

## BroadcastMed | Remote Monitoring for the Management of Heart Failure

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- MARTHA GROGAN:** Greetings. Thanks so much for joining us today. I'm Dr. Martha Grogan, a cardiologist at the Mayo Clinic. And during today's roundtable review, we'll be discussing remote monitoring for the management of heart failure.
- I'm joined today by my colleague, Dr. Margaret Redfield, who is the director of the circulatory failure program at Mayo Clinic. And Jean Wagner, who is a nurse practitioner, who is an expert in the management of patients with heart failure and those who have had heart transplant. And Carolyn Devens, who's our nurse coordinator, RN, in the heart failure clinic.
- So let's get started. Maggie, what is CardioMEMS?
- MARGARET REDFIELD:** Well, this is about remote monitoring of heart failure. And CardioMEMS is a type of remote monitoring for heart failure system. What it is, is a tiny, little pressure transducer, that's placed in the pulmonary artery during a right heart catheterization.
- The patient transmits a reading from this pressure sensor every day. And that goes to a website that contains a lot of information for the providers to review. And they see the pulmonary artery pressures and make treatment adjustments according to those pressure readings.
- MARTHA GROGAN:** It's pretty amazing when you think of this technology, you know, that used to be available only in the intensive care unit, now implanted in patients. Why do we use it? Why is it helpful?
- MARGARET REDFIELD:** Well, we manage a lot-- our team manages a lot of heart failure patients. And over the years, we've looked for a remote monitoring system that was proven. And this is the first remote monitoring system that's actually been proven in a clinical trial to improve outcomes-- so large, multi-center, randomized, controlled trial.
- We looked at the scales systems, where you transmit a weight and some questions, but never really proven in a big trial, actually. And there were two really, typically large trials that didn't show a benefit. We were interested in the thoracic impedance monitoring, but, again, no trial to show that it worked. And a minority of our patients actually have those devices.
- So we were quite excited when the champion trials showed that using the CardioMEMS system dramatically reduced heart failure admissions in patients with chronic heart failure, of either type-- systolic or diastolic heart failure. So that's really why we have adopted this at Mayo.
- MARTHA GROGAN:** And it's great because reducing admissions and readmissions is so important, overall, in the care of patients of heart failure.
- MARGARET REDFIELD:** Exactly.
- MARTHA GROGAN:** So that's really crucial. And that brings us to-- is CardioMEMS-- is that reimbursed by payers? Or what happens with the financial issues?
- MARGARET REDFIELD:** Absolutely. It is FDA approved. And CMS has delegated funds to cover it. So it's well reimbursed by Medicare and most insurance providers.

Now, it's a new device. And it takes a little bit of ground work to get that all set up at your institution, but, yes, it is reimbursed. Not only for the device, but the implantation procedure, and then, actually, the remote monitoring, over time, is reimbursed, as well.

**MARTHA GROGAN:** Great. So very important. Jean, what kind of patients are a good candidate for CardioMEMS? You see so many heart failure patients over the years, so I'm sure you're excited to have some new options for monitoring them.

**JEAN WAGNER:** Yes, definitely.

**MARTHA** Who should we think about this for?

**GROGAN:**

**JEAN WAGNER:** So, typically, these are designed for people that are the frequent flyers in the hospital. The FDA approval is for patients who have substantial class 3 heart failure symptoms-- doesn't matter if it's systolic heart failure or reduced or preserved ejection fraction heart failure. But they have substantial symptoms and recurrent hospitalizations within the last year.

What I found is the most-- where it seems to work the best is in those patients with difficult exams. For instance, they have a short squat neck and it's difficult to look at JVP, or someone who has obesity and it's difficult to look at exam parameters.

I also think it's pretty helpful in those patients with multimorbidities. So if someone has severe COPD, obesity, and heart failure, is this dyspnea really fluid overload? And that's where the CardioMEMS can really make a difference.

**MARGARET REDFIELD:** Right. I echo that completely. And one important note is, you do have to have at least one heart failure hospitalization in the last 12 months to meet the FDA indication. And if you're in the hospital and seeing a patient with their first heart failure hospitalization in the last 12 months, that doesn't count. You can't implant it during that hospitalization.

