



Preventing Avoidable Deaths: Dr. Frank Overdyk on Preventing Avoidable Deaths

Michael Wong:

Thank you for listening to the health and safety podcast.

I am Michael Wong, founder and executive director of the Physician-Patient Alliance for Health & Safety.

In an earlier podcast this year, I spoke with Dr Jeffrey Vender about respiratory compromise. Dr Vender is Chairman of Anesthesiology at North Shore University Health System and Chairman of the Clinical Advisor Committee to the Respiratory Compromise Institute.

Today we are speaking with Dr Frank Overdyk, who is an anesthesiologist at Roper St Francis in South Carolina, about the necessity of assessing and monitoring patients for respiratory compromise. Frank is also a member of our board of advisors and organized the two conferences on opioid-induced respiratory depression for the Anesthesia Patient Safety Foundation. So, we are honored to have Frank speak to us today about this critical patient safety issue.

This clinical education podcast is made possible by educational grants from Medtronic and EarlySense.

Welcome to the podcast, Frank.

Frank Overdyk:

Thank you, Michael

Wong:

For the listeners not familiar with you or your work could you give us a brief introduction about yourself?

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Overdyk:

Sure. I am a professor of anesthesiology. During my career, I've been studying the pain medications - simply opioids on breathing. In my research, I became aware that there are thousand of the patient dying unnecessarily from too much opioid pain medicine. My passion is finding ways to reduce this preventable harm from patients who receive too much pain medicine and stop breathing, and eventually reduce that to zero.

Wong:

We're talking today about the necessity of assessing and monitoring patients to detect respiratory compromise. There's often a sentiment that it's only minor surgery and yet serious adverse events and even patient deaths have occurred following routine surgeries - and here I'm thinking celebrity cases like Joan Rivers, kids that have their teeth extracted, or even elderly patients that go in for knee surgery - why is it difficult to predict how a particular patient will react to the administration of an opioid or other sedative agent.

Overdyk:

Let me address your first question. Some minor surgery can be quite painful, such as hand surgery, for instance, and, for those conditions, opioids are still an effective way to treat moderate to severe pain, even for minor surgery. Treating pain is a good and necessary thing, as uncontrolled pain will delay your healing and cause the suffering that's obviously avoidable.

However, what is not appreciated by patients and by some doctors and nurses is that a patient's response to a "standard dose of morphine," for instance, can vary up to 30 fold. And, what that means is if I give a hundred patients the same dose of morphine - ten milligrams of morphine - about ninety patients will get some level of pain relief - some better, some worse - and breath adequately, but there may be one or two patients who slow their breathing or even stop breathing. And, it is very difficult because of that variation in effect to predict which patients will be the one who stops breathing, when you turn your back on them for ten minutes. So, I always say there's no safe first dose of opioids, there's just a starting dose, and it is critically important that the patient be checked regularly to see how the patient responds and then adjust your doses accordingly.

Wong:

So, would you recommend titrating and starting with a lower dose first and then titrating up?

Overdyk:

Well certainly, most hospitals have pre-printed order sheets that have these doses and, yes, that's where you can stay where you can start - like I said there's a starting dose - and to be able to treat most patients you want to start somewhere in the middle, but you have to be cognizant that the patient may be the one who's all the way on the left of the spectrum, in terms of sensitivity, and may react much more seriously to that medication than your typical patient.

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Wong:

So, in your experience are there some patients who are more at risk or for certain procedures for which the risk of respiratory compromise is higher?

Overdyk:

Certainly, and that's not just in my experience, but that is what is widely published in the literature. Certain patient conditions and certain procedures place them at greater risk arrest for depression and the conditions fall into two categories - those patients who tend to obstructive their airway, when they get sedated and have their pain treated, and those patients who have conditions that make them more susceptible to respiratory depression.

So, let's talk about the first group. That first group includes patients, who have obstructive sleep apnea, which is more often than not, not even diagnosed - what we call occult obstructive sleep apnea. Morbidly obese patients are also at greater risk airway obstruction. So, those are two patients who, by virtue of their conditions, are at a greater risk. The second group includes the elderly, frail patients or patients with lung or kidney disease.

