

## Sedation and Paralysis

Hi all – here's yet another FAQ file. Why did I get so sleepy writing this one? As usual, please get back to me if you find anything wrong, anything left out, or anything that shouldn't have gone in, and we'll fix it right away! Also as usual, please remember that this is not meant to be a final opinion on anything, but is supposed to reflect the information that a preceptor would pass on to a new orientee...

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## Sedation

### 1- What is sedation?

- Sedation is actually used to mean two things in the ICU, because we have two goals: to either:

- make the patient sleepy for one reason or another, or
- give the patient pain relief, or
- both

To do this, we use a number of different meds in drips and pushes, depending on what we're trying to do. The meds may seem confusing at first, but mostly they all belong to only a couple of families: opiates, benzodiazepines, phenothiazine meds like haldol, and specialty meds like propofol. Sometimes we use meds like benadryl, but that hardly counts as ICU-type sedation...

### 2- Why do we sedate patients in the MICU?

Most often we sedate patients because they're fighting a ventilator, or because they're at risk for injuring themselves: an intubated patient with various invasive lines may become abruptly confused and start trying to climb out of the bed, either with or without those lines – this can lead to all sorts of dangerous situations, and it is your responsibility to keep your patient safe. There's a lot of debate about the legality and ethics of restraining patients, but there's not much disagreement that patient safety comes first.

Ventilation-dependent scenarios often require sedation, for a number of reasons. One of the simplest is that an agitated or confused patient may bite, hard and continuously on his ET tube. Obviously a bad thing. I've seen patients code as a result of this – no oxygenation. Similarly, a patient in a serious respiratory situation – say, on 100% FiO<sub>2</sub> for ARDS – can't be allowed to fight the ventilator, for the simple reason that she won't get oxygenated.

A key concept in sedation: don't overdo it. You really want to keep the patient comfortable and free of distress or pain, but you don't want him anesthetized to the point where you can't assess his mentation. By all means, if you need to, use the sedation that the situation requires, but remember to back off, and try to find the minimum amount required.

Another thing to keep in mind: why is your patient becoming confused? Obviously if your patient is at risk, your goal is keeping them safe, and that may mean quickly applying one form of sedation or other – but in the back of your mind you need to be thinking about what the causes might be. Just as a quick example, I remember a patient who became acutely confused: a relatively young man, maybe late 30's, who was otherwise stable, suddenly became agitated, frightened, very confused and combative – and we had no clue why. We did what we had to – as I recall we gave him some IV Haldol, and put him in soft restraints, but the medical team called the resident from the Acute Psych Service to look him over. To my amazement, they decided that his confusion was being caused

by his cimetidine. This, I never heard of. Turned out they were exactly right. Remember that APS is always available to help sort things out if necessary.

Which brings up a critical last point: what if the patient is adamantly refusing treatment? What if they're refusing and making sense? Or not making sense? Or intermittently making sense? (My wife says I usually fit in that last group...) Is the patient competent to refuse? Just make sure that you're not unlawfully attacking the patient – if there are questions of competency involved, Acute Psych gets a call.

### 3- What's the difference between "regular" sedation and "conscious" sedation, and why do we care?

I would call the main difference between regular sedation and "conscious" sedation scenarios the fact that the first group is usually intubated, and the second usually isn't, which can make things tricky. This second group is often going through a procedure like endoscopy, and there are a couple of key things to keep in mind:

Is the patient able to guard her airway during the procedure, or is she at risk for aspiration (how full is her stomach?), or airway obstruction?

Is she breathing at an adequate rate, or is she at risk for respiratory depression? Remember: an O2 saturation monitor won't tell you if your patient is breathing at a rate of 4, and becoming hypercarbic...use your eyes.

### 4-What sedative drugs do we commonly use in the MICU?

#### 4-1- What is propofol?

Propofol is a very useful sedative drug. It's very powerful, and it both works very quickly, and wears off very quickly. This makes it very useful when you need to gain control of a situation in which, say, the patient is trying to extubate himself and climb out of the bed – it is also just as useful when you want to try, say a day later, to see if the patient has become more alert, and able to tolerate ventilator weaning.

A couple of important things to remember about propofol:

It has no effect on pain at all. People get a little confused on this point at times. Propofol is not the drug to use alone when you have an agitated, intubated freshly postop patient.