**MARTHA** It can't be your very first time that you've been hospitalized for heart failure?

**GROGAN:**

**MARGARET REDFIELD:** In a 12 month period. OK. So if you see someone-- maybe they were hospitalized two years ago, they're now re-hospitalized. You can't implant that device during that hospitalization. Now, if you see the patient subsequently, and, you know, you've tried to adjust their therapies and they're still class 3, then subsequently, you can implant it.

**MARTHA** Then they don't have to be in the hospital again?

**GROGAN:**

**MARGARET** No.

**REDFIELD:**

**MARTHA** No. OK.

**GROGAN:**

**MARGARET REDFIELD:** Because they've already had that one hospitalization--

**MARTHA GROGAN:** One hospitalization, but--

**MARGARET REDFIELD:** --in the last 12 months.

**MARTHA GROGAN:** OK. Got it. Yeah, so that's important to know what the criteria are for planting those. And how about, Jean, what kind of patients maybe are not good candidates for this type of monitoring?

**JEAN WAGNER:** That's a great question. I think it's-- you need to be able to do something with the data. So if you have a patient with, say, fixed pulmonary hypertension, and renal failure, and they're diuretic resistant, learning what their PA pressure is isn't really going to help you because you don't have anything to do with that information.

You can't augment their diuretics or vasodilate them. So you have to have a patient who has some response to diuretics. So somebody with end stage renal failure, for instance, wouldn't be an appropriate candidate.

**MARTHA GROGAN:** Somebody-- they have to have some room to move on their medical management, otherwise, no reason to have the device.

**MARGARET REDFIELD:** Right.

**MARTHA GROGAN:** Right. OK. That's great. And how about, Maggie, how does a person go about starting a CardioMEMS remote monitoring system? You know, I know that when we've had some of these systems before, just the sheer volume of data can be overwhelming. But how does a group get involved in setting this up?

**MARGARET REDFIELD:** Right. And before I answer that, I want to add one thing to Jean's comment. Is that, quite often we'll get asked, well, I have this patient who doesn't come to their appointment, doesn't take their medicines, you know, I can't get a hold of them on the phone-- extremely non-compliant patients.

They're also not good candidates because they have to be willing to do this little two minute procedure in the morning where they transmit the data. And then they've got to be willing to take a phone call and work with you. So I think that's another kind of patient who is not a good candidate.

As far as getting started at a institution, you really have to have someone who's sort of going to be the champion for this. Now, a lot of us heart failure providers are not really used to dealing with devices. So the first thing I did, when setting up our program, was talk to my colleagues in heart rhythm and the cath lab.

They're very used to this-- having a new device, and getting the coding people, and the financial people, and negotiating the contract. And so they were very helpful in getting that set up.

We did meet with our coders because when you implant the device in a patient in the hospital, they get a different DRG. It's not just the heart failure DRG. So the coders needed to understand that. And then, they also needed to make sure they were using the right procedure codes or CPT codes. So that's kind of the first step.

And then, you have to build your team, which you're seeing here today. And we have three other nurses, besides Carolyn, that are all involved, and two other nurse practitioners in our heart failure clinic, and obviously, several other physicians. So you have to get the team on board.

Everyone has to be educated in how to use the system and how to make sure that the patients are well-informed, to educate the patients, and how you're going to manage it in the day-to-day practice.

And then you have to get implanters-- people who are expert in implanting the devices. And we have three different providers. Two of them are heart failure physicians who also do hemodynamic cath, and one's an interventional cardiologist. So you have to get them on board, and get them educated.

And they have to have three proctored implants, per provider, as the first operator, prior to being able to implant them. And then, we worked very carefully with our cath lab. So they maintain the supply of the systems.

And get them integrated into the team so that everything goes very smoothly when you schedule a patient-- they have to device, the cath lab people are all familiar with it, the implanter's familiar. And then, the team is ready to take over after implantation.

