Case Study: Strength in Numbers

Genitourinary radiologists at UCLA have constructed a multidisciplinary program to help refine the accuracy of prostate cancer diagnosis and improve patient care.

By Amena Hassan

Key Takeaways:
- The multidisciplinary UCLA Prostate Imaging and Interventional Program is an initiative led by genitourinary radiologists working with urologists, pathologists, physicists, and other experts. It improves prostate cancer diagnosis using multi-parametric MRI and MR guided biopsy based on the newest version of PI-RADS™.
- As part of the program, the radiology team built a database for both the MRIs and cancer surgical pathology specimens, which demonstrated that they could detect up to 93 percent of significant cancers.
- An outgrowth of the program is the annual UCLA Prostate Imaging Symposium, where a multidisciplinary group gathers for a two-day learning session about imaging-based detection, staging, surveillance, follow up, pathology correlation, and reporting of prostate cancer.

Radiologists diagnosing prostate cancer require a unique and multi-faceted approach for the best outcomes. Genitourinary (GU) radiologists at UCLA, and the other specialists who work with them are expanding their knowledge base through a new initiative called the UCLA Prostate Imaging Program. This innovative program, with the radiology team as architects, brings together urologists, medical and radiation oncologists, pathologists, surgeons, physicists, bioengineers, informatics professionals, and even finance experts to better understand and improve upon prostate cancer detection using multi-parametric MRI and the newest version of PI-RADS™.

The collaborative program has not only resulted in improved relationships between radiologists and their colleagues, but more importantly, it has the potential to improve outcomes for prostate cancer patients in the area.

Robotic Recognition

Beginning in 2002, GU radiologists at UCLA, led by Steven S. Raman, MD, and, later, by Daniel J. A. Margolis, MD, began looking for a better way to understand and improve upon prostate cancer detection. Rather than focusing only on staging, the group initially looked at improving radiation and robotic surgery and planning using MR imaging.

The initiative resulted in a collaboration with Robert Reiter, MD, a UCLA urologist specializing in the prostate to improve surgical planning after the introduction of robotic prostatectomy at UCLA in 2004. GU radiologists developed the process to help urologic oncologists determine the amount of prostate resection required, including whether to spare adjoining nerves that could also be involved with cancer.

“We localized the disease for the urologists and gave them its stage and a sense of how aggressive it was,” explains Raman. “It’s important because the less peri-prostatic tissue you remove, the more robust the post-operative outcomes are in terms of the patient’s continence and potency.”

The radiology team built a database for both the MRIs and the specimens, which demonstrated that they could detect up to 93 percent of significant cancers. As Raman explains, “There are multiple markers on MRI that help us detect, grade, and stage lesions — so these are progressive realizations.”

From the success with surgical planning, other opportunities emerged, including the need to identify the most aggressive prostate lesions. This was accelerated by the introduction of direct MR-guided and MR-US fusion-guided biopsy at UCLA in 2009, the latter by urologist Leonard Marks, MD. What followed was a dramatic expansion in the need for prostate MR imaging and expertise, as both academic and community urologists quickly adopted targeted biopsy due to its much higher yield in detecting significant disease.

MR and PI-RADS

UCLA GU radiologists developed and fully implemented the UCLA grading system and also
adopted and helped develop the second version of PI-RADS as part of standard reporting of each detected lesion. PI-RADS is a system designed to communicate a patient’s risk of significant prostate cancer. According to Margolis, “PI-RADS is a comprehensive document that describes the technical specifications, the protocol, and the assessment of prostate MRI, and gives radiologists a good sense of how to reliably perform and interpret prostate MRI.” Raman adds, “It enables us to correlate MR findings with pathology, or the whole mount histopathology. With PI-RADS, we were able to pioneer techniques by a very fine degree — slice by slice on MR.” PI-RADS, combined with the MR-guided technology, is now part of the foundation for the UCLA Prostate Imaging Program.

After initiating a monthly review of each MRI and prostatectomy at radiology-pathology meetings, the team developed a formal database, now holding more than 400 cases with clinical, radiological, and pathological data. The departments of radiology and urology made the database initiative a priority, and they established a multidisciplinary team involving informatics professionals, bioengineers, and MR and imaging processing physicists and technologists. This program was a departmental priority of UCLA radiology chair Dieter Enzmann, MD.

