

The Expanding Role of the Technical Assistant in Volumetric Imaging

Anthony Garcia, R.T. (R) (CT)
3D Lab / QC Supervisor

Radiology Ltd.
5960 N. La Cholla Blvd.
Tucson, AZ 85741
Phone: (520) 290-4848, ext. 1749
Email: tony.garcia@radltd.com

Introduction

Today's medical imagers have a generous palette of digital tools at their disposal, and most of these are so intuitive that it doesn't take a rocket scientist to use them. Yet in a busy radiology practice, the responsibility of who is best suited for 3D image manipulation is often unclear. Most radiologists usually have little time or patience for creating routine batch images or for learning the software to do so. Their time is better spent creating their product, the report. Generating a report in a timely manner is crucial, since it is the final product that provides financial support to a practice. Any activity that detracts from the reading of studies detracts from the bottom line.

Often the responsibility for postprocessing falls to the radiologic technologist, an obvious choice since he or she is well versed in anatomy, physiology and the needs of the practice. However, next to the radiologist, the technologist is the busiest person in the practice, through whose efforts a productive schedule is maintained. Only consistent and efficient throughput at the scanner level can offset the rising costs of medical equipment and fluctuating reimbursement. Since 3D postprocessing is extremely

computer intensive, it is counterproductive to have a patient wait while the scanner is still working on the last patient's images.

One option, of course, is to send out studies for post-processing. First, the importance of 3D imaging in the practice must be assessed. For example, if the practice primarily handles CTAs, then outsourcing studies may work well even with the increased turnaround time. However, some practices may find that the routine batch production of sagittal and coronal reconstructions for spine and extremity CTs or MRA MIPs are too time costly. In such cases, creating a dedicated 3D Lab environment to handle output from routine imaging protocols may provide a solution. Taking such time-consuming duties away from the scanner and the technologist will open up the patient schedule considerably. The actual configuration of the lab and its location are entirely up to the individual practice, based on perceived need, efficiency of workflow and structural considerations. Although a dedicated 3D Lab can cost a small fortune, this may be offset by the rewards of more efficient time management and increased productivity.

Given the argument that both the radiologist's and the technologist's time are too precious to spend on image postproduction, the question remains as to who should staff the lab. A potential solution is to hire and train a Technical Assistant or TA. A practice may benefit while simultaneously providing an educational opportunity to students in a Radiology Technology program or others who have an interest in establishing a medical career. With proper training and supervision, the TA may prove to be a cost-effective addition to the 3D Lab.



Figure 1: Right middle cerebral artery aneurysm

Objective

At our facility, our goal was to create an environment where a staff comprised of Technical Assistants routinely performed postprocessing on a wide variety of studies. The reasoning behind this decision was simple. The technology had reached a point where a person with basic computer skills and experience could produce images of consistent quality without extensive training in image acquisition techniques. While knowledge of scanning parameters is helpful, it is not required in order to follow standardized batching protocols. Long before the establishment of our 3D Lab, TAs were creating MIP rotational views of MRAs as part of their room assignments. Therefore, their use in a dedicated lab was a natural step.

In order to run smoothly, the lab needs a strong support structure that can address issues quickly and decisively. Problems stemming from the digital network, workflow and software interfaces are often unforeseeable and usually only come up in actual practice. As with the training of the TAs, the workings of the lab will be a work in progress until unique challenges are met and resolved.

The support structure involves staff at all levels. Good communication must be established rather

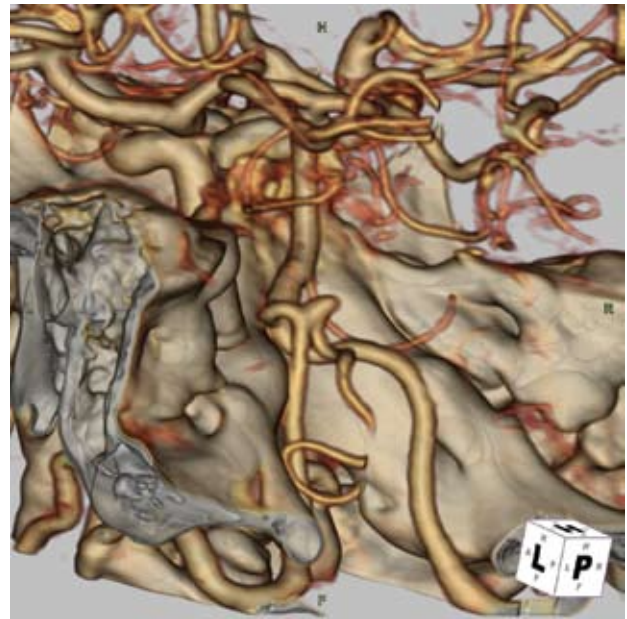


Figure 2: Posterior-inferior cerebellar artery origin aneurysm

quickly between radiologist, technologist and TA so that expectations remain realistic and results are consistent. This communication structure is even more important if a company has several facilities to bring into the 3D Lab workflow. An easily accessible hierarchy is necessary to accommodate unique situations arising with different sites or customers.

Skills and Hiring Process

Once the decision was made to use dedicated Technical Assistants in our 3D Lab, we determined the basic skill set necessary for the position. We interviewed several candidates whose qualifications included elementary computer proficiency, a cursory knowledge of digital networks and some experience in human

anatomy. In addition, we looked for good communication skills and sufficient self-motivation to interact properly with physicians and technical staff.

