



Pediatric EP and Interventional Cardiology

Young patients benefit from a close collaboration

Who/where

The Children's Hospital at Legacy Emanuel Medical Center
Portland, Oregon
USA

Challenge

Assure high quality imaging for children during electrophysiology and interventional cardiology procedures

Solution

Share time on a Philips Allura Xper FD10/10 X-ray system with dual detector and dose reduction technologies

Philips Allura Xper FD10/10 biplane X-ray system delivers the flexibility, and quality required to treat complex heart ailments.

Cath Lab Room One at The Children's Hospital at Legacy Emanuel is where pediatric electrophysiologist Dr. Marc LeGras does all his work. Equipped with a Philips Allura Xper FD10/10 biplane X-ray system, the lab offers advanced tools for electrophysiology (EP) procedures.

"I use biplane imagery on every case," says LeGras. "For me, it's a lot quicker, a lot safer and requires a lot less fluoro time. It's best for my young patients."

Dr. LeGras shares the system with his colleague and pediatric interventional cardiologist, Dr. James Kyser. "I do 99 percent of my cases in Room One," says Kyser. "It's actually the default pediatric lab for both electrophysiology and interventional cardiology, all because of its bi-plane setup."

This versatile system allows LeGras and Kyser to carry out some of the most challenging pediatric cardiology procedures with increased confidence.

"We chose the Philips system," LeGras recalls, "because we thought it was the best available for pediatric work in terms of image quality and product reliability – that's a big deal."

High quality, low X-ray dose for EP work

The Children's Hospital's pediatric cardiology program is the largest in the state of Oregon, with EP volume accounting for approximately 48 cases per year. Dr. LeGras specializes in interventional EP procedures such as EP Studies, ablations, and pacemaker and defibrillator implants.



Marc LeGras, MD



James Kyser, MD



“We take the team approach when it comes to congenital heart patients because you need the skills of both an interventionalist and electrophysiologist.”

Dr. Marc LeGras

As he describes it, “Most of the pediatric EP work I perform is elective and most of it is for SVT. I offer the option to electively go ahead with an ablation when kids are around four years old. I use a weight of about 35 to 40 pounds as a cut-off. Most parents take that option, especially if they have a child who’s had an arrhythmia since birth.”

The advanced flat detectors on the Allura Xper FD10/10 provide Dr. LeGras with exceptional image quality at a low patient X-ray dose. “The image quality of the bi-plane detectors is excellent,” comments LeGras. “They provide good delineation of the anatomy and that’s the biggest advantage in my mind. It saves procedure time and fluoro time to be able to switch from one image to the other. It really helps me quickly understand where my anterior and posterior positions are and where I am in the heart.”

The Allura Xper FD10/10 is specifically designed for superb imaging in procedures where contrast and X-ray dose are important considerations. Physicians will find:

- Exceptional visualization of heart anatomy
- Easy to understand dose readings and dedicated pediatric X-ray dose settings
- High performance for pediatric cardiology and electrophysiology procedures
- An Automatic Position Controller that places the heart of the patient into the iso-center of the X-ray system automatically to save time and reduce X-ray dose

Special EP X-ray dose settings on the Allura FD10/10 can reduce X-ray radiation exposure for staff and patients by up to 80 percent* and Dr. LeGras is careful to set his system to perform optimally. “I’m very particular and meticulous about the fluoro times, the dose exposure and the collimation. I really want to maintain the absolute minimum radiation exposure necessary. The Philips system works well with the different dosing approaches. We use an EP setting for the lowest dose of radiation while still maintaining good image quality.”

Acquisition frame rates (images per second) in standard configuration can be set as low as 3.75 fps on the Philips Allura Xper systems.

Two views key in interventional cardiology

Dr. Kyser finds that children’s hearts can come with many complex defects, so his procedures range from potential life saving ones where he may close a hole in the heart, to instances where he opens up a blocked valve, places a stent and more. “It’s a little bit of everything,” he says.

Visualizing catheter and lead positions from two directions has very real benefits, as Dr. Kyser explains, “When we’re dealing with congenital heart disease we’re really dealing with true three-dimensional problems and we need to see the anatomy in two dimensions. The Philips biplane system is extremely important because it cuts down on the fluoro time, it cuts down on the contrast used and it also cuts down on the number of cine-angiograms necessary.”

“By using a bi-plane detector system,” adds Radiologic Technologist Mike Gomez, “we can image the same vessel in two different planes with just one injection. The doctor can then review both images simultaneously.”



Real-time dose awareness. This indicates skin dose rate, accumulated skin dose by body region, and the safe working time remaining in any given projection.

Although primarily a pediatric cardiologist, Dr. Kyser will perform procedures on patients as small as 1.4 kg (3.1 lbs) all the way up to 200 kg (440 lbs). He is impressed with the Allura Xper FD10/10’s ability to handle most patient types. “The Philips system is really one of the only systems which can accommodate those extremes in patient size and still keep the radiation dose to a minimum.”

