

Supplementary materials: Advanced Fusion Imaging and Contrast-Enhanced Imaging (CT/MRI–CEUS) in Oncology.

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Supplemental Table S1. Included patients with focal liver lesions who underwent CT-/MRI-CEUS Fusion Imaging. B - Native B-mode, CD - Color Doppler, CEUS - Contrast-enhanced ultrasound, CE - Contrast-enhancement, US – Ultrasound, CT – computed tomography, FNH – focal nodular hyperplasia, FU – Follow-Up, HCC – hepatocellular carcinoma. MRI – magnetic resonance imaging, RFA – radiofrequency ablation.

| Patient Number | Age | Sex | Size (cm) | Liver Segment | CT findings | MRI findings | Native B-mode, Color Doppler, CEUS | Fusion Imaging | Treatment / FU | Histopathology |
|----------------|-----|-----|-----------|---------------|---------------|---|---|---|----------------------------------|----------------|
| 1 | 67 | F | 1.6 | 4B | - | Indeterminate | B/CD/CEUS: No specific correlation | Vascular pseudolesion | - | - |
| 2 | 81 | F | 4.5 | Multiple | - | Indeterminate cystic lesions | B: hypoechoic CD: - CEUS: - | Uncomplicated cystic lesions | - | - |
| 3 | 46 | F | 0.7 | 8 | - | Indeterminate, hypervasculatized lesion | No correlation due to steatosis hepatitis | B: Ill-defined CD: No hypervasculatization, CEUS: Central-to-peripheral CE → FNH | - | - |
| 4 | 17 | F | 0.7 | 7 | - | Suspicious lesion | B: isoechoic CD: - CEUS: - | Uncomplicated cystic lesion | - | - |
| 5 | 27 | F | 1.0 | 2 | - | Suspicious lesion | No specific correlation | B: Ill-defined, inhomogeneous, hypoechoic, CD: - CEUS: - → No malignancy | Segmental liver resection II/III | No malignancy |
| 6 | 80 | M | 3.5 | 4/8 | - | Complicated cyst | B: inhomogeneous, predominantly hypoechoic CD: - CEUS: - | Hemorrhagic liver cyst | - | - |
| 7 | 51 | F | 0.9 | 5 | Indeterminate | - | B: hyperechoic CD: - CEUS: perinodular CE, centripetal filling | Hemangioma | - | - |
| 8 | 70 | M | 0.8 | 2 | Indeterminate | - | B: hypoechoic CD: - CEUS: - | Uncomplicated liver cyst | - | - |
| 9 | 48 | F | 0.8 | 7 | - | Suspicious lesion | Massive steatosis hepatitis | No correlation | - | - |

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| | | | | | | | B/CD/CEUS: No specific correlation | | |
| 10 | 38 | F | 0.5 | 7 | Indeterminate | - | B: well-defined, hypoechoic, CD: - CEUS: - | Uncomplicated liver cyst | |
| 11 | 83 | F | 0.6 | 8 | Indeterminate | - | B: inhomogeneous, predominantly hypoechoic, CD: - CEUS: - | Hemorrhagic liver cyst | - |
| 12 | 66 | M | 1.5 | 6 | Suspicious lesion | - | B: hypoechoic CD: - CEUS: early arterial CE, wash-out | Liver metastasis | Right hemihepatectomy |
| 13 | 64 | M | 1.5 | 6 | Suspicious lesion | - | B: hyperechoic, CD: - CEUS: perinodular CE, centripetal filling | Hemangioma | - |
| 14 | 71 | F | 1.5 | 7 | Calcification | - | B: hyperechoic, CD: twinkling CEUS: - | Focal calcification | - |
| 15 | 58 | F | 3.7 | 2/3 | - | Suspicious lesion | B: inhomogeneous, predominantly hypoechoic, CD: - CEUS: early arterial CE; wash-out | Primary liver tumor or metastasis | Left hemihepatectomy |
| 16 | 53 | F | 1.0 | 7 | Suspicious lesion | - | Massive steatosis hepatis; no specific correlation in conventional US | B: Hypoechoic, CD: - CEUS: perinodular CE, centripetal filling → Hemangioma | - |
| 17 | 53 | M | 4.0 | 7 | - | Encapsulated abscess | B: hypoechoic CD: - CEUS: peripheral CE | Residual liver abscess | - |
| 18 | 65 | F | 0.5 | 4 | - | Complicated cyst | B: hypoechoic, CD: - CEUS: - | Uncomplicated liver cyst | - |
| 19 | 54 | M | 0.7 | 2 | Suspicious lesion | - | B: hyperechoic, CD: - | Hemangioma | - |

