

Cardiac High Acuity Monitoring Program (CHAMP): An App for Rapid Intervention

CHAMP (Cardiac High Acuity Monitoring Program) is a multi-disciplinary based team that has been designed to meet the needs of the most complex cardiac population with single ventricle heart disease.

The program closely monitors patients with single ventricle heart disease between the critical first and second stages (before stage II Glenn surgery).

The team at the Ward Family Heart Center at Children's Mercy has also developed a tool that makes it easier for families to report their single ventricle child's vital signs from home and provides the hospital team with frequent updates needed to keep these patients well between visits.

Amy Lay, MD, the Director of Inpatient Cardiology at Children's Mercy Kansas City, is here to help you better understand CHAMP.



Featured Speaker:

Amy Lay, MD

Amy S. Lay, MD, is the Director of Inpatient Cardiology at Children's Mercy Kansas City. She is also Medical Director of the Cardiac High Acuity Monitoring Program (CHAMP). Dr. Lay graduated from the University of Missouri-Kansas City School of Medicine and completed her residency and pediatric cardiology fellowship at Cincinnati Children's Hospital Medical Center.

[Learn more about Amy S. Lay, MD](#)

http://www.childrensmercy.org/Clinics_and_Services/Clinics_and_Departments/doc=20113

Transcription:

Dr. Michael Smith (Host): Welcome to *Transformational Pediatrics*. I'm Dr. Michael Smith and our topic is "Cardiac High Acuity Monitoring Program: An App for Rapid Intervention." My guest is Dr. Amy Lay. Dr. Lay is the Director of Inpatient Cardiology at Children's Mercy Kansas City and she is also the Medical Director of the Cardiac High Acuity Monitoring Program. Dr. Lay, welcome to the show.

Dr. Amy Lay (Guest): Thank you.

Dr. Smith: Why don't we just start with – tell us what CHAMP is, the patient that it monitors and what the motivation behind developing this program was.

Dr. Lay: CHAMP is the Cardiac High Acuity Monitoring Program. It was co-created by Don Tucker and Lori Erickson who are two APNs in the heart center in about 2012. It was originally just Lori Erickson seeing patients who are in the inner-stage that have a single ventricle physiology in the inner stages. They are in a very fragile clinical state between their first palliative surgery and their second palliative surgery. That stage typically lasts for about four to six months. In that period of time, initially Lori's

motivation for helping create this program was to decrease morbidity and mortality for that patient population which nationally was quite high. Originally, it was just her seeing patients as an add-on basis in clinic with an attending back-up, if needed. Then, it was developed into a full program that now includes her as the APN coordinator and provider, two physicians, and two RNs, along with nutrition, social work support during, not just the clinic visits, but continuous monitoring seven days a week.

Dr. Smith: So, the CHAMP program is a multi-disciplinary team approach that I know Children's Mercy does for a lot of its programs. But, there is something in addition to that. There is a home monitoring program, like an application. Can you tell us a little bit about that?

Dr. Lay: About a year ago, there was an application created and it's on a tablet that we give families that are in this inner stage period. The way they are introduced to this tablet is, usually, most of these babies are in the hospital for a period of time before they go home. We bring the tablet to them. It is provided by Children's through a grant with a wireless card so the family does not have a cost for this at all. The app is brought to them and the parents are taught by one of application managers, John Apperson, how to use the tablet. What the tablet does is, the parents are able to participate in this fragile child's care at home by entering the data that we need to help predict what is going to come next. Some of the things the parents are asked to do is check their pulse oximetry levels, check their weights daily, enter all of their feeding information, and also take 15 second videos that they are supposed to enter just at baseline and then also when they are concerned. The app collects all this data, sends it to us and we are able to see it. We get a 24-hour tally every morning in our group and then we are able to see it at any interval that we need to. There are also pages set up, meaning that we get paged when there is a red flag. A red flag is a patient's pulse oximeter level is lower or higher than expected; if they've had more than a certain number of emesis in a 24-hour period; if they ever have bloody stools, those are the examples. It directly pages us. So, even if we're not watching, we get paged and we're alerted from the app even before the parents call us, quite often.

