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Precision Diagnosis

Expert Perspectives

The role of MRI and fusion biopsies in advancing the quality of prostate cancer care toward accurate diagnosis and personalized treatments — a discussion with Prof. Dr. Christof Kastner, Dr. Tristan Barrett, Prof. Dr. Igle Jan de Jong, and Prof. Dr. Jurgen Fütterer.

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Improving the accuracy of prostate cancer diagnosis and treatment

Diagnostic uncertainty in prostate cancer is a challenge for clinicians and patients alike. To improve the quality of prostate cancer care, healthcare providers face many challenges – how to streamline, optimize, and connect workflows in radiology, urology and oncology, all while addressing the complexity of tumor characterization and staging.

Prof. Dr. Christof Kastner, Dr. Tristan Barrett, Prof. Igle Jan de Jong, and Prof. Dr. Jurgen Fütterer share their work to advance the quality of prostate cancer care.

> "The current approach to prostate cancer diagnosis is characterized by a considerable degree of diagnostic uncertainty. This uncertainty has contributed to both overtreatment and undertreatment and has left the medical community uncertain of the most effective method for diagnosing prostate cancer.*"

The need for more accurate diagnosis and personalized treatment in prostate cancer care

One out of six men is confronted with prostate cancer in his lifetime, with more than 1.2 million new diagnoses made globally in 2018.[1] As the volume of cases is projected to continue increasing, the biggest challenge in prostate cancer care is accurate, precise staging and treatment, which is crucial as there is an 80 to 90% survival rate[2] when treated correctly. What is the potential for new developments in MRI, fusion biopsy, and focal treatment to advance the quality of prostate cancer care?

The role of MRI in prostate cancer care management

Dr. Barrett observes that, from the 1980s to today, MR imaging has advanced from simply being able to visualize the prostate to identifying tumors to the development of diffusion-weighted imaging. Today, the use of MR is considered standard practice in many organizations—with an increasing number of organizations using MR pre-biopsy.

> "In 2015, we defined a pathway whereby patients with first presentation with the suspicion of prostate cancer would undergo MRI before any biopsy procedure with the idea of targeting the biopsy if the MRI was positive. Thus avoiding biopsy in the majority of cases where the MR was negative."

– Dr. Tristan Barrett

Dr. Barrett notes that for staging, T2 is the most important sequence to assess, as it provides images at their highest possible resolution. Diffusion, however, can help locate the cancerous area first. European guidelines advise prostate MRI for both biopsy negative patients and patients who have had a previous negative biopsy.

And while MR images have become an increasingly useful tool in identifying and managing prostate cancer cases, the panelists note that it cannot be the only tool used. A negative MRI does not necessarily mean that cancer is not present.

> "What we do…is measure PSA at 6 and 12 months. When the PSA is rising or is at the same level and there is still clinical suspicion, the patient will get another MRI after one year. If clinical suspicion is still high, we will do a biopsy. Those kinds of algorithms are very important."

– Dr. Jurgen Fütterer

Biparametric vs. multiparametric imaging

The use of biparametric or multiparametric imaging has been a major debate in the management of prostate cancer. Dr. Kastner comments that while there is evidence that contrast can be reduced while performing T2 and diffusion, one also needs to consider a few factors before moving completely to biparametric imaging:

- How many different clinicians will read prostate MRIs?
- What is the level of experience of each MRI reader?
- What is the volume of scans in your center?
- What is the quality of the MRI, and of the diffusion?

As Dr. Kastner notes, "Our greatest challenge is that the knowledge and experience that is gained from high-volume centers needs to be transferrable to centers that are starting with MRI or have lower volume."

Recent publications have begun to identify a potential role for MRI in screening certain patient cohorts. The panelists recognize that there may be benefit to using biparametric MRI as a tool to help triage particular patient populations—such as those who are older or with significant comorbidities—as it can be a less invasive test than a biopsy.

Dr. de Jong notes that his organization, which operates with a centralized model, uses MRI up front. Biparametric MRI is used for screening, and multiparametric is used for recurrent patients, those who had negative biparametric MRIs with high suspicion, and those who have had prior treatments in the pelvis. The organization has observed a difference in reading between experienced and non-experienced radiologists.

Dr. Kastner emphasizes that it is important to collect outcome data from MRI biopsies—as the choice between biparametric and multiparametric imaging is a question of quality management and collaboration rather than choosing one technique over another.

> "How do you work with your radiologist and ensure that they are delivering the quality? Can you draw the conclusions you want to from the MRIs? It's all about quality, teamwork, ensuring that you get the answers you're asking for. Then you can start thinking about not doing biopsies."

—Dr. Christof Kastner

The impact of fusion biopsies

The introduction of fusion biopsies has been beneficial in helping clinicians identify lesions earlier. Dr. de Jong's organization uses the prostate cancer risk calculator as a predictor of the presence of cancer and the percentage of risk for high-grade cancer, which helps guide decision-making related to the biopsy method. Fusion biopsies are used in patients where there is a low risk (5% or less) of high-grade cancer. If the risk is higher, systematic biopsies are used to provide more robust information for treatment selection.

Dr. Kastner notes that fusion biopsies are useful in high-volume settings with a high turnaround amongst trainees, as they can help maintain quality standards. He states, "For standardization and reduction of variation, fusion is better. It guides the systematic biopsies, ensuring that trainees place them in the same way as urologists."