| | | | | | | | | | | | CEUS: perinodular CE, centripetal filling | | |
|----|----|---|------|----------|-------------------|-------------------|--|---|----------------------|----------------------------|--|---|---|
| 20 | 25 | F | 0.5 | 8 | Indeterminate | - | No specific correlation | B: Hypoechoic, CD: - CEUS: - | - | - | → Uncomplicated liver cyst | | |
| 21 | 54 | F | 5.0 | 7 | RFA | - | B: well-defined, hypoechoic CD: - CEUS: - | Successful ablation of hepatic metastasis of ovarian carcinoma | | | - | - | - |
| 22 | 58 | F | 1.5 | 5 | - | Suspicious lesion | Massive steatosis hepatitis; no specific correlation in conventional US | B: Ill-defined, CD: - CEUS: perinodular CE, centripetal filling | - | - | → Hemangioma | | |
| 23 | 35 | F | 4.5 | 7 | - | Suspicious lesion | B: hyperechoic CD: -, CEUS: Central-to-peripheral CE → FNH | FNH | - | - | | | |
| 24 | 39 | F | 1.8 | 8 | Hemangioma | - | B: hyperechoic, CD: - CEUS: perinodular CE, centripetal filling | Hemangioma | - | - | | | |
| 25 | 43 | M | 6.2 | 5 | Hemangioma | - | B: hyperechoic, CD: - CEUS: perinodular CE, centripetal filling | Hemangioma | - | - | | | |
| 26 | 43 | F | <1,0 | Multiple | Suspicious lesion | - | B: hypoechoic CD: - CEUS: early arterial CE, wash-out | Metastases | Biopsy | Metastases (breast cancer) | | | |
| 27 | 65 | M | 2.5 | 2/4A | - | Suspicious lesion | B: hypoechoic, CD: -, CEUS: early arterial CE, wash-out | HCC | Left hemihepatectomy | HCC | | | |
| 28 | 20 | F | 1.7 | 4B | Indeterminate | - | B : hyperechoic, CD: - CEUS: perinodular CE, centripetal filling | Hemangioma | - | - | | | |
| 29 | 57 | F | 1.5 | 6 | Indeterminate | - | B : hyperechoic, CD: - | Hemangioma | - | - | | | |

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| | | | | | | | CEUS: perinodular CE, centripetal filling | |
| 30 | 46 | F | 3.4 | 6 | - | Indeterminate | B: hyperechoic CD: - CEUS: Central-to-peripheral CE → FNH | FNH |
| 31 | 76 | M | 1.0 | 7 | - | Suspicious lesion | B: hypoechoic CD: - CEUS: early arterial CE, wash-out | HCC |
| 32 | 59 | F | 1.2 | 7 | - | Suspicious lesion | B: hyperechoic CD: - CEUS: Central-to-peripheral CE → FNH | FNH |

Supplemental Table S2. Included patients with renal lesions who underwent CT-/MRI-CEUS Fusion Imaging. B - Native B-mode, CD - Color Doppler, CEUS - Contrast-enhanced ultrasound, CE - Contrast-enhancement, US – Ultrasound, CT – computed tomography, FU – Follow-Up, MRI – magnetic resonance imaging, RFA – radiofrequency ablation, RCC – Renal-cell carcinoma.

