Transcript Details
This is a transcript of an educational program. Details about the program and additional media formats for the program are accessible by visiting: https://reachmd.com/clinical-practice/nephrology/ckd-evaluation-measurement/15871/

ReachMD
www.reachmd.com
info@reachmd.com
(866) 423-7849

CKD Evaluation & Measurement

Announcer:
Welcome to this episode of KDIGO Conversations in Nephrology. This episode titled, CKD Evaluation & Measurement, is provided by KDIGO and is supported by an independent educational grant from AstraZeneca.

Here's your host, Dr. Peter Lin.

Dr. Lin:
Hello and welcome to KDIGO Conversations in Nephrology. I'm Dr. Peter Lin, Director of the Canadian Heart Research Center, and Family Physician in Toronto, Canada. And joining me today to discuss the importance of CKD evaluation and measurement is Dr. Magdalena Madero. Dr. Madero is the Head of Nephrology Division at the National Heart Institute in Mexico City. And her clinical and research interests include CKD progression, chronic hemodialysis, and CKD of unknown origin. Welcome, Dr. Madero, to the program.

Dr. Madero:
Thank you, Dr. Lin, and thank you, KDIGO. It's an honor for me to be here today with you.

Dr. Lin:
It's really good to have you here. And I think the CKD of unknown origin makes you sound like a UFO hunter. So it's kind of interesting to hear that term. But today, I guess we're going to focus in on trying to detect kidney disease. And I must admit, our kidneys work very hard for us and they never complain. And by the time they complain, they are quite damaged. So therefore, we have to go looking for this damage. So can you just go over, what are the tools that we can use to look for chronic kidney disease?

Dr. Madero:
Thank you, Dr. Lin. That's really that's a great question. And you are absolutely right, kidneys do not hurt until very late stage. So we have some tools to assess kidney function in the earlier stages. And these tools are EGFR, so this is estimated glomerular filtration rate, and albuminuria. And these both are critical to detect and to risk stratify chronic kidney disease. We know that lower estimated GFR and higher albuminuria are both strongly associated with risk of cardiovascular events, kidney failure, and mortality, so their measurement is crucial for effective risk stratification of persons with chronic kidney disease. The presence and severity of albuminuria also guides the use and dosage of treatments that we know delay chronic kidney disease progression, so such as ACE inhibitors, ARB, and SGLT-2 inhibitors.

So the ideal screening and diagnosis approach would consist of a triple marker panel with a serum creatinine, serum cystatin C, and urine albumin to creatinine ratio. We usually prefer albuminuria over proteinuria; however, we know that in resource-limited settings, we can also use proteinuria for detection of a protein or albumin in the urine.

There are now equations such as CKD-EPI, that are used to estimate GFR for markers such as creatinine and cystatin C, and the combination of both creatinine and cystatin C. And the latest equation is without inclusion of a coefficient for black race. So we have these very useful equations that can either use cystatin C, creatinine, or both. And you know, the fact that race was removed, it's a very important event in the nephrology practice. This was all done due to the concerns about continuing use of race in GFR, and led to the removal of the race coefficient. So a big rationale for CKD screening is the availability of many effective interventions to delay CKD progression and that reduced cardiovascular risk.

Dr. Lin:
That's actually very interesting, the fact that you're talking about renal risk, as well as cardiovascular risk, really, having these measurements would be helpful for us to manage our patients. And as you were saying, you know, serum creatinine, we can get, and

with the equations, then we can estimate the glomerular filtration rate. And so that tells us about how to use other medications, how well the kidneys are functioning. And oftentimes I, you know, for simplicity's sake, I tell my patients, that's the speed of your kidneys that it's working at. And I usually tell them, we want at least 60 miles an hour or higher, and you're only at 30 miles an hour. And they seem to understand that – that concept of speed. And as you were putting it, the urine albumin creatinine ratio is very important as well, because I tell patients, that's the quality of your kidneys. In other words, we want to keep the good stuff in, which in our case, we've tag that as albumin as being good things to keep in your body. And creatinine, which is waste product, as you were mentioning, we want to get rid of that. And so therefore, we want to make sure that the kidney is getting rid of garbage and keeping in the good stuff. So that measures the quality of the kidney. So I think that part, maybe we haven't explained that so well to patients. Do you find that people may be doing serum creatinines and maybe not the albumin creatinine ratio?

