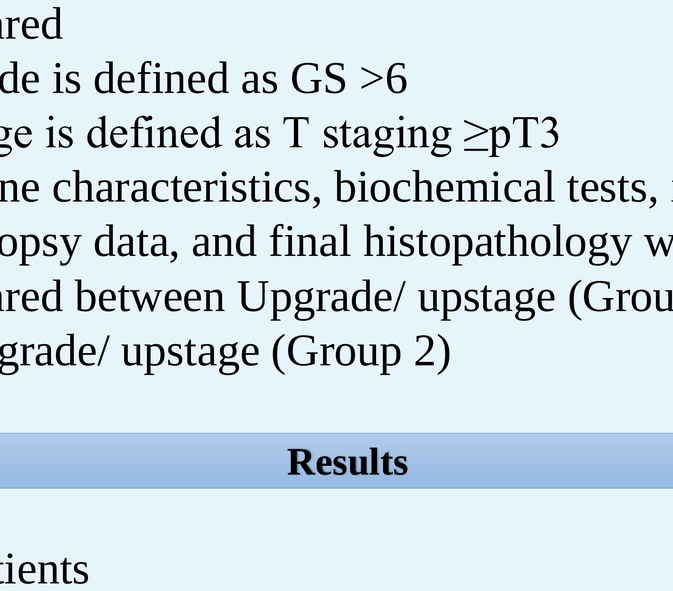

Figure 1. Flow diagram of study cohort

	Upgrade/ upstage (Group 1)	No upgrade/ upstage (Group 2)	P value
N	68	66	
Age	67.0±5.1	65.4±6.9	0.14
Prostate specific antigen (PSA) (ng/ml)	7.0±1.7	6.6±2.1	0.34
Free PSA (fPSA) (ng/ml)	1.1±0.6	1.3±0.5	0.41
Free-to-total PSA (%)	17.1±9.5	19.9±6.8	0.34
Prostate health index (PHI)	44.9±17.4	37.4±13.8	0.18
T staging (N)	T1 – 67 (98.5%) T2a – 1 (1.5%)	T1 - 61 (92.4%) T2a – 5 (7.6%)	0.11
Pre-op MRI (N)	61 (89.7%)	61 (92.4%)	0.76
Number of lesion on MRI	1.0±0.9	1.1±0.9	0.91
PIRADS 3 target lesion	34 (55.7%)	29 (47.5%)	0.47
PIRADS 4 target lesion	7 (11.3%)	16 (19.7%)	**0.04**
PIRADS 5 target lesion	3 (7.5%)	3 (7.5%)	1.0

Table 1. Baseline characteristics

	Upgrade/ upstage (Group 1)	No upgrade/ upstage (Group 2)	P value
Biopsy approach (N)	Transperineal – 10 (14.7%) Transrectal – 58 (85.3%)	Transperineal – 18 (27.3%) Transrectal – 48 (72.7%)	0.09
Grid biopsy (N)	2 (0.3%)	1 (1.5%)	1.0
MRI-US fusion biopsy (N)	15 (22.1%)	23 (34.8%)	0.13
No. of biopsy cores	14.3±4.8	16.1±6.0	0.06
No. of positive cores	2.8±1.9	2.7±2.1	0.68
Percentage of positive cores	21.4±15.1%	17.7±13.4%	0.14
No. of target biopsy cores	4.0±2.4	5.1±2.3	0.20
No. of positive target biopsy cores	0.3±1.0	0.7±1.5	0.15
No. of systemic cores	13.5±4.4	14.4±4.6	0.25
No. of positive systemic cores	2.6±1.9	2.2±1.6	0.21
Patient with positive anterior cores (N)	12 (17.6%)	13 (19.7%)	0.83
Maximum cancer core length (mm)	3.0±3.0	2.3±2.4	0.20
Percentage of maximum cancer core length (%)	27.0±24.2%	21.8±19.7%	0.19
Time interval between biopsy and operation (Days)	235.1±174.1	224.4±176.1	0.27
Prior active surveillance (N)	8 (11.8%)	5 (7.6%)	0.56
Perineural invasion (N)	35 (51.5%)	10 (15.1%)	**<0.001**
Lymphovascular permeation (N)	7 (10.3%)	3 (4.5%)	0.33
Extracapsular extension (N)	4 (6.1%)	0 (0%)	0.12
Biochemical recurrence (N)	12 (17.6%)	7 (10.6%)	0.32

Table 2. Comparison of biopsy and final histopathology data

Conclusion

This study revealed substantial pathological upstaging/upgrading in patients with low-risk carcinoma of prostate.