| Patient Number | Age | Sex | Size (cm) | Localization | CT findings | MRI findings | Native B-mode, Color Doppler, CEUS | Fusion Imaging | Treatment / Follow-Up | Histopathology |
|----------------|-----|-----|-----------|--------------|--------------------|-------------------|---|----------------|--------------------------|-----------------|
| 1 | 79 | F | 2.5 | R | Suspicious lesion | - | B: hyperechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 2 | 80 | M | 2.0 | R | Suspicious Lesion | - | B: inhomogeneous, partially hyperechoic CD: - CEUS: early arterial CE, wash-out | Bosniak 3 | Right Nephrectomy | Oncocytoma |
| 3 | 76 | M | 2.0 | R | - | Suspicious lesion | B: isoechoic, CD: - CEUS: early arterial CE wash-out | Bosniak 4 | Right Nephrectomy | Chromophobe RCC |
| 4 | 73 | M | 0.7 | R | Suspicious lesion | - | B: septated, hypoechoic CD: - CEUS: - | Bosniak 2F | - | - |
| 5 | 70 | M | 1.5 | L | Uncomplicated cyst | - | B: hypoechoic, CD: - | Bosniak 1 | - | - |

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| | | | | | | | CEUS: - | | | |
| 6 | 53 | F | 3.0 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: early arterial CE | Bosniak 4 | - | - |
| 7 | 44 | M | 1.0 | L | Suspicious lesion | - | No specific correlation | No specific correlation | - | - |
| 8 | 67 | M | 2.0 | L | Indeterminate | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 9 | 48 | F | 0.5 | L | - | Indeterminate | B: hypoechoic, CD: - CEUS: early arterial enhancement | Indeterminate, benign | Nephrectomy | Angiomyolipoma |
| 10 | 72 | M | 1.2 | L | - | Indeterminate | No specific correlation | B/CD: No specific correlation, CEUS: arterial CE → Bosniak 3 | No treatment due to comorbidities | - |
| 11 | 78 | M | 1.3 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 12 | 60 | M | 1.5 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: slight arterial CE | Bosniak 3 | Right nephrectomy | Clear-cell RCC |
| 13 | 75 | M | 1.2 | L | Hemorrhagic renal cyst | - | B: hypoechoic, CD: - CEUS: septal arterial CE | Bosniak 2F | - | - |
| 14 | 61 | M | 2.5 | L | Suspicious lesion | - | B: inhomogeneous, hyperechoic, CD: - CEUS: early arterial CE, wash-out | Bosniak 4 | Left nephrectomy | Clear-cell RCC |
| 15 | 66 | F | 0.7 | L | Suspicious Lesion | - | B: hypoechoic, multiple septations, CD: - CEUS: septal + nodular arterial CE | Bosniak 4 | Left nephrectomy | Clear-cell RCC |
| 16 | 70 | M | 1.0 | L | Suspicious lesion | - | No specific correlation | B: hypoechoic, CD: - CEUS: - | - | - |