Dr. Madero:
Yeah, that's a very good analogy, Dr. Lin. And you're right. I mean, people do measure creatinine for the most part, and many labs have automated EGFRs but I find that a lot of people are not having their urine albumins checked. And you know, this is very important because it is a big risk factor for outcomes such as kidney disease progression and cardiovascular events. And we know that our patients with kidney disease have an even higher risk of dying from cardiovascular causes and reaching to kidney failure. So both markers are very important in the evaluation of chronic kidney disease.

Dr. Lin:
Yeah, that makes a lot of sense. So I must admit, in the beginning, we only focused on creatinine, then we had the equation, so we only focus on that, but the albumin creatinine ratio together gives extra information. So we need both pieces. So let's say we now have an abnormal test. You've identified a patient, how do we go about finding out the cause of the CKD? Because I think a lot of us just assume it's diabetes or hypertension. But how do you go about thinking about the different causes that would put a patient in a CKD position?

Dr. Madero:
Thank you, Dr. Lin. That's a very important question. It's not everything diabetes or hypertension. So when we evaluate a patient with known or suspected chronic kidney disease, clinicians should inquire about additional symptoms that may suggest a systemic cause. For instance, if the patient has hemoptysis, or a rash, or lymphadenopathy, or hearing loss, or neuropathy, these may orient us towards something either genetic or towards glomerular disease. If a patient has, for instance, urinary hesitancy, urgency, or frequency, or incomplete bladder emptying, then this may guide us towards urinary obstruction.

Moreover, patients should be assessed for risk factors of kidney disease, and these include potential nephrotoxins, such as nonsteroidal anti-inflammatory medications, phosphate-based bowel preparations, herbal remedies such as those containing aristolochic acid, antibiotic therapies such as gentamicin, and chemotherapies. Also a history of kidney stones or recurrent urinary tract infections may guide us towards the cause. Of course, as we mentioned earlier, presence of comorbidities such as hypertension, diabetes, or autoimmune diseases may lead us towards the cause of the kidney disease.

And family history of kidney disease is important. There are times when we need to do genetic testing, for instance, in younger people with polycystic kidney disease, where they still do not have cysts or with inherited forms of focal segmental glomerulosclerosis, as these may allow an earlier treatment or make us take decisions such as a big decision in a family member that may be a kidney donor for instance.

Finally, imaging studies, such as an ultrasound, give us an idea of the chronicity of the disease and helps us to rule out obstruction. And then when we have done all these, a lot of the times we still do not know the cause and we need to perform a kidney biopsy. For instance, in a patient that has albuminuria or hematuria, and we are not 100% sure of the cause, then it is important to have a kidney biopsy as with a histologic diagnosis, we're going to have a more precise diagnosis and a better management. A fundamental justification for the early detection of CKD is that we now have a lot of available evidence-based interventions to slow chronic kidney disease progression as I mentioned earlier, and these would help us reduce its complication. Accurate diagnosis and staging of CKD impact the choice of the treatments. And this is one of the most important causes to establish what's really generating or causing the kidney disease in our patients.

Dr. Lin:
For those just tuning in, you're listening to KDIGO Conversations in Nephrology. I'm Dr. Peter Lin, and speaking with me today is Dr. Magdalena Madero. We're discussing the importance of CKD evaluation and measurement.

Yeah, you make a very good point. So now that we've identified a patient with CKD, finding the cause will then direct our therapies, and also, you know, risk stratify the patients. So finding the cause is actually as important as detecting the disease in the first place, of course, and yet many of us may just say, oh, the EGFR is a little bit low, and then we stop there. So all of these lists of diseases that you just mentioned reminds us that there are many causes that can bring a patient to that state of chronic kidney disease.

So let's say we have these tests now. And let's say we've got a cause as well. So we know which cause is causing the CKD. Then when do we consider it as CKD progression? Because a lot of times, a nephrologist and the referral centers would say, you know, if the CKD

progresses, then please refer to us. So what does that mean in terms of CKD progression?

Dr. Madero:
Yeah, so that's a very good question, Dr. Lin. And this is something we have debated as nephrologists over years. Progression can be defined in many ways. It can be defined as a sustained drop in EGFR for longer than 3 months, and a 25% or greater decrease in EGFR from baseline. Rapid progression, for instance, is usually defined as more than 5 mL/minute loss in 12 months. There are also slopes of EGFR decline that have been accepted as a definition such as 30 or 40% decline in EGFR, let's say, at 2 years. Because, you know, I have to admit that in the past, we used to define progression as doubling of the creatinine, or kidney failure. But these events are very drastic. And you don't want to wait until this happens to define progression. And that's why we have been establishing other definitions of CKD progression.

