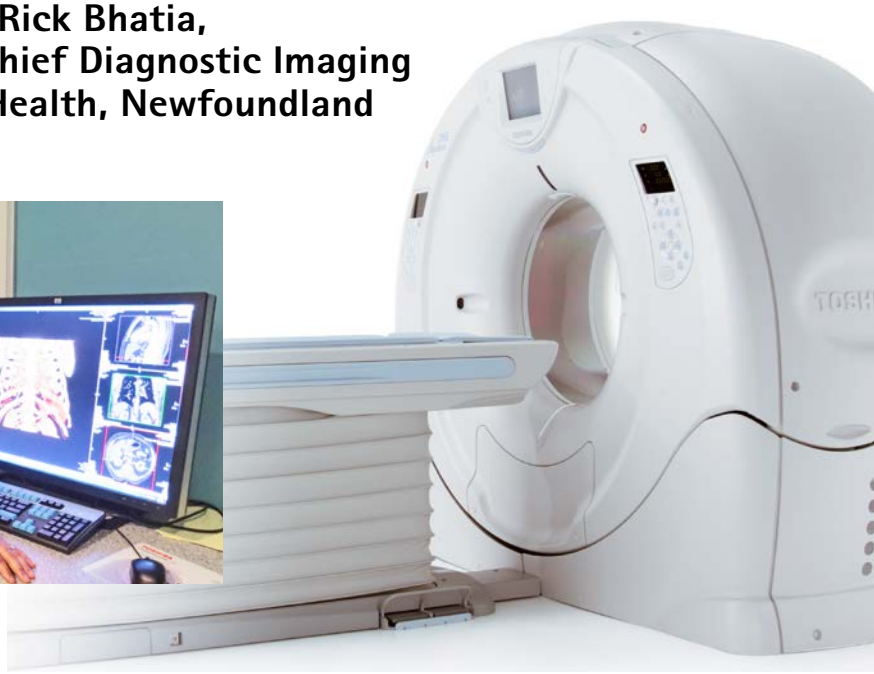
Going Live with the Aquilion VISION Volume 4D CT

Interview with Dr. Rick Bhatia, Regional Clinical Chief Diagnostic Imaging Program, Eastern Health, Newfoundland



What were the key factors that persuaded you to choose the Aquilion ONE™ ViSION CT scanner?

I first became familiar with the Aquilion ONE™ ViSION Edition CT when it was launched by TOSHIBA at the RSNA. I saw this volume CT and thought the technology was amazing. We knew we wanted the highest-end CT on the market to best serve our patients, so we established an RFP to get a response from the major vendors. At first, it took us a while to understand the concept of volume CT because we were used to a 64 helical slice CT. It was a learning process for us to move from "64 slice thinking" to "acquiring images with volume". We chose the ViSION CT because it answered all of our clinical needs from the basic to the most advanced including cardiac and neuro studies. In addition the ViSION made it possible to explore new techniques and unchartered territory.

In our society we have to weigh the balance of what an imaging system can do relative to its cost. When we looked at the value in terms of its cost benefit ratio, it was our number one pick. The ViSION CT had everything. In fairness other vendors can do some of this work, but then when you take everything into account we came back to TOSHIBA.

Tell us a little about your hospital, your department and your role. What clinical benefits have been provided to your facility with reference to the ViSION CT?

In my role, I serve as the Regional Clinical Chief Diagnostic Imaging Program, Eastern Health and was responsible for directing the RFP process for CT replacement. The Health Sciences Centre General Hospital in conjunction with St. Clare's Mercy Hospital are part of the Eastern Health Regional Health Authority providing tertiary care for not only the local area, but the entire province.

