

Suppl. Fig. 1

MRI reporting template.

Suppl. Fig. 2

Histology reporting template.

Suppl. Fig. 3

Tumor (arrows) in the transition zone at the apex, anterior and on the right side in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction from the T2w 3D sequence (F). The tumor was deemed T2 for both readers in the 2D set by both readers, but T3 in the 3D set of images. Templates from histology (G), Reader 2 in 2D (H) and in 3D (I), depicting tumor location with EPE assessment for each reading mode in bold frames.

Histological outcome was Gleason 3+4=7, pT2.

Suppl. Fig. 4

Tumor (arrows) dorsolateral in the peripheral zone at the apex on the right side in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Reader 1 deemed the tumor T3 in both sets and T2 by Reader 2 in both sets. Templates from histology (G), Reader 1 (H) and 2 (I) depicting tumor location with EPE assessment for each reader in bold frames.

Histological outcome was Gleason 4+3=7, pT2.

Suppl. Fig. 5

Tumor (arrows) dorsolateral in the peripheral zone from base to apex on the right side in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers deemed the tumor clearly extraprostatic (EPE 5).

Histological outcome was Gleason 4+3=7, pT3a, with extensive radial penetration outside the capsule.

Suppl. Fig. 6

Tumor (arrows) occupying the peripheral zone on the left side from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor with high probability of extraprostatic extension.

Histological outcome was Gleason 3+4=7, pT3a, only 0.6 mm radial penetration outside the capsule.

Suppl. Fig. 7

Tumor (arrows) occupying the peripheral zone dorsolateral the left side from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Reader 1 deemed the tumor T3 in both sets (H) and T2 by Reader 2 in both sets

(I), but both underestimated the tumor extent. Both readers missed tumor 2 shown in the histological outcome.

Histological outcome tumor 1 was Gleason 3+4=7, pT3a, 1.5 mm radial penetration outside the capsule and tumor 2 Gleason 3+4=7 measuring 10x5 mm without capsular penetration.

Suppl. Fig. 8

Tumor (arrows) occupying the peripheral zone dorsolateral the left side from the mid portion to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as risk for or suspicion of being T3 in both sets and underestimated the tumor extent somewhat (H-I). Both readers missed tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 4+5=9, pT2, no extraprostatic extension and tumor 2 Gleason 3+3=6 on the right side without capsular penetration, but exact location was not described in the histology report.

Suppl. Fig. 9

Tumor (arrows) occupying the peripheral zone on the left side from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as risk for or definitive T3 in both sets and underestimated the tumor extent somewhat (H-I). Reader 2 correctly gave suspicion of seminal vesicle invasion at least on the left side. Both readers missed tumor 2 on the right side shown in the histological outcome. Note the movement artifacts in the radial reconstruction of the 3D T2w images.

Histological outcome tumor 1 was Gleason 4+3=7, pT3b, < 1 mm radial penetration outside the capsule with bilateral seminal vesicle invasion. Tumor 2 Gleason 4+3=7 on the right side without capsular penetration, but exact location was not described in the histology report.

Suppl. Fig. 10

Tumor (arrows) occupying the peripheral zone dorsal and dorsolateral on the left side from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as suspicious for or definitive T3 in both sets and underestimated the tumor extent (H-I). Both readers missed tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 4+3=7, pT3a, 5 mm radial penetration outside the capsule. Tumor 2 a small foci of Gleason 3+3=6 on the right side without capsular penetration, but exact location was not described in the histology report.

Suppl. Fig. 11

Tumor (arrows) occupying the left half of the prostate from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as risk for or definitive T3 in both sets and

underestimated the tumor extent somewhat (H-I). Both readers missed tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 4+3=7, pT3a, > 1 mm radial penetration outside the capsule. Tumor 2 a foci of Gleason 3+3=6 on the right side without capsular penetration, but exact location was not described in the histology report.

Suppl. Fig. 12

Tumor (arrows) lateral in the left peripheral zone from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as risk for or suspicion of T3 in the 3D and for reader 1 in the 2D set (H). Reader 2 had no suspicion of EPE in the 2D set (I). Both readers underestimated the tumor extent. Both readers missed tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 4+3=7, pT3a, < 1 mm radial penetration outside the capsule. Tumor 2 a foci of Gleason 4+4=8 on the right side without capsular penetration, but exact location was not described in the histology report.

Suppl. Fig. 13

Tumor (arrows) anterolateral on the left side in the peripheral and transition zone from the mid portion to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as T2 in both sets and underestimated the tumor extent somewhat (H-I). Both readers missed tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 4+3=7, pT3a, < 1 mm radial penetration outside the capsule. Tumor 2 Gleason 3+3=6 anterior on the right side without capsular penetration.

Suppl. Fig. 14

Tumor (arrows) in the peripheral zone on the left side from the base to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers missed exact tumor location and reader 1 assessed the tumor as risk for T3 in the 2D set, but both readers otherwise as T2 (H-I). Both readers underestimated the tumor extent. The discrepancy in tumor location between MRI and histology may be due to the deformation that sometimes occurs during the preparation for histology. Note the movement artifacts in the radial reconstruction of the 3D T2w images.

Histological outcome was Gleason 4+3=7, pT3a, 2 mm radial penetration outside the capsule.

Suppl. Fig. 15

Tumor (arrows) anterolateral on the left side in the peripheral from the mid portion to the apex in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated $b=1500$ (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor as T2 in both sets and underestimated the tumor extent somewhat (H-I). Both readers missed the anterior tumor 2 on the right side shown in the histological outcome.

Histological outcome tumor 1 was Gleason 3+3=6 (tertiary Gleason 4), pT2, without capsular penetration. Tumor 2 Gleason 3+3=6 anterior on the right side without capsular penetration.

Suppl. Fig. 16

Tumor (arrows) dorsolateral in the left peripheral zone from the base to the mid portion in axial 2D T2w image (A), axial reconstruction from T2w 3D (B), diffusion weighted image calculated b=1500 (C), apparent diffusion coefficient (D), sagittal T2w image (E) and radial reconstruction of 3D from the yellow plane of sectioning in B (F). Template from histology (G). Both readers assessed the tumor T2 in both reading modes (H-I). Both readers underestimated the tumor extent. Both readers missed tumor 2 on the right side shown in the histological outcome.

Note the movement artifacts in the radial reconstruction of the 3D T2w images.

Histological outcome tumor 1 was Gleason 4+3=7, pT2 without capsular penetration. Tumor 2 and 3 were small foci of Gleason 3+3=6 on the right and left side without capsular penetration, but exact location was not described in the histology report.

Suppl. 17

Full version of the MRI protocol as .pdf, on the 3T scanner, Siemens Magnetom Verio, Erlangen, Germany.