It is a very powerful respiratory depressant – **it will make your patient stop breathing.** This is not such a big deal when your patient is intubated, but you'd better be at the bedside and watching while it takes effect – if your patient is on some ventilator mode that lets him breathe for himself, he may suddenly need to be "put on a rate". **Hospital policy: propofol patients must be on mechanical ventilation.** There has been one exception in the past: we've gotten permission occasionally to run no more than 30mg/hour of propofol on patients who are getting face-mask ventilation. It's a situation I don't like from the get-go: here's a patient who's at risk of getting her stomach all inflated, and then you apply a sedative that may lower her ability to guard her airway – what if she then vomits into the mask?

#### 4-1-1- How much propofol can we use?

Propofol is powerful medicine – it's easy to make a person lose blood pressure as well as respiratory drive – depending on how large a patient is, I would start with 30-50mg per hour. Bolus doses can be given – we usually give 10-30mg boluses depending on what the patient needs, and we have an hourly limit of 300mg – this is a lot of propofol, and is usually enough to sedate anyone. (Not always! The trick to effectively sedating a patient often lies in finding out “What's their drug?” – some people never do well with Ativan or Versed, but respond excellently to Haldol. You have to try different things in different situations.)

A couple more things to remember about propofol:

- It's very easy to grow germs in propofol – like TPN. The tubing for syringe mixes needs to be changed (along with the syringe) every six hours, and the tubing for bottle mixes every 12.
- Run propofol alone.
- Let nutritional support know about the propofol – since it's mixed in a fat emulsion, they may need to decrease the amount of fat the patient gets.

#### 4-2-What is fentanyl?

Fentanyl is a chemical cousin of morphine-an opiate. It's powerful – the doses are measured in micrograms - but like propofol, it's short-acting: works quickly, wears off quickly. We use fentanyl for patients who need long-term sedation, such as those with ARDS or BOOP – sometimes along with benzos prn.

The loading dose for fentanyl is 50-100mcg (at 50mcg/cc) by slow IV push – roughly 50mcg per minute. A drip can follow up to 200mcg per hour, or so says the policy, but I know that we've been authorized in the past to run higher doses when needed.

Things to remember about fentanyl:

- Policy says that these patients must be ventilated except when the drug is being used for intubation.
- People develop tolerance to fentanyl pretty quickly – after a couple of days on a given dose, you may find that the patient needs more. Or not. Use your assessment skills. Does the patient have liver failure? Is the patient already drug-tolerant? Is the patient getting ready for extubation? Always try to fit the use of the drug to the situation at hand.
- Remember that opiate drips can always produce a paralytic ileus – this can ruin your plans for nutrition with tube feedings. (Save a port on every central line for TPN!) You'll see teams try giving narcan to try to get the gut to wake up while the rest of the patient stays asleep – there may be studies that show that this works, but I've never seen it do much. More recently they've tried erythromycin – anybody know if this works or not? Apparently neostigmine has been used this way with really impressive results.
- Fentanyl will produce the small-pupil response that lets you know your patient is pretty well opiated.

#### **4-3- How do we use morphine?**

We don't use morphine drips much anymore – I seem to remember that one of the reasons that we changed to fentanyl is because morphine tends to provoke histamine release, which gets seriously in the way of asthma management. Still, morphine drips show up now and then, so a quick review of the policy:

- IV pushes can be 1-20mg over 4-5 minutes
- Drips can be 1-150mg/hour, titrated to response

Remember that morphine can suppress respiration, that it can drop blood pressure, and that it can also create an opiate ileus. It will also make patient's pupils shrink very small, like fentanyl. This isn't a bad thing in itself, but you can use it as a marker – if you shut the morphine drip off three days ago, and the patient's pupils are still tiny, then they may have a problem "cooking off" (metabolizing) the drug...

#### **4-4- What are the "benzos" that we use in the MICU?**

We use three "benzos" in the MICU: Valium, Ativan and Versed – although lately not much Valium, it seems to me. Just recently we've started using benzo drips: Ativan and occasionally Versed – I couldn't put my hands on policies for these drips right away, but they are cleared by pharmacy- check with them for any question, any time.