Our CT scanners operate five days a week for 16 hours each day, plus on call. The Health Sciences Centre site serves as the main site for trauma, neuro, cardiac and urologic cases. It also shares respirology, body and orthopedics with the St. Clare's site, which is the ENT site, and serves as back up to the adjacent Janeway Pediatric Hospital. The Bliss Murphy Cancer Centre is based at the HSC site. There is a busy ICU and of course, a dynamic Interventional Radiology program is a part of this as well. We needed a CT unit that would be robust enough to handle the everyday routine work and at the same time have the capacity to cover the high-end subspecialty clinical work

"We chose the ViSION CT because it answered all of our clinical needs from the basic to the most advanced including cardiac and neuro studies. The ViSION CT has enabled us to do some amazing cardiac work with lower doses."

Dr. Rick Bhatia
Regional Clinical Chief of Eastern Health

TOSHIBA's Aquilion ONE ViSION CT is installed in two Eastern Health facilities serving the province of Newfoundland: Health Sciences Centre General Hospital (shown here) and St. Clare's Mercy Hospital.

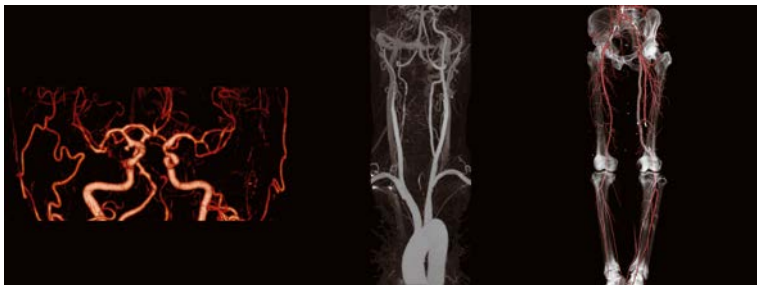
including both neuro and cardiac studies along with interventional procedures.

A very important benefit that we noticed in our department after installation of the ViSION CT, was an immediate boost in employee engagement. I had expected that when the ViSION CT was initially available for clinical application, the radiologists and technologists would require some time to adapt to its true potential, but to my surprise the ViSION CT actually excited our staff beyond my expectation. Our team felt re-invigorated because now we could do things that before we could only dream of.

The introduction process for the ViSION CT exposed our team to the full range of possibilities and they were immediately more excited about what they could offer to patients. Our MSK specialist in particular was very impressed with the new technology. He immediately set about evaluating what could be demonstrated for joint movement using dynamic models.

Having the ViSION CT sparked a new level of interest, replacing that sense of too much routine that can develop over time. When we showed the surgeons what is possible with the ViSION, they were really very impressed. They felt it was just what they needed with respect to orthopedics and plastic surgery. The surgeons can now view the vessels in more detail and joints in motion. Suddenly different applications were being initiated and new inquiries surfaced about what new procedures could be possible. The new VISION CT genuinely excited our department bringing us closer together as a team, an unexpected but major benefit.

Our technologists are really embracing the technology offered by the ViSION CT. They enjoy learning new clinical applications. Their routine has changed from "place the patient and scan" to deciding and managing what protocol is best for a particular patient. The "dual monitor control", that provides both operational and diagnostic functionality, has realized another very important benefit. The technologists can now spend their time focused on the patient and the examination at hand. The post processing of images using the second monitor eliminates the need to delay the next procedure. This was another important factor contributing to our decision to choose the ViSION CT. This helps us to better manage patient work flow. If a technologist has only one screen to work from, interruptions are unavoidable. For example, if a Radiologist or Clinician needs to look at an emergency case, they can use the second monitor



TOSHIBA's Aquilion ONE ViSION CT installed at Health Sciences Centre General Hospital incorporates SURE Subtraction software, providing unsurpassed visualization of vessels and contrast-enhanced tissue structures.

"The entire TOSHIBA team has embraced our project throughout in the true spirit of partnership, ensuring a favourable outcome and illustrating excellence in the customer experience."

instead of interrupting the technologist to use their monitor. This has also proven useful when the Radiologist wants to review images preparing for procedures.

The "Dual Monitor Operator Console" offered by TOSHIBA's Aquilion ONE ViSION provides significant workflow advantages for both operational and diagnostic functionality. The post processing of images using the second monitor eliminates the need to delay the next CT Examination. Using the ViSION CT, it is possible to work without interrupting the patient work flow by using the second monitor. The positive impact on patient workflow was a key factor contributing to Eastern Health's decision to choose the ViSION.