And, then, there's the last group that we call opioid naive patients - patients who never really had opioids - they can be explicitly sensitive to the effects. And, so as you can see, the response to an opioid it is somewhat complicated and unpredictable, and that's why we see this 30-fold variability in patient responses. Now, there are also certain procedures that increase your risk of respiratory depression and those include any surgery on the airway, the chest, the upper abdomen, or prolonged surgery or surgery requiring high doses of pain medicines in the operating room.

Wong:

So, are there tools or checklists that are currently in existence that may help clinicians recognize opioid-induced respiratory depression?

Overdyk:

Sure, we essentially use two types of tools currently. The first tool helps us evaluate a patient's risk for respiratory depression and relies on their past medical history and their physical attributes that may put them at increased risk. So, I just mentioned patients with sleep apnea or occult sleep apnea, morbid obesity, COPD, as well as patients who are tolerant of opioids.

The second tool that we use, are the assessment tools that we use on the ward to measure this effect in a quantitative way. These are sedation scores, pain scores, and records and trends in vital signs. Records and trends and vital signs are extremely important. Now, unfortunately, in our busy day on the ward, we don't always use these tools. But, it's been shown that practitioners, who use these tools reliably and take the time to do this, have a much greater chance that their patients will be safe.

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Wong:

Now, that's great. But, is there a danger of relying upon these tools as a predictor and using these tools to, in a sense, triage patients?

Overdyk:

Certainly triaging patients implies that there is a group of patients who are not at risk and this is unfortunately false. We have plenty of examples of tragic cases of patients, who do not have any of these disease conditions I've mentioned or these physical attributes that put them at high risk. But, they died on a hospital ward, typically behind a closed door from unrecognized opioid-induced respiratory depression. These are patients are healthy patients who come in for elective surgery and are typically opiate naive. So, no tool will be a 100% in successfully in identifying every patient, but these tools are targeted to identifying many of those patients.

Wong:

That's a great caution or warning to clinicians treating patients with opioids. The number of patients undergoing conscious sedation is increasing. Do you think that these patients could also be at risk for opioid-induced respiratory depression?

Overdyk:

So, I always have to laugh sometimes at the prevalent use of [the term] conscious sedation - I think that it's a misnomer. Most of the conscious sedation I see are actually patients who are unconscious and unresponsive to verbal or tactile stimuli. The more accurate term for that would be moderate procedural sedation. If your provider says they're going to give you conscious sedation, be ready that you may be completely knocked out, so the speak. These patients, who undergo moderate procedure sedation, this procedure is done in a closely monitored setting by a dedicated provider, such as a trained nurse, a nurse anesthetist, or an anesthesiologist. They should be using continuous oximetry and capnography monitoring - as that is now the standard of care for procedural sedations cases in all states. So certainly, if you're undergoing procedure sedation or conscious sedation, as some people may say, make sure that you have a dedicated person watching you and using these oximetry and capnography monitors.

Wong:

So, the risk really is every time you're giving a patient some kind of opioid or some kind of sedative, the risk is going to be there no matter what you do or what procedure you're undertaking.

Overdyk:

Well, yes, the risk is highest for people who get intravenous medications of these sorts - the pain medications - and certainly when they're doing the procedure on you, where you are having potential painful stimuli, there's that risk. But, this discussion is really about those patients who have had their surgery, who are now on a ward - some are behind the closed door potentially - and can go unmonitored for prolonged periods of time.

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Wong:

What's wrong with the current standard of care for monitoring patients, which in most places is taking vital signs every four hours?

Overdyk:

Critical respiratory depression can develop in less than an hour or even as fast as 10 to 15 minutes, but it's not something that you see within the first minute after you give an intravenous opioid dose. So, it can be somewhat insidious. Checking a patient every four hours will miss the condition. The result is that we may find the patient dead in bed and no amount of resuscitation will help a patient who has stopped breathing and is in full cardiopulmonary arrest for more than 15 minutes. We have rapid response teams in most hospitals that respond to these emergencies on the ward, but unless they get there within five minutes of a patient taking their last breath, there's very little hope of rescuing the patient. If you have a cardiac arrest on a ward, your chances of surviving or not having a lifelong brain injury are 30 percent or in that ballpark.