| | | | | | | | | | | → Bosniak 1 |
|----|----|---|-----|---|---|--|---|---|---|----------------|
| 17 | 47 | F | 3.5 | L | - | Suspicious lesion | B: hyperechoic, CD: - CEUS: arterial CE | Angiomyolipoma | - | - |
| 18 | 72 | M | 5.3 | L | Hematoma | - | B: inhomogeneous, hyperechoic perirenal area CD: - CEUS: - | No active bleeding, renal hematoma due to derailed oral anticoagulation (warfarin) | - | - |
| 19 | 80 | M | 3.0 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: arterial CE, wash-out | Bosniak 4 | Right nephrectomy | Clear-cell RCC |
| 20 | 51 | F | 1.0 | R | Suspicious lesion | - | B: isoechoic, CD: - CEUS: early arterial CE, wash-out | Bosniak 4 | Right nephrectomy | Clear-cell RCC |
| 21 | 70 | M | 8.0 | R | Indeterminate cystic lesion | - | B: hypoechoic, septations, CD: -, CEUS: - | Bosniak 2F | Constant FUs | - |
| 22 | 83 | M | 3.0 | R | Suspicious lesion | - | B: hypoechoic, CD: -, CEUS: - | Bosniak 1 | - | - |
| 23 | 58 | M | 3.0 | R | Suspicious lesion | - | B: hypoechoic, septations, CD: -, CEUS: - | Bosniak 2F | Right partial nephrectomy (15 months later) | Papillary RCC |
| 24 | 79 | M | 1.6 | L | Tumor recurrence (after partial nephrectomy due to clear-cell RCC) | - | B: hypoechoic, inhomogeneous, CD: - CEUS: early arterial CE, wash-out | Tumor recurrence (RCC) | - | - |
| 25 | 50 | F | 1.5 | R | | Parenchymal defect after Cyberknife treatment of clear-cell RCC | B: isoechoic, rounded, CD: - CEUS: - | Parenchymal defect after Cyberknife treatment of clear-cell RCC | - | - |
| 26 | 58 | F | 2.0 | R | Indeterminate | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 27 | 51 | M | 1.6 | L | Renal infarction | - | B: hypoechoic, patchy | Renal infarction | - | - |

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| | | | | | | | CD: - CEUS: - | | | |
| 28 | 87 | M | 0.7 | R | Indeterminate | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 29 | 56 | M | 1.8 | L | Suspicious lesion | - | B: inhomogeneous, solid components, CD: -, CEUS: early arterial CE, wash-out | Bosniak 4 | Left partial nephrectomy | Papillary RCC |
| 30 | 53 | M | 3.4 | L | - | Indeterminate | B: hypoechoic, septations, CD: - CEUS: marginal + septal CE | Bosniak 2F | Constant in long-term FUs | - |
| 31 | 64 | F | 3.5 | R | Indeterminate | - | B: hypoechoic, septations, CD: - CEUS: dim septal + CE | Bosniak 2F | Partial right nephrectomy | No malignancy |
| 32 | 71 | M | 4.5 | L | Indeterminate | - | B: hypoechoic, septations, CD: - CEUS: dim septal CE | Bosniak 2F | Constant long- term FUs | - |
| 33 | 53 | M | 1.2 | L | Indeterminate | - | B: inhomogeneous, partially hyperechoic, CD: - CEUS: - | Bosniak 2F | Constant long- term FUs | - |
| 34 | 56 | M | 2.5 | R | Indeterminate | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 35 | 73 | F | 1.0 | R | Suspicious lesion | - | B: mainly hypoechoic, inhomogeneous, CD: - CEUS: | Bosniak 2 | Right partial nephrectomy | Angiomyolipoma |
| 36 | 54 | M | 3.0 | L | - | Suspicious lesion | B: hypoechoic, inhomogeneous, mural thickening, CD: - | Bosniak 3 | Nephrectomy | Chromophobe RCC |

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| | | | | | | | CEUS: marginal + septal CE | | |
| 37 | 66 | M | 5.0 | L | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: marginal + nodular CE | Bosniak 4 | Nephrectomy Papillary RCC |
| 38 | 62 | M | 1.6 | R | Hemorrhagic renal cyst | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - - |
| 39 | 64 | F | 1.8 | L | Uncomplicated renal cyst | - | B: inhomogeneous, mainly hypoechoic, CD: - CEUS: arterial central CE | Bosniak 3 | - - |
| 40 | 61 | M | 1.5 | R | Indeterminate | - | B: hyperechoic, CD: - CEUS: early arterial CE | Inflamed morphology in the context of pyelonephritis | Nephrectomy No malignancy, pyelonephritis |
| 41 | 68 | F | 2.0 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: early arterial CE | Bosniak 3 | No FU (palliative) - |
| 42 | 70 | F | 1.1 | R | Indeterminate | - | B: hypoechoic, septations, CD: - CEUS: - | Bosniak 2F | - - |
| 43 | 68 | F | 7.5 | L | - | Suspicious lesion | B: hypoechoic, septations, CD: - CEUS: dim septal CE | Bosniak 2F | - - |
| 44 | 68 | F | 1.7 | L | Indeterminate | - | B: hypoechoic, septations CD: - CEUS: - | Bosniak 2F | Constant long-term FU - |
| 45 | 44 | M | 3.0 | R | - | Indeterminate | B: hypoechoic, septations, CD: - CEUS: - | Bosniak 2F | - - |
| 46 | 68 | M | 0.8 | L | Suspicious lesion | - | B: hypoechoic, inhomogeneous, | Bosniak 2 | - - |