How MR influences active surveillance programs

Dr. de Jong observes that in rural settings like that of his organization, MRI has helped change the case mix. Previously, cases tended to be larger at presentation, but the introduction of screening MRIs has helped find more disease at an earlier stage, selecting more men for active surveillance and improving potential overtreatment of low-risk cases. MR/Ultrasound fusion is also used to help identify patients for active surveillance, and in about 20% of cases, the clinician found a lesion that wasn't systematically biopsied. In a majority of those cases, the lesion was a higher-grade cancer that changed the decision from active surveillance to active treatment.

Dr. Kastner states that, in his organization, approximately 25-30% of patients are in active surveillance across all prostate cancer diagnoses. The success of active surveillance depends on the utilization of MRI and targeted biopsies to provide an accurate assessment of the disease.

Comparing 2009 to 2018, Dr. Kastner notes that referrals increased from 500 to 750, but the same amount of biopsies have been performed, and active surveillance volume has increased dramatically. The interval of active surveillance to active treatment has extended, and conversion has moved from approximately 30% to 15%.

From an imaging perspective, Dr. Barrett notes that for patients on active surveillance, PSA monitoring becomes less reliable than other tests; therefore, patients must be followed with a mix of PSA, medical assessment, MRI, and biopsy. His organization manages volume by stratifying risk to tailor follow-up protocols. High risk patients will receive yearly scans, while lower risk patients get scanned every three years unless a change in another method of assessment triggers the need for a new MR scan.

Recent reviews in European Urology Focus suggest that a negative MR is reassuring, but there are some patients who progress when the MR does not suggest progression. For this reason, Dr. Barrett emphasizes that PSA, PSA density, and MR must all be considered as triggers for repeating a biopsy.

The potential of focal treatments to improve balance between oncological and functional outcomes

As more men in their 60s and 70s are scanned using MR, more small lesions will be found, and those men could become candidates for organ-saving focal treatments.

While the panelists recognize that recent developments in focal treatments provide interesting possibilities, they emphasize the importance of a strong active surveillance program that provides psychological support to patients as they make decisions. Dr. Kastner notes that patients who receive focal treatments are often patients who could be on active surveillance but are too nervous at the thought of "doing nothing."

Dr. de Jong observes that focal ablation is particularly interesting. As he states, "We already do image-guided diagnosis, so it is easy to shift to image-guided treatment through focal ablation. Our colleagues in radiation oncology also have improved treatment schemes so hypofractionation is an option that may allow us to treat both the primary lesion but also nonidentified smaller lesions."—Dr. Igle Jan de Jong

Optimizing quality of imaging and delivery of care

As the burden of prostate cancer care continues to grow, healthcare organizations are faced with challenging decisions about how to best structure the delivery of care to maintain quality of care and keep patients in follow-up.

Dr. de Jong notes that Holland uses a regionalized model where imaging is centralized, but follow-up care is provided at regional locations. For the patients, it allows for quality control and data sharing in diagnosis, while making follow-up as convenient as possible.

In the UK, Dr. Kastner and Dr. Barrett have implemented a hub-and-spoke model, in which robotic prostatectomies are centralized in a small number of centers, while patients have access at a larger number of radiation centers and imaging is done at every hospital.

Dr. Barrett has been instrumental in optimizing MRI acquisition and reporting at each hospital location. His approach has included engaging radiologists in the community, helping them optimize their systems, education programs, training days, and one-on-one sessions in which regional radiologists sit with the central team.

Similarly, Dr. Fütterer operates a program that teaches technicians how to achieve a quality scan. When a new imaging center is starting up, a second reading exercise is used to help improve the quality delivered as a radiology community.

Click here to view the full webinar.

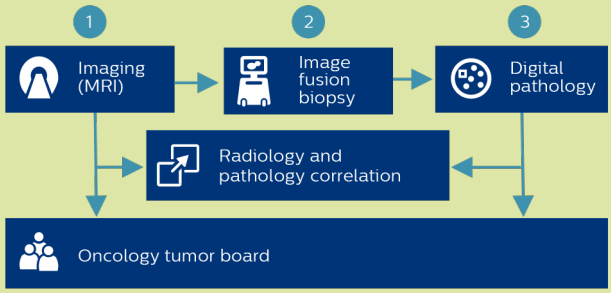
Evolving prostate cancer care

Advancing the quality of prostate cancer care toward more accurate diagnosis and personalized treatments requires that clinicians have easier access to insights they need. Integrated data and imaging, streamlined workflows and collaboration across radiology, pathology, and urology can bring the right information and the right people together to advance efficient, consistent, high-quality care that is personalized with each patient.

How Philips can support you

See how Philips helps you connect radiology and urology to provide more clarity for prostate cancer patients.

Reduce diagnostic uncertainty by connecting more parts of the pathway, combining tracking and navigation with real-time imaging that helps bring precision targeting for biopsy samples.



Disclaimers:
1. Rawla P. Epidemiology of Prostate Cancer. World J Oncol. 2019;10(2):63-89. doi:10.14740/wjon1191
2. American Cancer Society & SEER
*Ahdoot M, Wilbur AR, Reese, SE, et al. MRI-targeted, systematic, and combined biopsy for prostate cancer diagnosis. N Engl J Med. 2020;382:917-928 doi: 10.1056/NEJMoa191003Results

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