Oxygen for patients with STEMI: Who benefits?- Frankly Speaking EP15

Transcript Details

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Dr. Frank Domino

An ambulance is hurtling towards the emergency room and the paramedic explains to Mr. Golden, "I'm sorry, you've had another heart attack." The patient lies on the gurney and is wondering, "Why aren't they putting oxygen on me?" Hi, this is Frank Domino. With me today, is Alan Ehrlich. He's an Associate Clinical Professor in the Department of Family Medicine and Community Health at the University of Massachusetts Medical School, an Executive Editor for DynaMed. Today, he's with me to talk about the management of acute MI, and in particular, the use of oxygen. Welcome to the show, Alan.

Dr. Alan Ehrlich:

Thanks, Frank.

Dr. Domino

I appreciate you coming. What's this latest update on the use of oxygen, in the setting of an acute myocardial infarction?

Dr. Ehrlich

Well, the issue has to do with giving oxygen to patients who are not hypoxic. So if you have normal oxygen pulse ox saturation, do you benefit from supplemental oxygen? This has been a question in medicine for some time. Clearly, with myocardial ischemia, we think, "Well, the heart's not getting enough oxygen, so let's give it more oxygen." On the other hand, of course, if

the artery is blocked and the blood isn't flowing, you may be giving oxygen to other parts and not getting it to where you want. This has been a theoretical issue for some time, in terms of, is there benefit? And I think the bias has been, "Well, let's just give oxygen. It can't hurt." And there's really been some data coming out over the last couple of years that has started to question that. And so, this Cochran, looked at five randomized trials and found no benefit for patients who had oxygen saturations greater than 94%, whether they were given supplemental oxygen or not. There was no advantage.

Dr. Domino
So just to be clear, this is something I learned in residency and in medical school, probably. Everyone doesn't get oxygen in the face of acute MI?

Dr. Ehrlich
Right. This is something that the American College of Cardiology, the American Heart Association, they've been shifting their position from, "We should give oxygen. We should, perhaps, give it for the first six hours." And in the latest versions of the guidelines, in terms of the American College of Cardiology's recommendation for STEMI, they only recommend oxygen for patients who have heart failure, who have dyspnea, or who have hypoxia. And if you look at the American Heart Association Resuscitation Guidelines, they take a more neutral stance. It's interesting, 'cause they're the same organization, but when they look at it from two different perspectives, they give slightly different advice. But, again, they say, "Consider withholding oxygen from patients with normal levels of oxygen as measured by pulse-ox."

Dr. Domino
It's oxygen. It's something that we need and it's everywhere. What could possibly be the harms of giving oxygen to someone who's having an acute MI?

Dr. Ehrlich
Well, it's funny, you say it's something that we need, because there's lots of things in medicine and in life that, in small amounts is really valuable, and in fact, maybe necessary, and in large

amounts can be toxic. And it doesn't matter whether you're talking about sodium or potassium...

Dr. Domino

I was thinking wine.

Dr. Ehrlich

Well, the thing about oxygen is, we know, for instance, if you're a little baby, and you're having breathing problems, and we put you on oxygen, too much oxygen can lead to long-term health problems, so we know oxygen is not entirely benign. It's a very active chemical and it's certainly life sustaining, but it doesn't mean there can't be harms associated with it. There was a randomized trial recently where they... This was done in Australia and they randomized patients at the level of being, when the ambulance was called, to getting oxygen or to room air, if your pulse ox was over 94%. And not only did they not find a benefit, but six months later, when they were assessing the heart, using magnetic resonance imaging, they found larger infarct size in the group that had been randomized to oxygen. That group also had higher rates of recurrent myocardial infarctions.

Dr. Domino

That's remarkable. So patients who have good pulse oxes while they're being transported, they're not short of breath, they're not dyspneic, they can get just room air and there is some data that supports that they even do better than those that we apply oxygen to?

Dr. Ehrlich

That's right.

Dr. Domino

That's really remarkable. Are there any non-measured benefits? Are there any psychological benefits per se? You're anxious, you've just been told you've had a heart attack, you're riding in an ambulance. Is there any benefit to having the oxygen other than infarct size?