##### **4-4-1- Rules for using Valium:**

- IV pushes are 2.5-10mg, at 5mg per minute.
- For status epilepticus: 10-30mg at 5mg per minute.
- For delirium tremens – this gets a little hazy, and if this situation came up I would call pharmacy for guidelines. In my "too-many" years of ICU nursing I've seen situations where people in acute DTs were given truly impressive amounts of IV Valium with no apparent effects on blood pressure or respiratory rate.

##### **4-4-2- Rules for Ativan:**

- For anxiety or agitation, we can push 1-4mg IVP
- For status epilepticus: 2-8mg IVP
- IV Ativan has to be diluted with NS to make a 1mg/cc concentration – it's very irritating to veins.
- Maximum dose in 24 hours: 30-40mg depending on response. Lately we've started using Ativan drips, and I am pretty sure I've seen them running at least at 3 or 4mg/hour, which would mean a daily total of what – 3 or 4 times 24hours – more than the current policy limits. These drips are cleared by pharmacy – I'll follow up with them and get the latest info...

##### **4-4-3- Rules for Versed:**

- For anxiety or agitation: 0.5-2mg IVP.
- For maintenance: 1-2.5mg/hr. (I've seen patients arrive from other hospitals on versed drips, but I think we've only run them ourselves once or twice.)
- Maximum dose in 24 hours: 20-40mg depending on response.

- Policy says that these patients must be ventilated, or the med given in the presence of an MD trained in airway management. This is definitely for real – elderly patients seem to stop breathing very easily with versed.

#### **4-4-4- What do I do if my patient goes apneic with sedation?**

Let's stop and talk about this one for a second...what would you do if you gave your un-intubated patient a dose of versed, and they stopped breathing? First of all, you want to remember to be alert to this risk in the first place, right? Every time, right? Okay, so there you are, and they're doing an upper endoscopy, and they've ordered you to push two mg of versed, and you do... and the patient stops breathing.

- First move? Tell the doctors doing the procedure that the patient has gone apneic. The scope needs to come right out. You are calling for assistance, right? You're watching the patient's heart rate and saturation up on the monitor, right?
- Second move – oral airway handy? They keep one in every room, and you know where it is? Put it in – know where the ambu-bag is? There's one of those in every room too... but of course you had them both at hand and ready, because you knew that this might happen – you are an ICU monster! (That was a compliment!)
- Third move – airway in place? How's the saturation? Are you bagging them yet? Good O2 flow through the bag? Nice control of the jaw, good chest movement with bagging? How long has it been – two minutes yet? Sat still okay? Heart rate still okay? What does the heart rate typically do if the patient's airway is obstructed? (They go bradycardic...) Three minutes – think the versed is wearing off yet? Should be...
- Right. Deep breath – you, that is. Nice job. Sat okay? Heart rate, blood pressure, patient's physical skin color all okay? Nicely stabilized situation. Think you need to intubate this patient? Probably not – but is the versed still not wearing off? What drug do you want to have nearby? Do you want to give it or do you want to wait...? Why might you not want to give it? (Suppose you'd initially given fentanyl to the patient, or demerol – what drug would you want to have nearby if the patient had gone apneic in response to those...?)

#### **4-5-How do we use Haldol?**

We tend to use haldol when people are not intubated, and confused to the point where they may be trying to climb out of the bed, pull out their lines – situations like that, when all your explanations and reassurances aren't helping. It's a judgment call – sometimes benzos are a better choice; certainly if there's any question of ETOH withdrawal.

Here's a question. Why don't we treat impending DT's with alcohol? Seriously? I mean, if it would make the symptoms go away, and make gradual detox easier? Somebody shoot this idea down for me...

Haldol is a bit mysterious to me. Sometimes it works really well, other times it seems to do nothing. And yet apparently small doses, like 1mg bid have worked really well in controlling patients with panic attacks. Anybody know how this works?

The nice thing about Haldol though, is the fact that it doesn't seem to inhibit breathing very much, if at all. This may really be the way to go if you're trying to sedate a patient with respiratory problems that might be made worse with Ativan, or the like.