**MARTHA GROGAN:** Perfect. So you had to do a lot of background work to get it set up. Once a person becomes up to speed, for the implanter, how long does implant take?

**MARGARET REDFIELD:** Usually, not very long. It's just a right heart cath. It's through a femoral access. And the patient has to be off anti-coagulation for that.

And then they just go into the descending pulmonary artery, take some readings, implant the device, put the catheter back, right above the device, take some more readings, and that calibrates the device on the system. And that's it.

**MARTHA GROGAN:** So that's pretty quick, as far as for the patient, it's not a long procedure for them.

**MARGARET REDFIELD:** No. No.

**MARTHA GROGAN:** Yeah. OK. Great. And so you've really kind of told us about a lot of the systems that you put in place to really facilitate the use of this. How about documentation, Carolyn? That would be one thing I'd wonder about-- what kind of volume of data do you get and how do you document what you get from the device?

**CAROLYN DEVENS:** Yeah. Yeah. So I mean, that's something that we may need to do on a day-to-day basis, depending on the changes that occur. We can incorporate those changes in the website itself, the Merlin.net website. And then we will make comments in the medical record, as well.

**MARTHA GROGAN:** OK. So not a huge burden of documentation because a lot of it's automated. Is that right?

**CAROLYN DEVENS:** Exactly. And we can make it as brief as we want for those notes in the web site. And you know, we can come up with shorthand for the medical record to make it very quick and easy.

**MARTHA** OK. Great.

**GROGAN:**

**MARGARET** Yeah, they have a shorthand system.

**REDFIELD:**

**MARTHA** Yeah. And how about, any of you, if you want to just chime in about patient experiences with this device. What

**GROGAN:** have you heard from patients about the device?

**MARGARET** Well, before we go there, I just wanted to mention a couple extra thing that, actually, Carolyn has been very  
**REDFIELD:** instrumental in setting up for our workflow thing.

We've done a few things within our EMR. We've set up CardioMEMS hot list. So all our patients who have devices are just one easy place to go. And you can pull them up real fast in our EMR, as you kind of remind yourself about that patient.

They've also made a CardioMEMS email distribution list and a CardioMEMS checklist. So we can just type in, in our system, internet CardioMEMS and it takes us to this document.

And it just has some reminders about what needs to be done for implant. And we quickly fill that out. And then we email that on a distribution list, which includes all the nurses who are going to be managing the patients, the implanters, the cath lab.

**MARTHA** So everybody on the team is kept in the loop.

**GROGAN:**

**MARGARET** Everybody on the team and the coders, so that they know that patient. So that's been very helpful for us. And  
**REDFIELD:** then we have CardioMEMS Tuesdays, when--

**MARTHA** CardioMEMS Tuesdays? Oh, OK.

**GROGAN:**

**JEAN WAGNER:** Like taco Tuesdays.

**MARGARET** Yeah. So Carolyn, and the other nurses, and whichever provider is managing the patients, correspond, either  
**REDFIELD:** virtually, via email, or phone, or in person, and just kind of run the list of our patients, and see if anything needs to be done.

You know, you monitor the patients quite closely early after implant, but then, less closely, maybe once or twice a week after that. So that's kind of built into our workflow.

**JEAN WAGNER:** In addition, as the provider that's caring for that patient, if the patient's parameters are outside of a preset goal, that number-- or that gets flagged and I get a message so I know to look at that data that day.

**MARGARET** Right. And they get a message.

**REDFIELD:**

**MARTHA** OK so then the patient experiences-- maybe Jean wants to tell us, or Carolyn, about some patient experiences  
**GROGAN:** with the device?

**CAROLYN DEVENS:** Sure. Sure. You know, I think that they-- a patient is, of course, going to appreciate the fact that they can save themselves a hospitalization. And this is a pretty-- you know, it's invasive, initially, just to put the device in, but, you know, afterward, it's so quick and easy for them, daily-- these daily transmissions.

And they just need to know that they still need to call with changes in their clinical condition. And so we need to make that known up front that, you know, the responsibility still lies with them to notify us. We can see the numbers.

