UCLA Medical Center, Los Angeles, California
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Introduction
When spectators gathered to watch a massive crane swing the Varian TrueBeam™ system over the eight-story building, across the plaza, and down through the parking garage, they were watching the most dramatic part of a routine, well-orchestrated project. The project replaced, at UCLA Medical Center, an existing Siemens linear accelerator with the TrueBeam system and implemented the ARIA® oncology information system, resulting in a paperless workflow and digital patient record and enabling two treatment locations—in Westwood and Santa Monica—to be managed as a single radiation oncology department.

Background
UCLA Radiation Oncology treats up to 120 patients a day with external beam radiation—approximately 90 at the main clinic in Westwood and 30 at the satellite clinic in Santa Monica, California. “We perform many short-course treatments such as SRS and SBRT, so our turnover of cases is high,” reports Patrick Kupelian, MD.

In 2008, UCLA Radiation Oncology installed a Varian Novalis Tx™ system in an empty vault in the Westwood clinic. Then in 2011, the department acquired two matched TrueBeam systems, one for the new facility in Santa Monica and one to replace a Siemens system in Westwood.

At the same time, the Center migrated to the ARIA oncology information system from LANTIS™ and MOSAIQ® systems. “ARIA had been running the Novalis system as an island, so our physicists were already accustomed to it. When we added the two TrueBeam systems, we migrated everything to ARIA. We not only started using it for record-and-verify for all machines, but we also moved from being a paper heavy department to near paperless, using ARIA as the EMR,” says Kupelian.

Factors For Choosing Truebeam
In choosing a new system, Kupelian reports that UCLA considered several requirements. They included:

- State-of-the-art in-room imaging. “We wanted to update our in-room imaging to state-of-the-art technology that would provide improved soft-tissue contrast.”
- Large field IMRT. “We treat a large number of cases, such as head and neck, or pelvic cases, for which large fields would be advantageous.”
- Fast performance. “Large field IMRT treatments were often taking 30 to 40 minutes to deliver. As a result, we were working long hours. This is unsustainable for a patient load of 75 treatments in a day.”
- Unified, integrated information management. “We wanted to move off LANTIS and adopt a system with more functionality, that integrates with all our delivery platforms, and that has a long-term roadmap for continued development.”
- Timely image review. “We wanted a fully integrated image-guided system and process.”
The TrueBeam system with ARIA offered UCLA Radiation Oncology a solution for all these requirements. “From our clinical perspective, it was obvious that the right choice was Varian,” says Kupelian. “Varian’s long history in radiation therapy and the resulting high quality of their technology gave us confidence in choosing the TrueBeam systems,” adds medical physicist John DeMarco, PhD.

Conversion Report
A smooth conversion to Varian technology was made possible by thorough planning and efficient communications. “When switching platforms from different vendors, there are always extra steps required,” says DeMarco. “The Varian installation team made certain that every step happened on a specific timetable to minimize the impact on our patients and our operations. They made an essentially stressful process as efficient as possible for our physics group and our therapists.”

Support for Physics
To prepare the UCLA physics group to perform TrueBeam acceptance, commissioning, and regular quality assurance, Varian provided training for two physicists for each system purchased. “Varian has a very detailed and excellent week-long training session dedicated to the TrueBeam system,” says DeMarco. “We were well prepared to take responsibility for the machine.”

Information system migration
While the vault was being prepared for TrueBeam installation and training was taking place, UCLA Radiation Oncology also migrated information systems. “That was a huge process that affected everybody. It affected multiple groups in the department and really changed the landscape of how we deal with electronic medical records and scheduling and other workflows,” says DeMarco. “As we took the Siemens machine down, we slowly had to phase out the LANTIS record-and-verify system, and, during that time, we were essentially operating two record-and-verify systems independently in the department.”

DeMarco cites three aspects contributing to a successful software migration: Off-site, hands-on training for UCLA team leaders at the Varian training center in Las Vegas. On-site applications training for everyone affected by the change. And an ongoing joint working group. “Varian and UCLA teams met weekly throughout the migration process. I remember very good communication with Varian and a well planned project timeline,” emphasizes DeMarco.

New workflows and processes
UCLA rolled out ARIA in parallel with installing the TrueBeam system. “We pushed for the electronic medical record project at the same time, so many issues involved learning ARIA at the same time,” Kupelian recalls. For example, UCLA established new guidelines for deciding which patients would be treated on the TrueBeam system. They also set up the image review modules within ARIA and documented protocols for which images to order and how and when physicians would review them.

Kupelian gives another example. “We knew that we would need to transition our whole-body radiation program to TrueBeam, so we didn’t wait for the machine to be installed. We prepared everyone in advance.”

Treating patients without interruption during the transition
The most difficult and complex aspect of the conversion was not the new technology and new workflows to learn. It was continuing to treat patients in the midst of change.

“Before the TrueBeam system was up and running, scheduling patients was a little bit tricky,” recalls Kupelian. “A lot of planning among physicians, dosimetry, and physics went into figuring out which patients to treat on which of our other systems. “Our patient numbers were not exceptionally high at that point, but we were running long hours, often to 10:00 PM, for about three months.”

Matching TrueBeams
The TrueBeam system that went into Westwood was delivered with three photon energies (6, 10 and 15 MV) and five electron energies (6, 9, 12, 16, and 20 MeV), a 120-leaf multileaf collimator, and cone-beam CT and kV imaging. The TrueBeam system installed later in Santa Monica was identical in all respects except without the 15 MV photon energy. “We were able to meet with the installation engineers and request they match the energy and profile characteristics of both TrueBeam machines,” recalls DeMarco.

Having matched machines gives the clinic the flexibility to transfer patients from one machine to the other, if necessary, without making any changes to their treatment plans. “That’s a huge clinical advantage,” says Kupelian. “It doesn’t happen often, but we have transferred patients between clinics for a variety of scheduling or service reasons.”
**Results**

With the installation of the TrueBeam platforms and the conversion to the ARIA oncology information system, UCLA Radiation Oncology now has a uniform Varian environment where all the systems function and communicate together efficiently and where two separate locations are managed as one department.

In addition, “working hours have dropped dramatically,” DeMarco is happy to report. Both centers, in Westwood and Santa Monica, are now able to treat many more head and neck and lung cases with volumetric arcs. As a result, they are able to accommodate more patients within a regular eight or nine hour day.

“A good knowledge of what the technology offers is key to a successful conversion,” DeMarco concludes. “Varian training and presence throughout the transition were crucial.”
Intended Use Summary
Varian Medical Systems' linear accelerators are intended to provide stereotactic radiosurgery and precision radiotherapy for lesions, tumors, and conditions anywhere in the body where radiation treatment is indicated.

Safety
Radiation treatments may cause side effects that can vary depending on the part of the body being treated. The most frequent ones are typically temporary and may include, but are not limited to, irritation to the respiratory, digestive, urinary or reproductive systems, fatigue, nausea, skin irritation, and hair loss. In some patients, they can be severe. Treatment sessions may vary in complexity and time. Radiation treatment is not appropriate for all cancers.

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