So, measuring your vital signs every four hours is really a very outdated standard. There's really no evidence that suggests that every four hours is a good time. It's just something we have carried over through the years. It may be 30 or 40 years old, but it's an antiquated monitoring standard. Patients in our hospital these days with high acuities deserve better monitoring.

Wong:

I often hear from hospitals something like "Yes, we continuously monitor our patients, we've attached a pulse oximeter." Do you think that this type of patient monitoring is sufficient?

Overdyk:

So, the pulse oximeter is a device that checks the amount of oxygen in the blood and is a good way to make sure that your patient is getting oxygen and a sufficient amount of oxygen. It's a fairly reliable and accurate monitor. But, if you check this monitor only every four hours, which we call "spot checks", you may miss that serious episode of respiratory depression that can result in cardiac arrest. So, if you swing by the patient's room every four hours with a pulse oximetry, I don't think it necessarily helps you monitor the patient. It's been shown that these "spot checks" - oximetry checks - often involve waking a patient, who may be sleeping, and that the reading that they get then is actually artificially high. In other words, it's a falsely high value. So, "spot checks" with an oximeter have been deemed by The Joint Commission and other patients safety organizations as being dangerously misleading and really a bad practice.

Wong:

Have you found capnography monitoring a better early indicator of respiratory compromise?

Overdyk:

Well, let's go back to some of the physiology here. So, oxygen monitoring can be a good early detector, if the patient is not receiving supplemental oxygen. But, most of the patients in a

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hospital do so, for one reason or another. So, you mentioned capnography, which is the measuring of end tidal CO₂ or carbon dioxide that we breathe out. In the sense that capnography will show us whether we are actually moving air in and out of the body, it is a very good, more accurate monitor of a patient who's breathing, whereas a pulse oximeter may show this much later. That being said, there's no high level evidence that it's earlier, but there are some studies undergoing right now that suggest that it may help in the earlier detection of conditions related to respiratory depression and other forms of respiratory compromise.

Wong:

And, we've talked about the four hour spot checks. Is there more dangerous time during this period that a patient can be susceptible to respiratory compromise?

Overdyk:

Sure, the dangerous times for respiratory depression undetected basically fall into two categories.

The first relates to when the pain medicine is given. So, when a patient receives their first dose of opioid or there's an increase in the dosage, because their pain is not well controlled, you have to watch the patient very carefully. And, I would say at least every 15 minutes for the first hour, you need to be checking on that patients. The effects of morphine won't manifest for an hour to an hour and a half after you give the intravenous dose. Or, if you give a more potent opioid, such as fentanyl, it may happen earlier. So, that's very important when you initiate the dosage or increase the dosages that you watch the patient carefully.

The second most dangerous times of the day relates to the times of the day and week. Nighttime is a vulnerable time because the patient's sleeping and their airway may become obstructive more easily. That is just a one of the features of sleep is that we may relax our tongue and the other muscles in our airway, it may obstruct and, if you have a predisposition, such as obstructive sleep apnea, now you could get into trouble. So nighttime is a dangerous time, because of the conditions, but also because in night times and weekend, we typically have less vigilance on the ward. Our staffing is usually lighter, the experience of the staff on those times is usually less and, as a result, our vigilance is less. So, night times and weekends, and around the time of giving the medications are really extremely important periods that you have to be very alert.

Wong:

Some clinicians triage patients and continuously monitor some and not others. This may be understandable from a resource allocation point of view, what do you think of this practice?

Overdyk:

So, we've touched on this a little bit earlier. So, triaging or performing a risk assessment on all your patients to see if they fall into a high risk category of respiratory depression is now common practice with most hospitals and advised by The Joint Commission and others. As you said, this is done because there may be limited resources of providers and equipment to

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monitor riskier patients continuously. Like I mentioned before, you do put a small group of patients who have no risk factors or risk for undetected respiratory depression. And, we know how that story ends, possibly with cardiopulmonary arrest and death. That is not common or even a likely, but it happens to thousands of patients who we take care of every year in the US.

Ideally, I believe all hospitalized patients in 2018 deserve at a minimum some form up of continuous monitoring. Triaging is acceptable and it will catch those patients at the highest risk, but if we have a zero tolerance for preventable harm, then we should be paying for continuous monitoring of all patients.