Dr. Ehrlich

This has been looked at, but if you look at, for instance, the amount of pain medication people need, there's no advantage in the oxygen group. So a lot of times, I think we project our own insecurities onto the patients, and so we think the patient will feel better if they have oxygen. What that really means is, "I'll feel better if the patient has oxygen."

Dr. Domino

"I'll feel better." [chuckle] Absolutely.

Dr. Ehrlich

And so my experience with patients is, the ability to... If you can clearly articulate that there's a reason why you're doing it, it's not just, "Oh, I forgot to put the oxygen on." "No, your oxygen level is normal and we have found through data that you don't get any benefit." It's one less thing. One of the things we do know is that the whole experience of going to the hospital in an ambulance is very stressful. And so when you hook people up to IVs, and you put oxygen on them, and you're doing all of these things, you may think you're reassuring them. You're reassuring yourself. And patients will do just as well with verbal reassurance, in those situations, at least, in my opinion.

Dr. Domino

Alan, this is a curious bit of data and it's going to be practice changing, if it's not already practice changing. Maybe talk a little bit about how this study was done, because it seems to me, you're lying on that ambulance gurney or you're hurtling through town, you've got crushing chest pain, and someone says to you, "Hey, Mr. Golden, we're doing this study. Do you wanna have oxygen or do you wanna have air?" How could they do this ethically?

Dr. Ehrlich

First of all, the recent data is based on a Cochran, which is a systematic review of five randomized trials. These trials date from 1976 to 2015. And so you have a range, some of this is being done in the era of pre-revascularization, there's a variety of scenarios of how they did the studies. In some

studies, the patients are getting oxygen before they arrive at the hospital, where they then get randomized. And then you have to say, "Well, how valuable is that data? Are you really showing a difference between oxygen and room air?" There are dilemmas about this. There was a study, the one I mentioned before, out of Australia in 2015, and what they did, was the ambulance drivers had randomized codes in sealed envelopes, and then they simply randomized the patients to one of two groups, either oxygen or room air, and when they got to the hospital, that's when they sought informed consent. And it turned out, very few patients, only a handful, decided they wanted to not be in the study, and the rest were fine with having been randomized to one or the other, and they didn't know which they were getting.

So patients are okay with this. They call that delayed consent and I think you can argue the merits of that, but in an acute setting, the vast majority of patients are relying on clinician judgement. Again, if there was uncertainty as to the benefit in the first place, so it was not clear at all that there was harm being done to these patients. There had been another systematic review done a number of years ago looking at three randomized trials, that also had questioned this, which is why over time, the guidelines had been backing off of the benefits of oxygen in patients who are not dyspneic, or in heart failure, or who are overtly hypoxemic.

Dr. Domino
Alan, this is a great example of evidence based medicine, taking a standard practice that we assumed made logical sense, evaluating it critically through randomized controlled trials, and coming up with a conclusion that can be concrete and dramatically changes practice. So to summarize, patient has acute MI, they're not dyspneic, their pulse ox is above 94%, using room air is just as effective and may be even better than using oxygen. If patients have other concerns, they are dyspneic, their pulse ox is low, they have some complicating feature, oxygen probably still plays a role. Any final thoughts to add?

Dr. Ehrlich
Yeah, one thing is, if you are giving people oxygen, always use care if they have COPD and are CO2 retainers. That can be a dangerous situation. And whenever we say things like, "Given if their

oxygen level is above 94%," we always get into the question, "Well, what if it is 94%?" And there's some disagreement amongst the guidelines. I think 94% or higher is generally considered a threshold, where you have normal oxygen and you wouldn't need the supplemental oxygen.

Dr. Domino
And I think clinical discretion is probably available too.

Dr. Ehrlich
Absolutely.

Dr. Domino
Well, thank you Alan. Joining us today was Dr. Alan Ehrlich and discussing another groundbreaking change in how we approach something very significant in acute MI. This is Frank Domino, thank you for joining us on Frankly Speaking and join us next week, when we talk about how to prevent an opioid related death.