PHILIPS

Ultrasound

Case studies

Fusion imaging to enhance prostate cancer detection

Each medical imaging modality used in the practice of radiology has established its own footprint based largely on its inherent benefits, but also on its known technical limitations. The Philips image fusion and navigation application on Philips ultrasound systems is an innovative solution that is helping to unite various modalities in meaningful ways to address real clinical challenges. Clinicians are using experience gained in fusion imaging of the liver and kidney to expand the technique to aid in detection of lesions in the prostate.

Meeting the challeng of early detection

Early detection plays a key role in the prognosis of cancer. Recent studies have demonstrated that fusion imaging technology can contribute to early detection in patients with prostate cancer.¹⁻⁵

Fusion imaging in detection of prostate lesions

- 320 out of 582 subjects underwent standard biopsy with negative results, despite an elevated PSA level 9.9 ng/ml. Additional fusion biopsy led to Gleason score grading in 81 of these subjects, which had major implication for the treatment strategy.¹
- MRI/US fusion-guided biopsy versus standard 12-core TRUS biopsy alone detected more cancer per core for all suspicion levels. There were statistically significant associations

between the degree of suspicion on MRI and incidence of cancer detected for patients and targets (p <0.0001), and MRI/US fusion-guided biopsy detected more cancerous cores than standard 12-core TRUS biopsy alone.²

• Fusion-targeted biopsies detected CS cancer with far fewer cores compared with R-TRUS biopsy, and multi-parametric MRI had a perfect negative predictive value in this population.³

A clinician's **perspective**



Professor Dirk-André Clevert, Professor of Radiology, is the Section Chief of the Interdisciplinary Ultrasound Center at Munich University Hospital Grosshadern, which is part of one of the largest medical complexes in Germany. Professor Clevert has found that in his practice the clinical utility of fusion imaging for applications in the liver and kidney has naturally translated into other applications for his patients. He has applied the same basic principles for image fusion in the prostate to enhance detection of prostate lesions. Fusion is a tool that gives me options for detecting prostate lesions, which are not always visible on conventional ultrasound.
Even in a case in which the fused image is not aligned 100%, it is an indirect way to detect the lesion and perform a successful biopsy."

Professor Dirk-André Clevert, MD Section Chief of the Interdisciplinary Ultrasound Center University of Munich-Grosshadern Campus, Germany



Fusion imaging for the prostate



Physician's perspective: optimal clinician profile

Professor Clevert believes ideal clinical practitioners of fusion technology for the prostate are those who have an interest in fusion imaging technology and who:

- **Operate** in a shared service model with the urology department
- Are affiliated with centers who seek a more collaborative approach in caring for prostate cancer patients
- **See the value** in having urology and radiology work together to build departmental strengths and expertise



Physician's perspective: typical patient candidates

Professor Clevert says fusion imaging (transrectal ultrasound and MRI) for detection of prostate lesions can be considered for patients who have:

- Continued elevated PSA with negative core biopsies
- An unspecified abnormality demonstrated by MRI
- An uncharacterized lesion that can be seen on MRI, but not by using grayscale ultrasound alone



CT-PET/TRUS fusion of prostate.



CT-PET/TRUS fusion-guided targeted biopsy.

Clinical workflow prostate image fusion



difference.

apex, urethra, calcifications,

and/or known cysts.

Tips for success from Professor Clevert

- Obtain a targeted biopsy sample in addition to random cores to enhance diagnostic information.
- Consider that applying pressure with the endocavity probe will deform the prostate and affect the fusion image.
- Penetrate the harder capsule of the prostate before the actual biopsy to reduce deformation of the prostate.
- Display the biopsy guideline to ensure sampling at the target.
- Focus more on the fusion image in the specific area under question, or the suspicious area being evaluated, rather than on the whole organ.

Case studies

All cases are from the Interdisciplinary Ultrasound-Center, Department of Clinical Radiology University of Munich-Grosshadern Campus, Germany.

Case study 1



82-year-old Prostate-specific antigen (PSA): 12 ng/mL

MRI: PI-RADS 5

MRI/TRUS fusion biopsy: prostatic intraepithelial neoplasia (high-grade PIN)



Case study 2



Case study 3



Additional resources

Learn how the Phllips fusion capability continues to evolve with the end user in mind, offering ease of use and significant functionality. The Auto Registration feature on the Philips ultrasound system applies an anatomical algorithm to complete fusion in less than one minute. More information about fusion imaging can be found in various resources made available by Philips, including **"Combining modalities for confident diagnoses"** and **"Auto Registration on EPIQ Evolution 1.0"**.

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