

Colorful Doppler echocardiographic opera in Toronto:

A clinical and research experience at The SickKids Hospital

For a Scandinavian, the amount of paper work required for clinical and research work in Canada is unimaginable. Having repeated chest x-rays taken a month apart from each other, I stopped asking questions and just ran from one office to another and filled up hundreds of different forms. After six months of extensive paper work, however, I found myself in a Torontonion human resource office finalizing my temporary medical license in Canada. To be truthful, I later realized that things went very smoothly in my case!

Fetal circulation has always been close to my heart. In order to get exposed to fetal echocardiography I wanted to be located in the Dept. of Pediatric Cardiology at The SickKids Hospital and not in the obstetric unit of Mount Sinai Hospital across the road. Luckily, the research project on intrauterine growth restriction that brought me to The SickKids in the first place to work with the Head of the Fetal Cardiac Program, Edgar Jaeggi, is a joint project of both institutions, and thus, I get also a good exposure on the obstetric care in Mount Sinai Hospital. As regards to research, the paper work is almost as extensive as for getting a medical license. Big dollars are involved in research grants, but, on the other hand, everything here is much more expensive than at home. Although the number of patients is enormous in these big centers, there are many groups that try to recruit the same patient populations and thus, when consenting a pregnant woman, she may tell you that she is already participating in 2- 4 studies and feels that she can't contribute more. Let's hope that our ongoing research projects will be finalized in an appropriate time!

The echocardiographic unit at SickKids is a busy lab with 14 cardiologists and 13 technicians working under the leadership of Dr. Luc Mertens. The Dept. of Pediatric Cardiology covers the care of about 10 million people with about 95 000 annual deliveries and all cardiac surgery required during neonatal period is performed at The SickKids. Thus, with over 1300 third level fetal echocardiograms annually, The Fetal Cardiac Program at The SickKids is a massive program from my Lappish perspective. About a third of the fetal echocardiograms show abnormal findings. Weekly meetings with pediatric cardiac surgeons and cardiac intensivists

for planning the surgical and postnatal care of unborn babies are very beneficial for an obstetrician, and the possibility to follow the echoes after the surgeries and later during childhood further deepens our knowledge on the outcome of various congenital heart defects.

But back to everyday basics! A clinical visit of 1-1.5 hours is allocated for every mother in one of the two fetal echo rooms in the unit. This includes a scan done either by a pediatric cardiologist fellow sub-specializing on echocardiograms or by an echo technician and a structured written report with recommendations concerning the antenatal care, the delivery and the postnatal care. After the scan, the video clips and the report are reviewed and finalized by a staff cardiologist in a separate echo reading room. If further imaging is required, the staff cardiologist may ask the sonographer to rescan the patient and get the information needed, or the cardiologist may take the diagnostic clips himself. This immediate feedback system is very educative; your image quality for making the diagnosis is reviewed and there is instant feedback on how you can technically improve your pictures. After making the diagnosis from the digitally stored video clips, the staff cardiologist counsels the parents in a separate counseling room adjacent to the fetal echo rooms. Depending on the fetal cardiac defect and the nature of the visit, the counseling may last from 15 minutes to one hour. After the counseling a nurse practitioner will go over all the details and tour the units where the postnatal care is organized with the parents.

This kind of a clinical approach is very different from the one we use in our practice. The biggest differences are that 1) everything included in the fetal cardiac diagnosis has to be shown in the stored video clips, 2) the review process with slow motion cine loops and a possibility to rewind and optimize your images in a separate echo reading room guarantees that you can take your time to do the diagnosis, 3) teaching and consultation is possible while all the doctors are working simultaneously in the echo reading room, 4) the clinical visit lasts as long as required to make a full diagnosis and 5) the final diagnostic feedback is immediate while the cardiac catheterizations and surgeries are performed in the same institution. While some of the staff cardiologists have also specialized in radiology, fetal cardiac MRI is also an option to further clarify the clinical diagnosis in some complex cases. The exciting fetal cardiac MRI research projects on fetal volume blood flows and oxygenation at The SickKids will hopefully also help us obstetricians in the future!

There is no doubt that the most enjoyable experience at The SickKids has been every day clinical teaching. All staff cardiologists including various heads of the department teach the fellows an hour every week. The teaching, totaling up to 7 hours per week takes place outside the busiest office hours, starting either at 7-7.30 am or 5-6 pm. The teaching includes technical aspects related to echoes, case reports, journal clubs, general lectures and pathology. All staff cardiologists lecture and give courses around the world, so there is always plenty of material around. My favorite teaching has been the 3-hour special teaching sessions on Tuesdays, which include an hour lecture on a specific cardiac lesion, followed by pathology rounds. After the lecture, a pediatric cardiac pathologist brings 10-20 autopsied hearts and everyone one of us start to do segmental cardiac diagnoses. Finally, the pathologist comes around and asks us to show how we did our diagnoses. It is very educative to see the cardiac lesions in the autopsied hearts that we try to image with ultrasound in our very hands! More than once during this visit, I have wished to be younger so I would have the chance to do my fellowship again!

The work atmosphere is essential to keep us all going. The fellows at The SickKids know that they have been selected out of very many candidates, and thus they will work enormous hours in the clinic and research labs. The seniors as clinicians in a university based hospital eagerly promote that teaching and research are essential elements to improve the medical care of our patients. I have deeply enjoyed seeing how seamlessly the team work can take place. And it really is always the team that it is all about! I think there is a lesson to be learned for us Scandinavians in this field. Never before have I heard so much positive feedback dressed to words. Of course, it makes me happy to know that 3 of my 30 images are great! In our language (and practice), however, the everyday way to express this would be: 'You took 27 grab pictures and only 10% looked like what they should!' What if we gave a try to this new system in our clinics? I bet we would be surprised!

I will treasure this opportunity to work in a pediatric cardiology unit for a long time and hopefully this experience will benefit our patients up in northern Finland. Heartfelt thanks for the Nordic Federation of Societies of Obstetrics and Gynecology for this opportunity and the support!

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