Rules for Haldol:

- Initial Dose: 2 to 10mg IVP doses may be repeated every 20 minutes, up to 20 mg in one hour. 24 hour cumulative total dose is 240mg. (That's a lot of Haldol. Maybe that patient needs something else...)
- Be careful of overdoing it – the drug can build up, and the patient may wind up knocked out for a long time.
- Very important – and this turns out to be more important than we ever thought for a long time: be careful when using Haldol with cardiac patients, or even in non-cardiac patients. Haldol can prolong the QT interval, increasing the risk for something really unpleasant like “torsades de pointes” – also known as polymorphic VT, which sort of looks like a tornado on it's side on the monitor, in case you've never seen it. It has tornado-like effects on blood pressure too. We've actually seen haldol blamed for this several times over the years...

#### **4-6-How do we use dilaudid?**

We've just started using dilaudid drips in the unit recently, as there seems to be a national shortage of fentanyl. (What, did the crop fail, out there in Idaho?) We run a drip of 1-20mg per hour – keep in mind that dilaudid is powerful stuff – according to a web reference I found, a milligram of dilaudid is roughly equivalent to 7 or 8 milligrams of morphine.

#### **5- How sedate does my patient need to be?**

Generally there are two goals for sedation: keep the patient safe, and/or keep the patient in “synchrony with the vent” – which is to say, to keep them from fighting the ventilator. We actually have a sedation scale on our flow sheets, which ranges from zero for “Anxious and/or agitated”, to 5 for “Unarousable – does not respond to mild prodding or shaking.”

Usually for ventilated patients, we shoot for somewhere around 3: “Drowsy/sedated, responds only after name is called loudly...”. Of course, if we're trying to wean the patient, we'll lighten them up...

#### **5-1- Something to think about...**

Here's a question – we haven't gotten to discussing paralysis yet, but suppose you were caring for a chemically paralyzed patient, who was also on, say, a fentanyl drip. This patient is not going to “respond to mild prodding” in any way that you could see – or are they...? How could you tell if your patient was not sedated enough under their paralysis – say, awake and terrified at being unable to move? Or too sedated? Think this one over as we continue.

#### **6-How do I document my patient's level of sedation?**

Use the numbers on the assessment scale, but describe the patient's neuro status in your note. It doesn't have to be super detailed, but it should always cover the basics – first, are they in the same neurological state as they were when you started the shift?

Pupils the same? Moving all extremities? No enormous, detailed assessment, but you sure want to know if a patient has blown a pupil on your time, and sedation will certainly hide symptoms – your assessment should be ongoing throughout your shift. Is the level of sedation meeting the patient's needs? Did you need to change it? How come?

### **6-1- A sample nurse's note.**

Here's a sample of how I might write a note. Let's pick a scenario – say, an elderly patient who comes in, and who's been intubated in the ER for a COPD flare. She was given Ativan in the ER, because she'd been very combative and confused, and she'd needed sedation for a CT scan before she came up to the MICU.

Now she's been with me for six hours – it's 6 am, and I'm writing my note:

#2: Potential Alteration in Mental Status : Pt. arrived from CT scanner after ER admission, very agitated despite repeated attempts to re-orient, coughing and asynchronous with ventilation– per discussion with team, started on propofol at 50mg /hour with only fair effect, still trying to climb OOB despite explanations, reaching for ET tube – propofol titrated up to 120mg/hour with smooth effect, soft restraints x2 to wrists for safety. PERL, MAE with no apparent focal weakness...remains in phase with the ventilator, on PCV rate of 22/min, VT about 500...

In other words: she's not fighting the ventilator, she's safe and not in danger of extubating herself, and her tidal volume looks pretty good on pressure control ventilation (for more on what the ventilation terms mean, have a look at the Vents and ABGs FAQ). Make sure – right away- that the physicians are aware of the fact that you've applied restraints. You definitely have the legal authority and the right motivation in this case to apply them, but there must be an order written promptly, and the need for restraint must be carefully and continuously assessed. Remember – sedation is a form of restraint. What if the patient is completely competent, and is refusing all your treatment...? While your first goal is to keep the patient safe when they may be confused, this is always something to keep in the back of your mind.

