CASE STUDY:

HeartPlace

Using the Toshiba Infinix-i X-ray Systems and Next Generation AIP Technology to Increase Cath Lab Efficiencies in Interventional Cardiology

SITUATION:

Increasing diagnostic efficiencies and the speed in which patients are diagnosed is paramount in improving patient care. With the American College of Cardiology and American Heart Association setting new national standards for "door-to-balloon time" procedures (also called ST segment elevation myocardial infarction or STEMI) to be completed within 90 minutes of the patient entering the hospital, leading interventional cardiologist Vinit Lal, M.D., wanted to improve cath lab efficiencies to meet and exceed these standards everywhere he practiced.

As a member of HeartPlace, a group of cardiologists in the greater Dallas metropolitan area, Dr. Lal required a cardiovascular X-ray system that would allow him to reduce door-to-balloon time by decreasing time for patient setup and loading, as well as offering him better access to the patient on the table during procedures.

SOLUTION:

To facilitate cath lab efficiencies and achieve the STEMI program goal, Dr. Lal utilized two different Infinix™-i systems to handle the schedule and urgent cardiac caseload, the Infinix CF-i/SP and Infinix DP-i. The Infinix CF-i/SP also features the Next Generation Advanced Image Processing (AIP) technology, which improves resolution and visualization for interventional procedures.

BENEFITS:

- **Infinix System's Flexible C-arm:** The flexibility of the C-arm positioning provides unprecedented access to the patient, ancillary equipment and fellow clinicians as well as accommodates easy access in urgent situations regardless of femoral and transradial approach.
- **Patient-Friendly Features:** The Infinix systems are designed with an enduring focus on improving patient safety, and help reduce contrast and radiation dose.
- **Next Generation AIP:** The technology provides improved visualization of the coronary arteries and enhances device guidance and deployment, allowing for safer and faster exams.

When it comes to interventional cardiology, increasing diagnostic confidence and reducing exam time are paramount to improving overall patient care. With the American College of Cardiology and American Heart Association setting new national standards for "door-to-balloon time" procedures (also called ST segment elevation myocardial infarction or STEMI) to be completed within 90 minutes of the patient entering the hospital, leading interventional cardiologist Vinit Lal, M.D., wanted to improve cath lab efficiencies to meet and exceed these standards everywhere he practiced.

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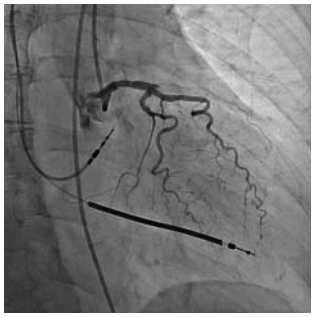
Improving Efficiencies with the Infinix-i Cardiovascular X-ray Systems

To facilitate efficiencies and meet the STEMI program goals, Dr. Lal utilized two Toshiba America Medical Systems Infinix-i cardiovascular X-ray systems to reduce procedure time. The two systems, the Infinix™ CF-i/SP and the Infinix™ DP-i, offer a unique C-arm design to improve productivity through faster setup and patient loading time. The Infinix design also reduces overall exam time by giving physicians unprecedented access to the patient.



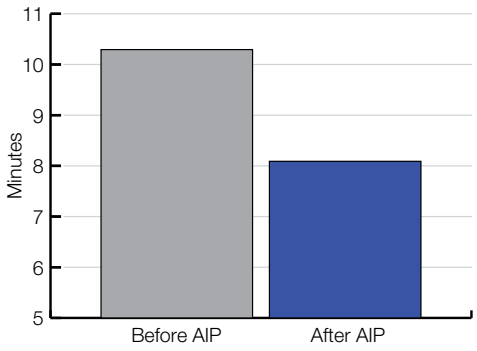
Left coronary injection with multiple stents that are visible in this totally occluded left anterior descending artery.

The Infinix CF-i/SP features the innovative 5-axis floor mounted positioner and cardiac flat panel detector. This system is equipped with numerous mechanical design features to improve cath lab efficiencies, including an easy-to-adjust C-arm for quick loading and unloading. The flexibility of the 270-degree C-arm positioning provides unprecedented access to the patient, ancillary equipment and fellow clinicians. It accommodates easy access, regardless of the approach needed, which is particularly helpful for urgent cases.

"The ability to quickly move the C-arm in and out of the way facilitates quick loading of the patient," says Dr. Lal. "Once the patient is in place, the C-arm is immediately moved back into the desired position to begin the case. This system has saved time by enabling us to start catheterization sooner and reduce overall setup and procedure time." (Figure 1)

The Infinix DP-i, which has two independent C-arms and two different-sized flat panel detectors (FPDs), provides the ability to perform cardiac or vascular procedures on the same patient in the same room. One C-arm with an 8x8 FPD imaging chain is optimized

FIGURE 1.
Average Procedure Setup Time Reduced by 20 percent



for cardiac work, while the other C-arm with a 12x16 FPD imaging chain is optimized for peripheral work outside the heart, such as carotids, renals and legs.