For the review, the group gathers in a room with multi-headed microscopes. Radiology cases are projected on a large monitor, and pathologists show the corresponding images from the whole mount. The group then discusses each case within the context of the patient’s surgical planning. Attendees review each specimen and pertinent tumors, which are mapped back to corresponding slices from the MR. Co-registration is improved with the use of a patient-specific 3D-printed mold courtesy of the bioengineers, generated from and oriented to the MRI. After cases are reviewed, the information is added to continue to build the extensive prostate cancer database. This collaboration has resulted in more than 25 peer-reviewed publications.

**UCLA Prostate Imaging Symposium**

Based on the success of the multidisciplinary approach to refining the accuracy of prostate cancer diagnosis and improving patient care, Raman and Margolis wanted to share their approach and results with a wider audience. In 2013, they created and held the first UCLA Prostate Imaging Symposium called “The Evolving Role of MRI in Prostate Cancer Management.” The symposium has become an annual event, where as many as 120 medical professionals gather to learn about the current state of prostate MRI and to review current and past cases and scenarios.

In this full-day learning session, urologists, pathologists, oncologists, bioengineers, and radiologists learn from UCLA’s collaboration in the detection, staging, surveillance, follow up, and reporting of prostate cancer. With genitourinary radiologists at the helm, the program involves a multidisciplinary audience of attendees and speakers. It revolves around using MR and the newest version of PI-RADS for prostate cancer detection. Attendees earn a full day of CME, and they vet issues surrounding prostate cancer detection.

One of the major objectives of the course is to gather physicians, technologists, and industry representatives to foster prostate imaging and intervention systems. The course is led by Raman and begins with an introduction to state-of-the-art techniques used for prostate diagnosis. “We, along with the physicists, describe the technical components of MR,” says Margolis. “We have case vignettes and have specialists talk about how prostate MR is used in their arena. We try to embed the entire presentation within the clinical context.”

One surgeon discusses how MR helps his surgical management, and another surgeon explains image fusion-targeted biopsies. A radiation oncologist highlights radiation therapy planning, and a pathologist talks about the histology and active surveillance. UCLA’s nuclear medicine physicians discuss what techniques they use to image prostate cancer. Technologists and billing specialists offer insight into a patient’s perspective when coming in for a prostate MRI, and vendors provide information about the newest equipment used to provide image fusion targeting for biopsy and treatment. The case review encompasses all forms of prostate cancer, from early stages to more aggressive prostate cancers, as well as those undergoing surgery and radiation.
Based on the success of the local symposium, the radiology team is now planning a two-day event for attendees across the United States and even internationally.

**Quarterly Practicum**

In addition to hosting the CME events, the radiology team continues to remain visible throughout the year by educating other specialists with intensive tutorials called the UCLA Prostate Imaging Practicum. The practicum allows the radiology team to assess the needs of practitioner groups and tailor a two- or three-day course that provides a more hands-on experience than the symposium.

“It’s more of a practical version of the theoretical course, and it is conducted on a quarterly basis,” explains Raman. “The practitioners come to us and give us a sense of what they’re looking for. We assess their objectives — such as where they are, what technology or equipment they are using or considering, who their collaborators are, and what parts of the puzzle they already have in place — so we can help them put the remaining pieces together.”

**NEXT STEPS**

- Review PI-RADS™ for global guidelines to improve early diagnosis and treatment of prostate cancer using high-quality, multi-parametric prostate MRI.

- Develop a relationship with other specialists as early as possible and educate them regularly about radiology initiatives that could affect their patient populations or practices.

- Find a specialist, such as an oncologist or urologist, who is aware of your work and will advocate for radiologists by sharing information to improve patient care outcomes.

Want to join the discussion about how genitourinary radiologists at UCLA have constructed a multidisciplinary program to help refine the accuracy of prostate cancer diagnosis and improve patient care? Let us know your thoughts on Twitter at #imaging3.

Have a case study idea you’d like to share with the radiology community? Please submit your idea to http://bit.ly/CaseStudyForm.