Computers have been around long enough for most people to have some experience with them. Since the Aquarius software works on a Windows platform, many keyboard and mouse functions are familiar to the operator. While a detailed knowledge of digital networks is not necessary to manipulate image data effectively, an understanding of the routing and archive location of the 3D data set is important. At our facility, the technologist sends out two data sets, one to the radiologist's PACS server and one to the AquariusNET server. The 3D Lab TA needs to know which images are available on each server, be able to track images that have been routed incorrectly and, in turn, transfer the processed images to the proper location.

We interviewed candidates from within our company as well as without. They were screened to make sure that all had some experience the medical field. We found several candidates that had worked in medical offices ranging from radiology to family practice. They had experience with medical terminology and some exposure to radiographic images.

Training Program

Two Technical Assistants were eventually hired for the 3D Lab and training was begun by an experienced R.T. They were given visual roadmaps of arterial structures pertinent to our practice as well as the necessary nomenclature used in the labeling of images. After the initial installation of the workstations, a TeraRecon Applications Specialist performed the fundamental training on the Aquarius software, going over keyboard, mouse and tool functions. The existence of an extensive demonstration database made it possible for TAs to have several days of uninterrupted practice before taking on the actual patient load.

Training typically begins with abdominal CTAs, which allow the beginning operator to practice with the selection tools on the larger structures in the body before moving on to finer structures in other body parts. Anomalies are easier to distinguish in the abdomen and pelvis because the arteries are not surrounded by bone, as is often the case in head and neck studies. From there, it was an easy matter to extrapolate these tools and skills into other body-related studies such as MRA abdomens or CT IVPs.

Constant feedback from the radiologists is critical to the success of the 3D specialist. Standardization of batching protocols is also very important to ensure consistent results. The TA approaches a new study the same way every time, with guidance from the physician when a structure needs closer scrutiny for diagnostic purposes. We have compiled a 3D Lab "playbook" that addresses the images required for a particular study and have distributed it throughout the staff so that all the various stages know what to expect and what is expected of them. The technologist at the scanner then has a list of studies that routinely go to the 3D Lab, the scanner TA then knows to notify the 3D Lab of a pending case, the 3D Lab TA knows which batch series to produce, the quality control people know which images should be part of their hanging protocols and finally, the radiologist has the requested list of images.

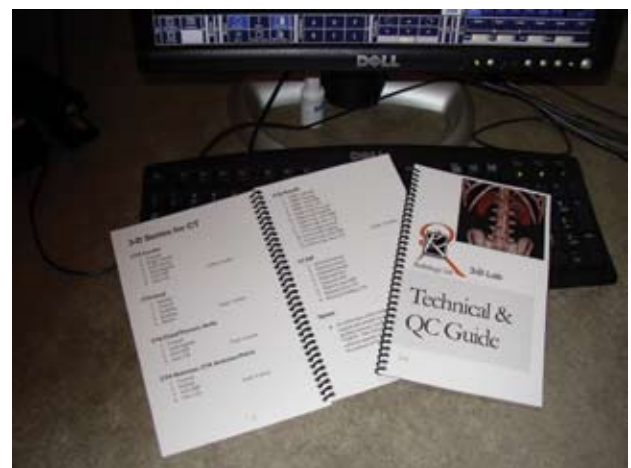


Figure 3: The 3D Lab "Playbook"

Results of Training

We now have a dedicated 3D Lab comprised of two full-time TAs, a part-time TA to handle after-hour and weekend studies, and a registered technologist to maintain quality control and protocols for the Lab. A radiologist oversees the department as a further safeguard. The Lab now processes between 600 and 700 studies per month, a figure that will increase as the company adds scanners to its new facilities.

Exams have been standardized throughout the company, and each study is built along exacting protocols. There are, of course, allowances for further in-depth evaluation of disease and physical aberrances, which the TAs have learned to identify correctly on a routine basis. Even then, as in the case of cerebral aneurysms, there is a specific subset of protocols established to address the finding.

The TAs themselves have all expressed a desire to further their education in the medical field. They either have enrolled in a Radiologic Technology program or are taking prerequisite courses with an eye toward eventually becoming a physician. As the current crop of TAs begins to move on to other endeavors, TAs from other departments have volunteered to fill those gaps. The position is an attractive one, as TAs have the opportunity to work with innovative technology and also be an important part of the diagnostic process. The educational potential for a TA working in the 3D Lab is enormous, not only from



Figure 4: The 3D Lab Technical Assistant

the hands-on experience, but also from the constant one-on-one sessions with the radiologists who provide comprehensive feedback of their work.

Conclusions

The Technical Assistant is a valuable commodity in a dedicated 3D Lab environment. With proper training, the TA may easily master the necessary software and protocols, develop a proficiency in anatomy and imaging, and proudly become an integral part of the diagnostic process. A dedicated 3D Lab assistant also frees up the valuable time of the radiologist and technologist. In turn, the 3D Lab can provide an educational environment in which the TA can receive the motivation and building blocks for a future career in radiology.



Figure 5: Multilobular, pedunculated broad-based aneurysm/pseudoaneurysm of the left internal carotid artery