### **7- What should I do if my patient is oversedated, or undersedated?**

This is why your assessment has to be ongoing. If your goal in the scenario above is to extubate the patient someday – well, you're going to have to lighten them up. So do it. But what if they don't tolerate it? Say – their respiratory rate goes to 60, and their sat does the same? Yes indeed, you should re-sedate that patient, while informing the team that you are doing it, but – and this is an important “but” – document why you are doing it. No one from the team will stand there and argue with you if your patient is becoming hypoxic, diaphoretic, turning blue, and clearly not tolerating their sedation wean, but you must write down the essential information on your flow sheet while the events are occurring: the sat, the heart rate, the respiratory rate, the blood pressure... And send a blood gas while they look awful, to document their poor response to the wean. And another one afterwards to show how they benefited (or didn't) from re-sedation. This is the whole point of the exercise: to show what helps the patient, and what doesn't, and why.

Another critical point: in a situation like this, make sure the team is in close touch, that they understand every move you make, and why you made it. Don't be put off if they're deep in rounds discussion, or anything else – if your patient is in trouble, respond within the limits of your orders, get help from your teammates, drag those doctors physically into

your patient's room, and keep them there until your patient is safe. Remember the essential point of survival in the ICU – **always get help**.

Let's do another example. Same patient, next day – lady with COPD, who was intubated, and needed sedation for agitation during a CT scan, right? Team makes rounds, says: okay, let's lighten her up and see if we can extubate her... you're not sure if this is actually going to be the way things go, but we do need to see how awake she is under her sedation... they have you turn the propofol off. 20 minutes later, she's doing all those bad things we listed above – she's wild, blue, pulling at everything, tachycardic, she looks awful, maybe ischemic, she's sweating...

First move – get on the intercom, call to have the team come to your room immediately.

Quick second move- jot down the vital signs, whatever they are, somewhere – on a paper towel maybe. At the same time, keep your eyes on the patient and the monitor...

Third move – if you can, draw a quick blood gas, and get it sent off. Ask someone to send it for you – don't leave the bedside with your patient in trouble.

Fourth – got your propofol ready to restart? Team in the room? Everyone agrees? Start it back up, maybe with a little bolus first. Note the time – write it down.

Make sense? Sedation is a tool in your kit – and you have to use it! But do it by making the rules work for you, and for your patient.

## **8- How do we wean sedation?**

Actually, you need to start thinking about weaning sedation as soon as the patient is started on it. This doesn't mean that you have to do it right away, but you do have to have some idea of where you're trying to go. Clearly, a patient who needs sedation to stay safely in synch with her vent, who is so sick that she clearly can't wean from that vent yet – that patient probably will do badly if her sedation is weaned.

In the event, you just have to do it. Turn the sedation down and see what happens. Document what does happen, and make sure the team knows – even better, pull them into the room and show them...

### **8-1- Weaning propofol.**

The nice thing of course about propofol is how quickly it works, and how quickly it goes away. This makes it ideal for short-term intubation scenarios, say, a COPD flare that comes under control in a day or two. You can turn the propofol off, and the patient will be reasonably awake within minutes.

### **8-2- Weaning benzos.**

I have to confess that we've been using benzo drips so infrequently that I really don't know much about how this is done- anyone from the group have anything to help out with this one?

### **8-3-Weaning fentanyl.**

This one we do know about – we use a lot of fentanyl for long-term sedation cases, and if the patients have been on it for more than a week to ten days or so, weaning can

become an issue. The general rule is to decrease the drip by 25% each day – this doesn't mean that the drip is off in four days; it means that if you start weaning at 1000mcg/hour, then your first move down is to 750. Next day – what's 25% of 750?: 187, subtracted from 750 – second day would run at 560mcg/hour. Next day, 25% less than that. So it actually probably takes something like 10 days... sometimes we'll wean the drip to a certain point and then apply a patch.

The symptoms of withdrawal are usually really obvious – the patients get tachycardic, hypertensive, maybe diaphoretic – clearly in distress, anyhow. Sometimes you just have to go back up on the drip for a while. Another maneuver that they make sometimes is to treat the patients with clonidine – either as a topical patch, or po. Micromedex says that clonidine has been used to control the symptoms of withdrawal to a bunch of things: opiates, benzos, nicotine, and alcohol, blocking the adrenergic release that's involved.