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|----|----|---|------|---|--------------------------|-------------------|--|---|--------------------------|----------------|
| | | | | | | | CD: - CEUS: - | | | |
| 47 | 78 | M | 2.1 | L | Indeterminate | - | B: hypoechoic, inhomogeneous, CD: - CEUS: - | Bosniak 2 | - | - |
| 48 | 67 | F | 3.5 | L | Indeterminate renal cyst | - | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 49 | 80 | M | 5.0 | R | Suspicious lesion | - | No specific correlation due to massive obesity | B: hypoechoic, CD: - CEUS: early arterial CE, wash-out → Bosniak 4 | Right nephrectomy | Clear-cell RCC |
| 50 | 69 | F | 3.5 | L | Suspicious lesion | - | B: hypoechoic lesion, CD: - CEUS: early arterial CE | Bosniak 4 | Left nephrectomy | Clear-cell RCC |
| 51 | 75 | F | 1.0 | R | Indeterminate | - | B: hyperechoic, CD: - CEUS: equivalent to renal parenchyma | Angiomyolipoma | Constant in long-term FU | - |
| 52 | 47 | M | 2.0 | R | Suspicious lesion | - | B: hyperechoic, CD: - CEUS: early arterial CE, wash-out | Bosniak 4 | Right nephrectomy | Clear-cell RCC |
| 53 | 68 | M | 10.0 | R | Uncomplicated renal cyst | - | B: hypoechoic, septations, CD: - CEUS: - | Bosniak 2F | - | - |
| 54 | 57 | M | 0.8 | L | - | Indeterminate | B: hypoechoic, CD: - CEUS: - | Bosniak 1 | - | - |
| 55 | 71 | M | 1.0 | L | Suspicious lesion | - | No specific correlation | B/CD: no specific correlation, CEUS: early arterial CE, wash-out → Bosniak 3 | Left nephrectomy | Oncocytoma |
| 56 | 57 | M | 0.8 | R | - | Suspicious lesion | No specific correlation | B/CD: no specific correlation, CEUS: early arterial CE, wash-out | Right nephrectomy | Clear-cell RCC |

| → Bosniak 4 | | | | | | | | | |
|--------------------|----|---|-----|---|-------------------|-------------------|--|--|---|
| 57 | 62 | M | 2.0 | R | - | Suspicious lesion | B: hypoechoic, septations CD: - CEUS: dim arterial septal CE | Bosniak 3 | Right nephrectomy Papillary RCC |
| 58 | 53 | M | 1.3 | R | - | Indeterminate | B: cortical retraction, CD: - CEUS: corresponding lack of CE | Renal infarction | - - |
| 59 | 31 | F | 1.4 | L | - | Angiomyolipoma | B: hypoechoic, CD: hypervascularized CEUS: early arterial CE, wash-out | Angiomyolipoma at 26th week of pregnancy | Biopsy, constant during FUs Angiomyolipoma |
| 60 | 56 | M | 1.2 | R | Suspicious lesion | - | B: hypoechoic, CD: - CEUS: early arterial CE, wash-out | Bosniak 4 | Right partial nephrectomy Clear-cell RCC |



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