



EP Lab Spotlight PeaceHealth St. Joseph Medical Center

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When was the EP program started at your institution? By whom?

Bellingham is a remarkably beautiful coastal city in extreme northwest Washington State. In the early 1980s it had achieved status as a small city worthy of dedicated cardiology support, and North Cascade Cardiology (NCC) was born at that time. As the practice grew concurrently with advances in cardiovascular technology, the need for cardiology subspecialists grew. In the early 2000s, biventricular pacing systems were implanted by one of our cardiologists who had done a year of EP training during an interventional cardiology fellowship.

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Cover Story

Managing a High-Volume Lead Extraction and Management Program

Interview by Jodie Elrod

In this interview, we speak with Robert C. Canby, MD, and Amin Al-Ahmad, MD, about the lead extraction and management program at St. David's Medical Center in Austin, Texas.

Can you give us an overview of the lead management and extraction program at St. David's Medical Center?

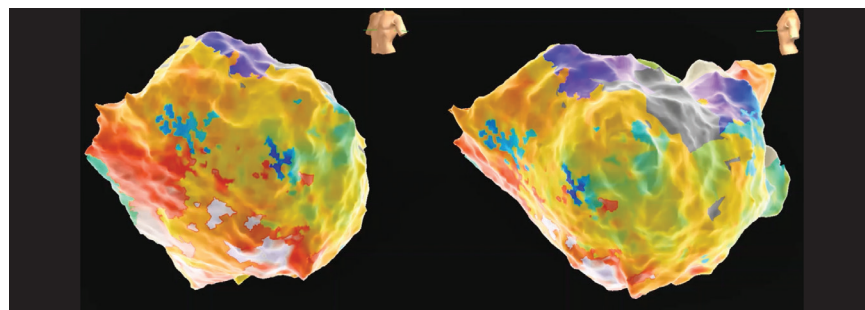
Canby: The lead management program at St. David's was created around 2007. As a high-volume EP practice, lead management issues were becoming an increasing part of the responsibilities of electrophysiologists. With all of the devices that we manage, it became clear that meant chronically implanted leads were going to become a bigger issue for all of us. We made the conscious decision at the time to start a lead extraction and management program, and it took off from there.

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Cover Story

Optimal Ablation Techniques for Ventricular Tachycardia Management: Functional Substrate Mapping With the Sense Protocol

Jason Collinson, BS¹; Joe Shipton, BS¹; Neil T. Srinivasan, MBChB, PhD^{1,2}



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Managing a High-Volume Lead Extraction and Management Program

Interview by Jodie Elrod

Canby: When setting up a lead extraction/lead management program, it's important to first meet with the "key players" such as lab staff, hospital administration, and surgical services before getting started to make sure you understand how the pieces fit together and how it can be a collaborative effort. Issues happen when there isn't a good relationship with the cardiac surgeons and you don't have surgical backup, or there isn't a good relationship with the hospital and they don't understand your equipment needs, supply needs, and clinical needs.

So that is where we started — we set up a collaborative discussion, figured out how we were going to work with the surgeons, and ensured hospital buy-in. We initially started the program using patients within our practice. Then, as we developed some expertise, we reached out to other regional practices that managed devices and offered to help them with lead management.

Al-Ahmad: I had been doing lead extraction since about 2003, and joined the practice here in 2013. When I came to St. David's, I was really impressed — the scheduling was straightforward, the relationship with the surgeons was good, and we were able to get cases done in a very quick and timely manner.

Describe the components of your lead extraction heart team.

Canby: The first component of the team is the electrophysiologist. Having another expert physician provide a second set of eyes is helpful when approaching complicated cases. The second aspect is having lab and hospital staff that are fully invested in understanding what we're doing in these procedures and what our needs are, what the potential complications are, and how to work together to quickly help resolve a potential crisis.