Another important clinical benefit is the very significant reduction of radiation dose. We have spent a lot of time and energy in the past working to reduce radiation dose while trying to strike the right balance with image quality. Of course we can go with a higher radiation dose and get perfectly crisp images, but there is a balance. The ViSION CT provides the perfect balance. This was in part possible due to the highly professional support we received from the TOSHIBA CT clinical applications specialists. We were able to generate balanced images that pleased our clinical team and there was quick acceptance of these protocols. The ViSION CT has enabled us to do some amazing work with ultra low dose. For example, very recently a young patient in ICU, who required a follow up CT because of uncertainty with respect to a standard radiograph of the chest had an ultra low dose chest CT which was acquired with the ViSION at only 10 DLPs, a dramatic drop from the typical 400 or 500 DLPs previously encountered. Using the ultra low dose we achieved a significant reduction in dose and got the information we wanted.

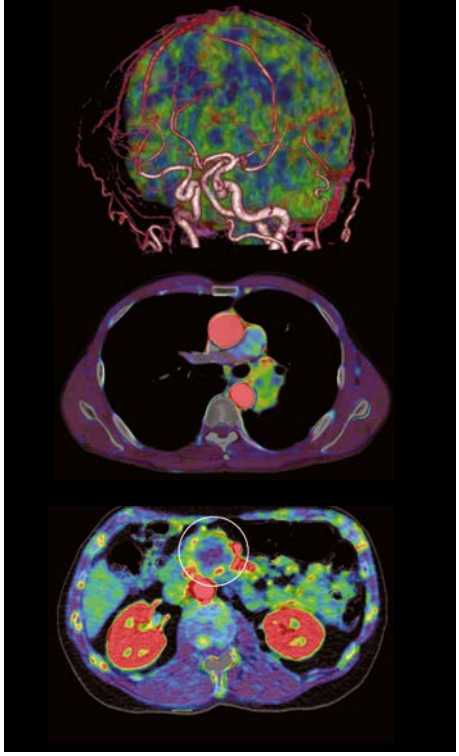
There indeed was a steep learning curve from the technologist's point of view because they were going from a different platform. TOSHIBA recommended that only two "super users" receive initial training. Once we got that concept under our belt, the transition went very smoothly. It was important for the "super users" to focus their time in learning how to use the new system to its full advantage so that they could then teach others within our department. The learning curve proceeded quickly. Every day we could see big strides. Within a month the team had progressed well and learning expectations had been met. The team was able to do both routine exams as well as the more demanding studies. Now, only a few months later, a few of our technologists are advancing to the next level and taking the lead in mastering post processing using the Vitrea workstation.

It takes time to appreciate fully the difference between a standard 64 slice helical acquisition and a 4D volume acquisition. This is a new dimension that brings additional clinical benefit and impact. One must allow for staff to go through the learning process in order to know which is the most appropriate protocol to apply to solve the clinical question.

An important factor is that TOSHIBA has been there every step of the way. Our confidence in the high level of support we knew TOSHIBA would give us, including the provision of a comprehensive Evergreen Program contributed to our decision. This essentially means we receive as much help as we need whenever we need it. This commitment has been demonstrated through the CT clinical applications team who are very responsive. Inquiries are answered immediately, whether by telephone, email or text.

When purchasing expensive technology, we take into consideration not only the capital piece of equipment but the day to day vendor support to ensure optimal use, optimal servicing and applications support. The full package that TOSHIBA extended to us was exactly what we were looking for. The service commitments that were presented by TOSHIBA are being delivered and what we see evolving is a true partnership.

The entire TOSHIBA team, including the general manager, have embraced our project throughout in the true spirit of partnership, ensuring a



Eastern Health's Aquilion ONE ViSION incorporates advanced dose reduction technology, AIDR 3D, Adaptive Diagnostics, and the ability to perform whole brain perfusion, dynamic CT angiography and Dynamic Musculoskeletal exams with less radiation dose.

favourable outcome and illustrating excellence in the customer experience.

