

## **Electrophysiology Experiences by Dr. David Cho, M.D., M.B.A., Class of 2018 May to June 2017.**

Hi all,

I've been at the Second Affiliated Hospital in Hangzhou now for a week, and as the first EP-bound fellow to rotate through here, I thought I'd share some of my thoughts/observations. It's a little long, so read along if interested. Some things are very different, and some things are the same. But overall, like the coronary guys/girls, they do more with less.

Interestingly, cardiologists in China specialize by intervention performed (non-invasive TEE, devices, ablation, coronaries, structural) and not by disease (cardiomyopathy/HF, EP, interventional, imaging, etc).

### **Case Load and Equipment**

There are three rooms available for procedures, two of which are reserved for ablations. The third alternates between device implantation and coronary angiograms/PCI. There is a Biosense Webster Carto 3 room with stereotaxis available, and an Abbott/St. Jude NAVX room. The satellite hospital uses the Carto 3 system as well.

The following are rough estimates of their annual volume:

- 500 SVT cases annually
- 500 Afib ablation cases annually
- 50 VT cases annually. Mostly endocardial but one doc here does epicardium VT cases. Dr. Tung came here before and did a few cases.
- Over 300 watchman procedures performed.
- 600 implants (all types) annually (Dr. Boyle came as a visiting professor and trained students and faculty - they love him here)
- 100 icd and CRTs

Because patients usually pay about 50 percent of cost of procedure (except for AFib which is covered 80%ish), the EP docs are mindful about the cost to the patient.

As a result, I've rarely seen more than two catheters used for any given ablation. Definitely no more than 3. Usually they will use their made-in-China CS catheter for EGMs, and an ablation catheter for electroanatomic mapping as well as manual movement of the catheter to various points to record and stim as needed. (I.e moving it to the His or V or HRA to record and then back to area of interest for ablation).

They have both cryoablation and RFA available.

Patients here have insurance, with varying scales of coverage. But for the types of patients they serve, including the rural farmers, procedures are usually partially covered by insurance. Implant devices are much pricier. Insurance will typically cover up to 30,000 RMB of a device (roughly \$4,200). However, the cost of an ICD is typically 100,000 RMB (~\$14,300) and CRT is 130,000 RMB (~\$18,500). Thus, many poor patients who would otherwise need an ICD usually cannot

afford to get one. The docs here suspect SCD rates are probably higher in China as a result.

### **Case Diversity**

I have seen a diverse mix of cases so far. It's been lighter volume because the summertime is when a lot of people are doing their work in their villages/towns. Once the farming season ends, the volume picks up considerably in the winter.

I've seen atrial flutter, atrial tachycardia, and afib ablations. I have seen 4 accessory pathway ablations, a CRT implantation, and a couple of PVC ablations. Coolest case so far was typical slow-fast AVNRT that after slow pathway modification/ablation unmasked another, slower SVT that was consistent with right free wall accessory pathway. There was no pre-excitation on baseline ECG.

Interestingly, for all left lateral accessory pathways, they start with a retrograde approach from the femoral artery into the LV to the mitral annulus, rather than go transeptally.

I've also ventured into the structural realm and seen a few Watchman devices, and percutaneous ASD/VSD closures.

Lastly, I've also done a just a couple of coronary cases too, particularly when the EP guys are in clinic or when they took off early one day for their ACC equivalent conference in Shanghai.

### **Hands-On/Personal Experience**

I've been attached mostly to Dr. Fan, who speaks the most English along with Dr. Jiang (not the coronary Dr. Jiang). Unlike the interventional-bound fellows, my experience with hands on time has been more limited. I can't tell if much of the earlier stuff (I.e access, bringing up the CS catheter) is done by the EP fellow since the attending does pretty much everything else, or if because I'm Asian, that I'm experiencing a more traditional role of fellows here and doing more observation. With device implantations, the attendings do the entire case. Half of the time people don't know I'm from UCLA and think I'm a visiting fellow from Korea. I've had to proactively ask to do more, and have been able to map and make a few ablation lesions, and one doc let me do the full ASD closure case. So that's been fun. I'm hoping to get some transeptal time and more ablation catheter manipulation later this week. It's really challenging to pay attention to catheter movement and watch the EGMs at the same time.

### Technique Observations

They access the femoral vein very low here. Like a good 3cm below the groin crease into the upper thigh area. People are thinner here so I realize the inguinal ligament and groin crease are probably closer together than your average American. But still, it's so low!

Transeptal puncture is done strictly with fluoro. No ICE available due to cost. They bring the sheath and introducer into the SVC and pull back into the fossa ovalis. Then they move fluoro to RAO 45, check to make sure it's properly positioned, and then poke through with the needle. No LAO to confirm facing leftwards. No ACT rechecked after initial heparin Bolus, during ablation, or before sheaths are pulled.

Because they use fewer catheters, they rely heavily on activation mapping. Also because they use fewer catheters and have high number of cases daily, they do not appear to be as thorough in confirming 100 percent that the arrhythmia they are seeing is in fact what they think is most likely occurring. For example, when we did the left lateral accessory ablation, I didn't see them try to entrain the tachyarrhythmia, give early PVCs to see if the A was advanced, stim near the ablation site from the ablation catheter on the atrial side to look for pre-excitation on the ECG, check post-pacing intervals before ablating, etc. They know the maneuvers, because I asked them to do it for my learning, but they hadn't planned to do it. Instead they looked at the activation pattern on the CS was distal to proximal (left to right), and began activation mapping, and burned where it was earliest and red on the map. For SVT ablations including atypical flutter, this seems to be the general theme - look at CS EGM activation sequence. Then map with the ablation catheter where one thinks it is originating from, determine if focal or macro-reentrant with activation mapping, and ablate. Once done, see if able to induce arrhythmia. If not, end case.

### Closing Thoughts

Overall, I'm learning a ton. I'm not sure if by removing a lot of the EGM stimulation and pacing maneuvers, it makes it easier to understand how to localize the arrhythmia...or if by omission I'm missing a lot of the nuances that helps make more sense of the cases and easier to digest. I'm sure it's somewhere in between the two.

I'd recommend this rotation as at least a one-time experience to see how differently cases are done than at UCLA. But with the language barrier making it hard sometimes to fully understand the minute details, I think that either late second year with EP lab time immediately beforehand, or third year would be the best time to come. If one stays longer, they will give more hands on time for sure. I wouldn't expect to get any device time here, either. Best time to come would probably be in January or February, when the the EP fellow for the prior year would be finishing up.

I'm happy to answer any questions if they come up.

Best,

Dave