The third component of the heart team is the surgical staff. During the active phase of removing a lead, we'll generally have a cardiothoracic surgeon available in the room or closely nearby, so that if we get into a potential issue, they could be in the room within a short period of time and help us determine the next step. In addition to the cardiothoracic surgeon, we ensure the OR team is available, so that if we have to go on bypass or pump, they can step in right away with the surgeon, because there is a limited amount of time to deal with those issues.

Finally, the other important factor is having quality anesthesia staff. In the vast majority of cases, we have a cardiovascular anesthesiologist who helps place the transesophageal echo probe, looks for pericardial and pleural effusions that might develop, monitors the patient's vitals, and manages relative hypotension. Part of the indication that something is going wrong can be transient hypotension during the case, and so communication with the anesthesiologist is important.

Al-Ahmad: Over the years we have developed very good lab staff who have the expertise and know what is needed and how to provide support. That has been critical, in addition to having all the ancillary aspects in place.

How many procedure rooms or hybrid operating suites are there?

Canby: In our program, we have 6 EP labs and a shell for the seventh. All of them are hybrid capable. We use the largest room for most of the extraction cases, and it's better suited for procedures such as

As a high-volume center, we see many different types of leads, and they all behave differently, they're made differently, and their structural characteristics are different.

extraction because of the positioning of the fluoroscopic unit and the size of the room. We're very lucky in that we have a very nice suite of labs for EP.

Tell us about your scheduling and annual volume.

Canby: We work with the surgical support teams for scheduling. Our surgeons prefer that extractions are scheduled as the first cases of the day. We will generally set up 2-3 extraction cases on those days. Our goal is to work through cases as efficiently as possible so that we can release the surgeon at a reasonable time. In terms of volume, I would estimate that we have been doing between 200-300 extractions per year since 2007. I've personally been involved in around 3,500 cases. I think that is a pretty good volume over a multi-year period of time. From a procedural standpoint, high-volume programs generally have a lower complication rate and tend to do much better from an outcome standpoint than low-volume programs.

What are some of the key challenges that exist today in lead management and extraction?

Al-Ahmad: Lead extraction is still a bit of a moving target in terms of some of the Class II indications; for example, in patients with multiple leads, do you take them out or not? Different patients have different needs, and these are all



Figure 1. St. David's TCA Laser Lead Extraction team. Julio Casas, CVT; Martin Santibanez, CVT; Brandon Doyle, CVT; Carlos Monreal, RCES; Dr. Robert Canby; Lauren Ferrante, RN; Jenny Camp, RN. Not pictured: Dr. Amin Al-Ahmad.

important discussions to have with patients in terms of risks and benefits. I think in general it has evolved in the last 10 years, and I think it will continue to evolve as leads and extractions change. So that continual evolution and where we end up is one of the main challenges I see. The other challenge is that there are still some older leads out there that were put into young people, so when they present for extraction, those are definitely challenging cases. Our solution to that has often been 2 physicians with experience performing the procedure. However, I think those cases are going to keep coming up over time. There are also the healthcare economics, in terms of paying and making sure that the surgeons are on board, and that is a big challenge at a lot of centers.

Canby: You're absolutely right. As a high-volume center, we see many different types of leads, and they all behave differently, they're made differently, and their structural characteristics are different. The techniques used for extraction depend on the lead that has to be removed. One of the advantages of a high-volume center is that you become really experienced taking out all those types of older leads. In addition, when you get older leads in which there is less collective experience, having another experienced operator during the case is critically important. All the other issues that you talked about are true as well. Keeping the surgeons on board is important, and fortunately, we've been very successful here. The hospital supports the surgeons from a contractual side, so that help is available for these cases in a way that works for everyone.

Tell us more about your lead extraction technique and how it has evolved.

Canby: What has changed is the evolution of the tools. The primary tools for us are laser extraction. There are mechanical tools available as well. In our practice, we're also getting more facile with our ability to snare and snag leads from below and help stabilize them, as well as use a joint approach to capture the lead, perhaps coming up from a femoral vein. We're still using the other techniques to extract from above and work in tandem to take out some of the more difficult leads under those circumstances.