How is the role of CT scanning perceived in terms of the importance and position in your clinical service offering?

CT Scanning is the bread and butter of our department for both our in and out patients, for problem solving, making diagnosis and for following patients, including cancer patients. Our MRI wait list is much longer than for CT which is very short by virtue of running the system 16 hours per day. If a patient is qualified for an Ultrasound, CT or MRI examination, because all three would be appropriate, clinicians frequently defer to CT because it is more readily available. Therefore in our wait list management, CT is our "go-to" place.

Having said that, we do not ignore the consideration that Ultrasound and MRI are both "non-invasive" with respect to radiation exposure. We are now feeling a bit more comfortable resorting to the option of CT when necessary because of the significantly lower radiation dose that is required.

At both the Health Sciences Centre General Hospital and St. Clare's Mercy sites we will scan approximately 50 patients each in a standard eight hour shift. We use the CT for drainages, and biopsies when not possible to use ultrasound, including an average of one to two chest biopsies per day. The CT has been fantastic for these biopsies. Now we have three modes of CT fluoroscopy operation, regular "Step and Shoot", real time fluoroscopy and the 3D Volume scan mode. I use all three and each has a different clinical application.

I use the "Step and Shoot" mode for the daily routine biopsies because it employs a slightly lower radiation dose for simple things compared to the other methods of CT fluoroscopy. However if the lesion is close to the diaphragm and moving, I use CT real time fluoroscopy which makes it easier to precisely hit a moving object. In a limited number of complex cases which presented exceptional difficulty I resort to the 3D Volume scan mode which has been extremely helpful in concluding the procedure satisfactorily. With the three modes, I can do it all with relative ease. This was another key reason why we chose the ViSION CT.

What are your expectations of vendors supplying CT equipment?

When a vendor is supplying CT equipment, we do have very specific expectations. In Newfoundland we are very conscious of our geography and therefore technical service support is important. Our expectation is on-site servicing from the vendor within a very short period of time. TOSHIBA staff live and work here. They are just a phone call away and are accessible at all times. We enjoy a great relationship with TOSHIBA's service engineers. In addition when we have a question related to clinical applications, it is important that a qualified clinical applications specialist is available to assist us. In this respect the TOSHIBA team has been exceptional. Their senior applications specialist was available to respond on a Sunday evening while on vacation. She responded immediately with the information I required. We also do expect the account contact to be available to assist; he is an important liaison in maintaining a strong and meaningful partnership. We are very fortunate to have the services of Tony Roberts who certainly has not walked away after the sale. He is there when we need him.

What do you believe is the biggest challenge for companies developing CT systems for the future?

The road to lower dose is there and getting a lower dose with good resolution is a balancing act which all vendors are constantly working to perfect. In my opinion, today's CT speed is fast enough as the

scanners are faster than actual blood flow. I see the growth of CT more from a technological point of view, with more automation on the horizon. I would like to see a frontal and lateral scanogram acquired simultaneously, rather than separately. Currently technologists acquire an "AP" scanogram and then a "lateral" scanogram, leading one to ask why not all at once which would result in yet a lower radiation dose and save time. Continued improvements in artifact reduction are another area that requires attention. I believe the user-friendliness of CT systems can improve for the technologists. I look forward to the improvements TOSHIBA will present with its next software version (V 7.0).

What is your personal vision in terms of where CT technology is likely to go in the next ten years?

I really do wonder what more can you do in computed tomography now that we have the ViSION CT which offers a large detector that can in the majority of cases image the entire heart in one heart beat and is able to fully cover the brain for studies related to perfusion and vascular flow. To be honest, I think this machine is ahead of us. One thing I realized when I visited Professor Prokop in the Netherlands where he demonstrated perfusion imaging of the pancreas, was that I truly don't believe our knowledge level has caught up to the technological capability of the equipment. Do we truly know what these images mean? If a lesion perfuses or does not perfuse, what exactly does that mean? The CT technology advancements that have been achieved lately are significant, but now it is a matter of doing the research to better understand how to interpret and understand the imaging data. If a lesion in the pancreas shows perfusion what does it mean? Does it mean a tumor, or not a tumor, does that mean it is improving, or not improving with treatment?