There's also regression. And regression can be defined as a sustained higher EGFR category for longer than 3 months, and a 25%, or greater increase in the EGFR from baseline. So this means that not everything is progression; patients can actually get better from the disease, and these would be considered as a regression. Regression is important because it can help us guide the frequency of monitoring or assess treatment progress. And this is why we need to establish progression.

Dr. Lin:
Yeah, that's actually a very good point. In other words, the direction the speed at which it's dropping, those are all very useful information. And to your point is that it changes how quickly we refer, how often we assess them, and review their testing. So these are all important things for us to do. Now, you had mentioned something about cystatin C, and that caught my attention, because I'm not sure if everybody's aware of cystatin C. So when would cystatin C be appropriate testing? So in other words, when would our traditional creatinine EGFR estimates sort of not be as accurate? And what kind of scenarios will we see that assist that a cystatin C would probably do better in assessing renal function?

Dr. Madero:
Thank you. That's a great question. Ideally, cystatin C should be used for the initial diagnosis. The use of cystatin C alone or in combination with creatinine strengthens the association between the EGFR and the risk of death and kidney failure across diverse population. So number one, it better categorizes risk. Number two, it should be used when the diagnosis of CKD is uncertain. For instance, patient that has G3aA1, so patient with mild CKD and no albuminuria. Number three, when muscle mass is low, such as in the case of amputations, or the opposite, when there's a large muscle mass, such as observed in football players or bodybuilders, where creatinine may be under or overexpressed, and these would over or underestimate estimated GFR. And finally, a more accurate estimation of EGFR is required a lot of the times for dosing on certain antibiotics such as chemotherapy, assessment of kidney function in kidney donors, for instance.

Dr. Lin:
So therefore, there would be certain situations where cystatin C is better. And I guess, as you were pointing out that creatinine is muscle breakdown, so therefore, if there's changes in muscle mass, that might affect it as well. And so, there are situations where our creatinine friend may not be as accurate, and that's why cystatin C, which is sort of reduced at a regular rate in the cells and it's mainly filtered out, and there's no secretion of it in the renal area that basically, that might give a better measurement. And you listed some very important times where we need a more accurate measurement. And that's where the cystatin C would be useful. And I think that's very useful for us to know, because many of us may not have heard of cystatin C as a new way of testing for renal function.

So I think that brings us to a close for this particular session. I want to thank you very much, Dr. Madero, for your insights into the importance of CKD evaluation and measurement. You nicely told us about the EGFR and how that sort of measures the speed of your kidney function. That's one component of it. Albumin creatinine ratio is another important component of assessing renal function and so, therefore, both of them together would tell us about the speed of the kidney as well as the quality as I sort of simply put it for my patients. And then you talked a little bit about cystatin C and its important role in certain circumstances where maybe their creatinine may not be estimating the glomerular filtration rate as well. And also to identify the causes of CKD. Because you listed all these causes that would have very different treatments and different trajectories. And they would need different strategies to make sure that we can prevent the kidney progression. And then you nicely told us about kidney progression and what we should be looking for, deterioration in the EGFR, change in classes of CKD, and also this rapid drop of 5 mL/minute, over a 12-month period. So we have things that we can look out for, so that way, we can make sure that the patient gets the care in a timely fashion.

And I think all of this, I'm hoping, with your knowledge and insight will help us all make sure that we can detect CKD and make sure that we manage these patients as well as we can, so that we can avoid those complications that you were saying used to be the only thing we measure which was doubling of creatinine and end-stage disease and dialysis. Hopefully, we will avoid those horrible things for our patients by diagnosing them earlier and making sure that they do well. So thank you very much, Dr. Madero, for your insights and all your hard work in terms of treating patients and sort of getting the benefits of all this knowledge, to make sure that the patients will benefit from this new treatment strategy and detection.

Dr. Madero:

Thank you, Dr. Lin, for all these very important and interesting questions. You just gave a very nice summary of what we have discussed. And it has been an honor to share this forum with you.

Dr. Lin:
Great pleasure with you. And it's so easy to summarize when you put things beautifully. So thanks very much again.

Dr. Madero:
Thank you.

Dr. Lin:
You have been listening to KDIGO Conversations in Nephrology. You can find more at KDIGO.org/podcasts. Thanks for listening.