What is your approach to pre-op testing, assessment, and pre-procedural planning?

Canby: For pre-procedural testing, we want to make sure we have the best information available. This includes determining the type of leads that are available, evaluating if the patient has any specific anatomical issues, and reviewing the patient's echos and other imaging modalities. At minimum, a chest x-ray is important to determine that the information is accurate. In general, we're very quick to get a fluoroscopic picture pre-procedure to make sure everything is consistent with what

we know. We also obtain some venograms to make sure we understand what access issues we have to deal with. We'll use a T-probe to again confirm there are no surprises before we start the case. We then move straight into extraction.

Al-Ahmad: I agree. I believe there are some centers that have promoted the idea of routine CAT scans. We have not really adopted that — we have not found it to be as useful. We've been able to do high-volume lead extractions without that information. The other imaging modality some people use is thoracoscopy for high-risk leads. We have not tended to use that either; it takes a little bit more involvement from the surgeons. We will use intracardiac echo for intra-procedural imaging during some occasions, particularly if there are any issues with getting a TEE, but that sometimes requires another pair of hands. So in general, we use all available technologies, but we're not routinely doing pre-op CT because we have not seen the value in our cases.

Can you talk about your involvement with clinical research?

Al-Ahmad: This is one of the areas that we're developing as the program continues to grow. The two areas we're really trying to expand upon are clinical research and teaching. On the teaching side, we've performed some live and recorded cases that can be viewed through the Philips platform. We also perform live cases for conferences such as EP Live. We have the advantage in our lab that every single case has the potential to be archived, and so we have a library of fluoroscopic images and cases. We're trying to leverage that ability to be more involved with teaching and mentoring other centers as they go forward with their lead extraction program. In terms of clinical research, we've been discussing the possibility of setting up a database to allow us to analyze our data, including patient outcomes and when patients are discharged.

Canby: The other thing we are working on with Philips is that we have become a proctoring center for them when they need to bring in physicians for live cases. In the last year, traveling was somewhat limited due to COVID, but moving forward, the plan is for physicians to come in to see live cases several times a year. During those visits, they will be able to interact with us as we do those cases and learn new techniques as well.

What are the benefits of high-volume lead extraction program? What sets your program apart?

What sets us apart is the very high volume associated with this program. We have been one of the largest volume programs in the country for the last 10 years.

Canby: I think what sets us apart is the very high volume associated with this program. We have been one of the largest volume programs in the country for the last 10 years. In addition, we've had very good patient outcomes. Out of probably 4,000 cases performed at St. David's Medical Center, I think we've gone to the OR maybe 5 or 6 times. The statistics suggest this should be more like 3 per thousand on average.

Al-Ahmad: I agree, we have the advantage of experience because of our high volume. That is a big thing that sets us apart. The more you see, the more you're able to handle some of the more complex lead issues. We are also able to use technology such as Micra (Medtronic), for example, as a substitute for pacing in cases where there is no availability. We also use venoplasty techniques on occasion. So we really have the full skill set necessary for lead management.

What do you see as the potential future of the lead management/extraction program at St. David's Medical Center?

Al-Ahmad: The next step is having a robust database that allows us to publish and evaluate whether we can test different strategies in terms of patient management. We also plan to share our experiences with others across the world, whether it's digital or otherwise.

Canby: Yes, we would very much like to share what we've learned with other programs. We're setting ourselves up to be in that position. We'll also continue to interact with other programs that are trying to start a lead extraction program. We have a good relationship with our hospital facilities within HCA Healthcare, and hope to work with the other 186 hospitals within the HCA network and be a resource for them. As new techniques become available, we'll also be helping to validate them and be available for industry to help advance the cause. ■

Disclosures: Dr. Al-Ahmad and Dr. Canby report a grant/honorarium from Philips for a lead extraction educational symposium. Outside the submitted work, Dr. Al-Ahmad and Dr. Canby report honorarium from Abbott, Boston Scientific, Medtronic, and Philips.