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Are there educational solutions that could address this need?

Yes, I believe this would help but the concern is that the clinical data is not out there. Currently there is not enough research to know the answers to all such questions. Conducting research studies with new technology is very important because again, we don't know fully how to utilize the imaging data that is being generated. For example at one point in time, dual energy was all the rage. Are there applications for practical everyday imaging? Where does dual energy stand? Where does perfusion imaging stand? There are many schools of thought. I think there are things now that the CT scanners can do, but we need to revisit what is practical and what is meaningful.

It would be ideal for TOSHIBA to enable technologists to talk to other technologists at different TOSHIBA CT sites around the world to share protocols and best practices. This could be practically done over the internet. Perhaps if a technologist is having trouble with something, they can go to the web community and share solutions and protocols. Right now I can call our TOSHIBA CT applications specialist and ask this question directly. However it would be nice to have it on the web to be able to study what the different sites are using for each model of CT equipment. A support network designed to have answers to commonly asked CT protocol questions through an interactive web based solution would be well received. Secondly when you have a group of technologists working together, there is always more knowledge sharing. Technologists can find their skill set diminishing in some areas where they don't do a lot of practical work. For example, a technologist who has not done many cardiac studies would find the interactive web based solution helpful, especially if they could do a simulation lab online. Enabling technologists to experience online to develop and practice their skill sets would be helpful and would optimize patient care.

I believe that other healthcare institutions would want to share protocols. Perhaps we have one that we think is really good but perhaps we would discover that the protocol used in another institution is a bit better. Any one site may not have not have the resources to do a study in perfusion on the pancreas for example, but through this type of exchange, various institutions who all share the same needs, could communicate and coordinate to work together on multisite research projects where each site contributes

a certain number of patient studies. This would be possible if TOSHIBA could help link different sites to share information and ideas on common projects. I would say that is also a way of helping with product development and would be the ideal next step for a company such as TOSHIBA with a growing installed base of advanced CT scanners. Building the communications capabilities between these sites is important to increasing knowledge sharing and would bring tremendous advantages to patient care. To prove this point, TOSHIBA recently facilitated our MSK radiologist to work with Prof. Blum in Nancy, France. This was a fruitful educational opportunity, for both radiologists.

Do you have any final recommendations or comments?

The ViSION CT is almost 100% perfect in terms of satisfaction. The VISION has everything we had expected to receive and more. It has been a fantastic experience for our team. The scanner has been excellent and the radiologists are very happy and excited. I am looking forward to having the capacity to move the patient in and out of the gantry aperture myself as opposed to relying on the technologist, when conducting CT fluoroscopy; which I understand is being developed by TOSHIBA. We offer a residency program and we are also using this scanner for research projects. It is a real benefit from an educational point of view. It is important for our residents to train on the most modern equipment and they enjoy working with this system very much. It makes them feel they are in a program that is modern and up to date. For us to be able to say that we are the first university center in Canada with a clinically functioning ViSION CT means a lot. From a residency perspective as a university center, we are extremely proud to say that we have two ViSION CT units, one at each hospital site, Health Sciences Centre General Hospital and St. Clare's Mercy Hospital.

We had no issues at all with the installation. You would never have known that we were installing a CT. The contractor was fantastic. The work was completed on time, without any unexpected issues to cause delays. We did not have a backup CT available at the St Clare's Mercy site so TOSHIBA facilitated the rental of a portable CT. That proved to be a big help as the St. Clare's Mercy Hospital site was undergoing a month of renovations and this allowed us to continue to scan during the renovation period.

In conclusion our overall experience with TOSHIBA has been excellent in every respect, and in some ways, exceeding expectations.

Dr. Bhatia,
Thank you for this Interview.

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