Wong:

You're certainly correct, because most of the patients stories that have appeared on our website are with opioid naive patients and they have unfortunately suffered adverse events or more likely death because of that. So, great point, Frank. How expensive is it for hospitals to continuously monitor patients and how expensive it is not to monitor patients appropriately?

Overdyk:

So, economic analyses of the cost of continuous respiratory monitoring have been done. The cost of technology is a moving target, since the cost has come down, as adoption becomes more widespread and there are different pricing models as well. You can price by disposables, so, there are creative ways to finance continuous monitoring, but there are estimates that the daily cost of continuous monitoring of a patient for example with a pulse oximetry is on the order of 20 or 30 dollars a day. This does not include the cost implications of staff workflow and some of these other softer costs - indirect costs. Although rolling out new technology may initially require more resources, there are many institutions that have now adopted continuous monitoring where a couple of things have happened - the institution finds that it is to their financial benefit, the providers find it to their clinical benefit that they are vocal about removing the technology.

And, obviously what we cannot ignore is the human cost of this and the human costs of a preventable harm or preventable injury or death to the patient is not just to the patient and their families - probably the most important cost and toll - but also to the providers. This is a very traumatic thing to happen to somebody.

Wong:

Absolutely. Hospitals often tell me they don't have a problem - and I think you just alluded to that - they haven't had an adverse event or death occur and they don't continuously monitor their patients. What would you say to these clinicians and hospital executives?

Overdyk:

I believe if you check the quality and outcome data that hospitals report to CMS and other regulatory agencies, there's not a hospital in the US that I'm aware of who has not had a cardiac or cardiopulmonary arrest on a ward in a patient who walked into the hospital for an elective procedure and has few, if any, medical problems. So I'm focusing on this category because

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these are patients who should not be having these preventable deaths and they fall under a reportable category of events called patient safety indices or PSI's - failure to rescue is one of those, death in patients with low co-morbidities - there are a number PSI's that we track now. A significant number of these PSI's are related to opioids and undetected critical respiratory depression. So, if a hospital administrator tells you they don't have a problem, I think they are simply not informed on their outcome data or they're in denial - one or the other.

Wong:

So, what do you think are the biggest impediments to incorporation of continuous monitoring in everyday clinical practice?

Overdyk:

We've come a long way in that people recognize now that there's a need. Initially when we started this ten years ago, people said we don't have a problem. And, we now have enough metrics and enough evidence that we do have a problem. There's a reluctance to change things - medicine is a very difficult industry to get change. We are a long way away from being a higher reliability industry, where we have a very high quality. Our quality is not reliable and there's a great variation. So we are reluctant to change.

But, the champion institutions, who adopted this, have overcome the barrier - the financial barrier, the workflow barrier. The evidence showing that this is a good thing to continually monitor is accumulating. And, obviously, you need a center of gravity of research to be able to start to prove that. But, it makes sense that we shouldn't have anyone dying unnecessarily in a hospital and that we can go a long way towards earlier detection as well. We are overcoming these barriers. Some people are a little more reluctant, some institutions are more reluctant, but, I think that for the most part, people are recognizing there are ways to do this that makes good clinical sense, good human sense, and good financial sense.

Wong:

So, do you have any last words of advice for clinicians looking to keep their patients safe?

Overdyk:

Well, I'd like to go back to some of the sentiments that resulted from the 1999 report by the Institute of Medicine "To Err is Human," where they showed how much preventable harm we have. And, I think that as we go into our clinical day every day, we need to make a commitment to take care good care of all our patients, not just most of them. And if you do so, you will recognize that the extra effort required to keep them safe may come at a small expense to you - you may have to respond to a few false positive alarms during a shift or you may have to spend little time educating a patient what you do to keep them safe with a monitor or with the pain expectations or how they can help in that care - but not having to sit and explain to a patient's family, why they died a preventable death or have a lifelong brain injury is well worth that investment.

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We need to have really a zero tolerance for preventable harm and monitoring is part of that, but there's other things you can do. Your organization and others are taking a lead in that. So, it's a extremely worthwhile effort.

Wong:

Thank you, Frank, for being on this podcast and hopefully clinicians, hospital executives, and risk managers listening to this podcast will continuously monitor patients and improve their patient safety. Thank you, Frank.

Overdyk:

Thank you, Michael.

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