“We actually have presets for the weight of a patient,” says Gomez. “So, when we set it up, automatic features come into play to help control dose.” It is Philips DoseWise dose reduction technologies that are active at every level of the Allura system – from SpectraBeam filtration and pulsed fluoroscopy to a clear dose reading display and more.

* “Dose reduction in Electrophysiology Fluoroscopy” Davie, Kengyelics, Cowen, Moor, Pepper and Cowan. Leeds X-ray Imaging Research 2004

Dr. John Iguidbashian, surgeon and Medical Director, Children's Heart Program at The Children's Hospital at Legacy Emanuel confers with parents before their daughter's surgery.



Collaborative procedures offer particular benefit

In perhaps the most effective use of the Allura Xper FD10/10 system, Drs. LeGras and Kyser combine their efforts during a single procedure when treating patients with congenital heart disease. "There is a lot of opportunity for us to collaborate in the same room, with the same patient, using the same equipment," says Kyser.

Dr. LeGras explains that children with congenital heart disease can present with a myriad of issues. They may suffer from:

- Limited venous access due to many previous procedures
- Physical anatomy that makes it difficult to map certain chambers
- Mechanical valves that pose major navigational challenges
- Reduced cardiac function

"Kids who have both arrhythmia and congenital heart disease," says LeGras, "have anatomy that is often complex. Even something seemingly simple such

as access to the heart can be challenging. So I often end up requesting assistance from my interventional colleague, Dr. Kyser. We'll work as a tag-team. For instance we'll do a combined procedure, he'll do a cardiac cath and then I'll follow with an EP study and ablation."

Dr. Kyser adds, "For kids who come with a history of dysrhythmia, it's important to sort out if it's a primary dysrhythmia or if it's secondary to something like a cardiomyopathy or post-infectious myocarditis. So I'll go in and do a regular heart cath and get all the information and pictures and take some biopsy specimens and then Dr. LeGras will come by and do his EP work."

This collaboration can manifest itself in many ways.

- Dr. Kyser will stent an obstructed superior vena cava so Dr. LeGras can place a pacemaker
- Dr. Kyser will close an atrial septal defect, fenestration or baffle leak before Dr. LeGras implants a defibrillator

Both doctors know how critical quality imaging is in these cases because the anatomy is not straightforward. Improved detail allows them to gain a clearer understand of what they're dealing with, how to navigate through or around it and how to plan treatment accordingly. It makes the collaborative process more effective and the procedure more likely to succeed.

"We never did any of these tag-team cases before the biplane was installed," says Kyser. "Whenever there is a question if the child might need a cath, we team up together to decrease on the anesthetic, the procedure time and radiation dose."

Suited for a quick change

Room One's imaging equipment is designed to be very flexible and functional, making it easy to switch from one type of exam to the next. "There are not a lot of radiographic adjustments that we have to make other than press a button to choose a different frame rate," Gomez points out.



“The room change over is very smooth,” he continues. “The patient will typically be intubated so it’s a stable situation. Dr. LeGras walks out, Dr. Kyser walks in, or vice versa. We don’t have to move the patient. Everything is set up exactly how we’re going to use it for both exams.”

Dr. Kyser describes a typical situation, “We had a case where a teenager had a congenital heart defect, an ASD and also SVT. So, Dr. LeGras did an ablation and I went behind him and I closed the hole in the child’s heart. There is a very short change over time between the two specialties – it only takes about five minutes.”

The motorized floor mounted C-arm provides each team with excellent patient accessibility from all sides. Philips’ unique ceiling-mounted, double C-arc can be independently rotated and angulated to provide a full range of projections. The compact flat detectors and design of the ceiling mount creates maximum floor space and superb access for the interventional team.

In addition, says Gomez, “The ceiling mounted monitor boom is easily manipulated in any direction across the room. You can move the monitors up and down and side to side. Dr. LeGras likes it in a certain position – Dr. Kyser likes it in another.”

“It probably saves us 45 minutes to an hour if we do both exams together as opposed to separately,” he concludes.

Ready for tomorrow

For electrophysiology and interventional cardiology work at The Children’s Hospital at Legacy Emanuel, the Philips Allura Xper FD10/10 X-ray system covers all the bases. The system’s high resolution image quality (a true 1024 x 1024 in biplane mode) and DoseWise dose reduction technologies will continue to support Drs. LeGras and Kyser into the future.

Dr. Kyser agrees, “The Allura has a very wide range of ability. It can take care of all my complex cardiology cases from the littlest babies to adults, while at the same time handling all the EP cases that come our way.”

“We’re building a new children’s hospital,” he reveals, “and one of the directions we’d like to go is to create a hybrid type of lab where it will work like a functioning operating room for our surgeons as well as be fully outfitted as a cath lab/EP room for interventionalists and electrophysiologists.”

Technology and workflow innovations from Philips can help The Children’s Hospital at Legacy Emanuel meet current and future needs for EP, surgery and hybrid procedures.



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