The patient-friendly design of the Infinix CF-i/SP system with 5-axis positioner provides clinical benefits. For example, it is common to insert the catheter through the femoral artery and at times, this access is blocked. The 5-axis system with its liberal C-arm rotation and transverse travel can easily be positioned for a transradial or brachial access (pictured below).

"There have been times when switching from femoral to radial access is necessary and within minutes, we have reconfigured the system components to accommodate the transradial approach," states Dr. Lal. "This flexibility enables more comfortable ergonomic positions for physicians while also keeping the patient comfortable."

The Infinix CF-i/SP features the innovative 5-axis floor mounted positioner and is equipped with numerous mechanical design features to improve cath lab efficiencies, including an easy-to-adjust C-arm.

Increased Visualizations with Next Generation Advanced Image Processing (AIP)

While addressing the STEMI requirements, another national trend was growing that the HeartPlace cardiologists and Dr. Lal needed to address. This involved the immediate treatment of patients following diagnosis, meaning that more cases are performed using percutaneous cardiac intervention (PCI). Anticipating this trend, Toshiba developed Next Generation Advanced Image Processing (AIP) technology to support interventionalists during procedures while utilizing fluoroscopic and fluorographic imaging. This AIP imaging innovation was a combination of proprietary hardware and software working in concert with the image chain to optimize image quality. The Infinix CF-i/SP system was then upgraded to include this new technology.

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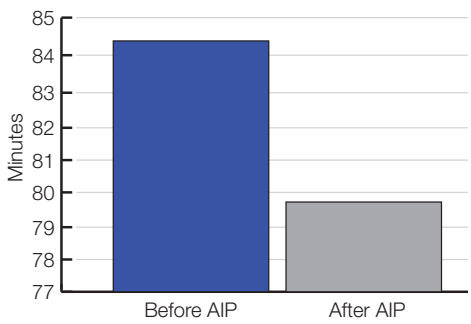
>
> — Dr. Vinit Lal
> Cardiologist and Member of HeartPlace

Toshiba's AIP feature improves patient care by increasing the quality, sharpness and image contrast during interventional procedures. This proprietary technology has virtually eliminated image lag, benefiting clinicians while guiding and deploying devices during fluoroscopy. Next Generation AIP further increases image clarity during interventional procedures, creating a safer, more time-efficient exam for the patient by reducing the possibility of having to re-image the patient.

"Next Generation AIP greatly improves coronary artery visualization and the ability to identify disease," says Dr. Lal. "The greater image detail on all patient types has improved diagnostic confidence and treatment planning, resulting in more accurate device selection and placement. Additionally, Next Generation AIP has improved our department's efficiency."

FIGURE 2.
Total Procedure Time Reduced by 5 percent



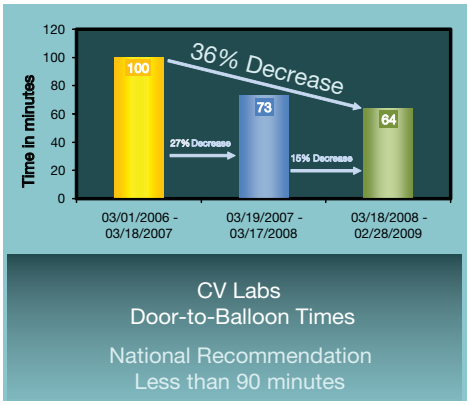
Dr. Lal's utilization of Next Generation AIP technology led directly to a reduction in room time. This results in shorter exams and increased patient safety and throughput. (Figure 2)

Benefits of the Infinix-i Systems and Next Generation AIP

The Infinix-i systems in conjunction with Next Generation AIP directly led to an improvement in Dr. Lal's cath lab efficiency. Before-and-after data from more than 500 cases was analyzed. Numerical results show a reduction in the average amount of fluoroscopy time during procedures and a reduction in the amount of average contrast used on patients.

"The Toshiba Infinix-i systems and Next Generation AIP technology have proved to reduce exam time, procedure setup and the contrast and radiation dose a patient receives," says Dr. Lal. "Additionally, the reduced exam times have improved the utilization of our staff members and increased patient safety."

The Infinix-i systems and Next Generation AIP technology have clearly enhanced Dr. Lal's operation and helped him achieve the STEMI goals. The entire line of Infinix-i systems share common characteristics that will improve interventional cath lab efficiencies.



A combination of the Infinix-i systems, Next Generation AIP technology and physicians led to lower door-to-balloon times. Dr. Lal started using the Infinix-i systems in January 2007 and AIP in September 2008.

Figures are based on data retrieved from the Hemodynamic system database, comparing over 500 cases of all diagnostic and interventional cases from the nine-month periods before and after the AIP upgrade was installed on the Infinix CF-i. Data on file.

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