

The Importance of Image Quality in the Urological Workflow



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The past 2 decades have seen advancements in imaging technology that assist in the diagnosis of urological diseases. With these advancements and the increased use of radiation during urological procedures, radiation exposure has become an increasing concern. Safety awareness must be practiced and precautions must be taken to limit potential radiation exposure to both patients and staff without compromising image quality.

This article includes highlights from a recent *UroView*TM interview with Bradley Schwartz, DO, FACS, a urology expert, in which he discusses the importance of image quality and radiation safety in his practice.

Imaging systems

Schwartz specializes in kidney disease, including kidney stone disease, kidney tumors, and urinary obstruction, and he uses imaging extensively in his practice. In the work-up and diagnosis of a patient's disease, Schwartz said that 90% to 95% of his patients receive some sort of imaging. He pointed out that image quality may be the most important component of an imaging system in making a diagnosis.

"When you look at the impact of clinical outcomes and the medical care of the patients we are treating, it could mean the difference between success and failure. It could mean the difference between seeing a defect and not seeing a defect. It could be tracking the wire up into the kidney and actually having successful placement of the wire versus failing and...[converting] to an antegrade approach, thereby changing the entire outcome of that patient's disease process. The quality of the imaging is key," he explained.

For approximately 30 years, Schwartz said, he has used Liebel-Flarsheim urological procedure tables at every location where he has worked, adding that they are reliable and dependable. The tables are equipped with the most current technology and superior image

quality, both of which are assets when working intraoperatively, he noted. Schwartz said he especially values the independence that the surgeon has when using the system by being able to control almost everything with the foot pedals (eg, magnification, spot films, fluoroscopy), therefore eliminating the need for someone else to be in the room to adjust settings.

"We can really have complete surgeon independence when dealing with these systems. That gives us real-time information and has been shown in the literature to decrease the amount of fluoroscopy that we utilize when we control that. I think surgeon independence is fantastic. The image quality is fantastic, and we can really make some very high-level treatment decisions based on what we're seeing [in] real time," he said.

Regarding fluoroscopic tables, Schwartz noted that in his practice he uses them for all his ureteroscopy procedures and for 30% to 40% of percutaneous stone procedures. He considers a fluoroscopic table an investment; it is a significant piece of medical equipment for hospitals and surgery centers. Schwartz added that mobile cystoscopy tables are a smaller and often more economic option, but image quality may be compromised.

Radiation Safety

Schwartz emphasized the importance of radiation safety within his practice environment. Various studies published in the literature have focused on the need for minimal exposure and maximum protection during radiation imaging. This can be achieved through technological advances of the imaging system itself, as well as through radiation education. Schwartz and his colleagues are required to wear dosimetry badges per state guidelines as a typical method to track radiation exposure. Additionally, Schwartz's institution requires staff to engage in yearly trainings on minimizing radiation exposure.

When addressing concerns of radiation exposure due to urological proce-

dures, Schwartz reassures patients that the current technology minimizes the risk of exposure to the greatest extent. In an effort to limit exposure, ultra-low-dose CT scans can be used, and patients are shielded during the scans. MRIs and ultrasounds also are used when possible in order to limit radiation doses.

"When in the operating room, we do try to maintain our distance from the radiation source. We all wear lead aprons [and] lead thyroid shields. Most of the surgeons have lead glasses that we use. Again, we all are required to [comply with] the radiation safety [practices]. As much as we can limit the amount of radiation exposure to the patient, we do [so] by employing less radiation and [being] careful and sensible [regarding] exposure to [patients]," Schwartz said.

Trends and Future Developments

Schwartz emphasized that the technological advances in image quality have been remarkable. It's important to focus on patient safety by decreasing radiation dose and exposure while at the same time maintaining high-quality imaging. There have been advancements in safety components for patients and staff as well as better technologies. Artificial intelligence may be key to future growth in this space.

Schwartz anticipates that prostate cancer also will benefit from technological advancements, with artificial intelligence playing a major role. Breakthroughs in image quality will be crucial for better grading and diagnosis, resulting in more accurate assessments.

"I think all of us are always excited to see the next level of technology and the next breakthrough," Schwartz said. 

REFERENCE

1. Radiation protection in urology. International Atomic Energy Agency. Accessed April 15, 2021. <https://www.iaea.org/resources/rpop/health-professionals/other-specialities-and-imaging-modalities/urology>