**MARTHA GROGAN:** Pretty simple from their standpoint. And Jean, patients-- what feedback have they given you?

**JEAN WAGNER:** One patient in particular had heard repeatedly, there's nothing we can do for you. There's nothing-- there's nothing further to revascularize. Arise We can't transplant you. There's nothing further we can do. And this provided him a sense of security that at least there's somebody watching out for him.

At the same time, he also had the perception that this meant it was going to help his heart failure. And so when I call, whenever his PAs are so high, he goes, darn it. You know exactly when I'm cheating on my sodium before I even get symptoms. So it's an interesting thing that patients experience.

**MARTHA GROGAN:** I'm wondering, who was monitoring the day after Thanksgiving? Was that-- added a challenge?

**JEAN WAGNER:** It was busy.

**MARTHA GROGAN:** Did you get a lot of high alerts? I mean, you know, I don't know. And, Maggie, how about disseminating this, kind of throughout out the whole Mayo heart failure practice? I mean, obviously, we have a heart failure clinic, but getting more widely involved?

**MARGARET REDFIELD:** Yeah. Well, it's a new thing. And you know, as with beta blockers way back when, and left ventricular assist devices, CRT-- all these advances in heart failure management-- there's a learning curve, and a, oh am I going to think of this curve.

So all our providers have been educated. And so they refer us patients. And people are increasingly thinking about it. But from a health care system perspective, if you really want this to decrease the total number of heart failure hospitalizations within your system, you really have to be somewhat systematic about it.

So to augment that, we've started doing some screening of patients who have had a heart failure hospitalization in the last year. We review their record. And then, if they look like they're appropriate, we contact their provider and discuss CardioMEMS. So we're really starting to do that on a systematic basis.

**MARTHA GROGAN:** Have they been kind of surprised? I imagine, maybe, if you call some of these general practitioners or primary care providers, are they a little surprised when you say, gosh, I've got, basically, this PA catheter that we could put in your patient? Or what's the reaction been?

**MARGARET REDFIELD:** Usually it's just, oh, that's so cool. And I think everybody recognizes, as Jean commented on, not many of our patients just have heart failure. And it's just so useful when you don't know if the shortness of breath is the lung disease they have, or the heart failure.

**MARTHA** I think that would be a really important population.

**GROGAN:**

**MARGARET** Yes.

**REDFIELD:**

**MARTHA** Yeah

**GROGAN:**

**MARGARET** And I would echo Carolyn's comments-- it's a very reassuring thing for patients. They really feel that closeness, and yet it's not too imposing on their day-to-day lifestyle. So it's really been well accepted. And nearly all our patients have been incredibly compliant. So it's been a very positive--

**MARTHA** Good. Good.

**GROGAN:**

**MARGARET** --experience.

**REDFIELD:**

**MARTHA** Anything else to add from anybody that we haven't touched on? I think we've kind of covered the spectrum, probably.

**GROGAN:**

**MARGARET** I would just say, I find this so exciting. I mean, and I think we're going to learn so much about heart failure. And I think there's a lot of things other than avoiding hospitalizations that will be studied in the future.

**REDFIELD:**

I mean, what does better management of the PA pressures do for the patients right ventricle, which, as we know, is so critical in prognosis and how they're doing clinically. So I feel like, kind of, we're at the dawn of a new era.

**MARTHA** It's exciting because there really haven't been that many big advances in heart failure, and certainly technology like this, not something that we've ever had in the outpatient setting before.

**GROGAN:**

**MARGARET** Yes. For the day-to-day management, right, we haven't had any-- we've had lots of therapeutic advances, but in just the day-to-day management--

**REDFIELD:**

**MARTHA** Right. Right. I mean, really takes it into a different paradigm. And blocks that cycle, hopefully, of the readmissions. But as you say, learn a lot of other important information about heart failure.

**GROGAN:**

**MARGARET** Absolutely.

**REDFIELD:**

**MARTHA** That's great. Well, thank you, very much, for sharing your important insights about this device. And thanks to our viewers for tuning in today to this Mayo Clinic Roundtable Review at the heart.org Medscape.

**GROGAN:**