Dr. Smith: The app will work independent of the parents in those kind of cases where the app itself will recognize the red flag and page you.

Dr. Lay: Correct.

Dr. Smith: I'm sure that the parents start to learn a lot of that and they can probably call you, too, but the app takes care of that. They don't have to reach out to you.

Dr. Lay: As part of the app teaching, the parents are actually taught these red flags, so the parents know it and the machine knows it. Quite often, what happens is the app pages us as the parents are calling us or paging us. So, we usually get two notifications. But, if it's two in the morning quite often the app will page us even before the parents get a chance.

Dr. Smith: When the parents are first introduced to the tablet and the application, how do they feel about it initially?

Dr. Lay: We've had mixed reviews, initially. Some parents are a little bit overwhelmed by the technology because they are just like, "I would rather use paper and pen" and it just makes more sense to them. But, most of them have a very nice reaction to "Oh, this is an electronic device. I know how to

use electronic devices. This keeps it easy. It keeps it simple and I can keep this tablet with me anywhere I go and just quickly enter data." What they like is, they know we know right away; that they don't have to wait for a piece of paper the next morning that they email to us or that they call us about. They know that when they enter the data, we can see it. They really like that part of this program.

Dr. Smith: Obviously, the whole point of this is to decrease the mortality that we see between the first surgery and the second surgery which is anywhere between 10 and 20 percent of the babies will die before the second surgery?

Dr. Lay: Yes.

Dr. Smith: What kind of results are we seeing? Do you have that data?

Dr. Lay: Yes. So, actually in the last year and a half, with both with the program and with the app, we actually now have a zero percent mortality in the last 18 months, since this program has really been in place and since the app has been in place. We have had no inner-stage deaths for the patients that have gone home on this program. Which is huge.

Dr. Smith: Yes. I know. That is pretty powerful.

Dr. Lay: The other thing is that we have seen is we've actually increased our clinic visits because we see them in clinic when we start seeing these red flags. These children are not coming to the emergency room. So, we have decreased emergency room visits significantly. We have also decreased ICU admissions, meaning that we are catching them early enough in clinic where they are sick enough to be admitted to the floor but we don't get them sick enough to be admitted to the ICU. So, that also has decreased significantly and both of those decrease costs which is already a burden for these families.

Dr. Smith: Right. Right. So, Dr. Lay, as you describe this program, I am already thinking this has application in so many other areas of medicine, right? I mean, where do you think this type of team approach, this type of at-home monitoring of critically ill patients, like these babies that have that high mortality waiting for that second surgery. Where do you think this kind of technology is going to go? This looks pretty awesome.

Dr. Lay: I think it goes a couple of ways. One of the things we are actually looking at is a predictive analytics, meaning that can we take this data and find even the small changes, because we have lots of data points on all of these patients. We have thousands and thousands. Can we break those little data points down and say, "Okay, when your stat drops by 2% over a certain period of time, is that an indication that you are going to get sick soon?" That's one place that we're looking at – can we predict sooner than we're even predicting now that something is going to happen that requires us to intervene sooner? The little subtle signs. That's one thing. I do think that this application can be used even outside of cardiology. Could this be used for another discipline who has critically ill patients? Maybe those patients can go home sooner because they have this ability to be monitored from home which is a much better environment for a child developmentally; it's better for the families; it's better for the siblings. Can children go home sooner because of this? We have actually already seen that. Patients are going home sooner because we have this program in place.

Dr. Smith: Dr. Lay, thank you so much for the work that you are doing. The results that you have now are quite impressive. I want to thank you for coming on the show. You are listening to *Transformational Pediatrics* with Children's Mercy Kansas City. For more information, you can go to ChildrensMercy.org. That's ChildrensMercy.org. I'm Dr. Michael Smith. Thanks for listening.

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