## **Paralysis**

### **9- What is paralysis?**

For some reason, people get confused about the difference between paralysis and sedation. Paralytic drugs do nothing to sedate your patient. Paralyzing drugs must be given with industrial-strength sedation: usually propofol or fentanyl, or sometimes both. There are stories you can find in the literature about anesthetic failures in the OR, in which a patient was alert but chemically paralyzed throughout his surgery, and felt it all. Didn't the anesthetist notice all that tachycardia and hypertension? Give a lot of loproressor, did she?

### **10- Why do we paralyze patients in the MICU?**

The basic idea in using chemical paralysis usually involves an effort to gain safe control when a patient is in severe respiratory trouble. Most of the time we can do this with effective sedation, but sometimes we simply can't ventilate some patients effectively, and paralysis makes all the difference. I understand that it has to do with relaxing the muscles in the chest walls, and allowing better chest movement (if you want to be really cool, you call this "better excursion".) With better movement comes a larger tidal volume, and that allows for better clearance of CO<sub>2</sub>. Remember that ventilation and oxygenation are different (you read the "Vents and ABGs" FAQ, right?) – ventilation specifically means "how well the patient is getting rid of CO<sub>2</sub>".

Some scenarios for paralysis might be: severe asthma episodes (status asthmaticus), ARDS, sometimes overwhelming pneumonias- any condition that severely affects the volume of air that the patient can move in and out.

### **11- What drugs do we use for paralysis?**

Over the years we've used a lot of different drugs to paralyze patients, including curare, which is the South American arrow poison. (Here's a question: if we are paralyzed by a plant, or sedated by a plant, does that mean that we're physically related to that plant?) Nowadays we paralyze our patients with Nimbex (cis-atracurium), or sometimes with vecuronium. Someone explained to me awhile back that we use the combination of Nimbex and fentanyl now, instead of the older curare and morphine, because they cause less of a histamine release. This can be really important in situations like asthma, which is "mediated" by the histamine-inflammatory thing. What do I know? I just hang the stuff and run it!

Up until just recently we dosed Nimbex by weight, using a range measured in mikes per kilogram, per minute. Lately we've been using a standardized scale of 1-10 mg per hour. It doesn't seem to have made much difference treatment-wise. Nimbex has to be loaded first, 10 or 15 mg, IVB. Usually what I do is give the load, and then start the patient in the middle of the drip range – that way you're not giving too much, but you know you're giving enough that they ought to have some response – then you titrate up or down by effect.

The only other paralyzing agent we see nowadays (rarely) is succinylcholine – anesthesia will use this when they're intubating.

## **12- How paralyzed does my patient need to be?**

Remember what your goal is: to keep the patient in synch with the vent, and to improve CO<sub>2</sub> clearance. If you meet those goals, there you are. If you can get there without paralyzing your patient, so much the better!

## **13- What if my patient isn't paralyzed enough?**

Usually this is the way this goes: you give a loading dose – this is enough to initially paralyze the patient. Remember to document pre- and post-load TOFs. Then you start a drip, which is supposed to keep them paralyzed. Each patient's metabolism is a little different – some patients will 'cook off' a loading dose faster than others, but they are also probably going to be the ones who also cook off the hourly amount they get at a faster-than-normal rate. Which means they may start to move around, drop tidal volume, and fight the vent. Usually we wind up repeating a loading dose, and then restarting the drip at a higher level. To me, it would only make sense in this situation to run the Nimbex at max: 10mg per hour, since your patient is in a life-threatening situation, or you wouldn't be doing all this in the first place, right? Your goal is to keep your patient safe. There's an old ICU nurse saying: "Sometimes your only goal is to be able to say that your patient is still alive at the end of your shift." Don't obsess about whether the next nurse will holler at you because the lines aren't dated – or even if the bed linen isn't clean. This is part of priority-setting – keep them alive. Cleanliness is next to godliness, but alive sometimes comes before clean!

## **14- How do I assess my patient's level of paralysis?**

In the old days (I keep saying that...) there were only two positions on the paralysis meter: "paralyzed enough", or "not paralyzed enough", and we'd increase or decrease the drip based on how well the patient was responding vent-wise.

Apparently the problem with this was that lots of patients took forever to become un-paralyzed, and they figured out that this was because the little muscle receptors were becoming too "saturated" with the paralyzing agent. In other words, we were giving too much drug, because we didn't have any precise way to measure the response to the doses we were giving, except for observing how flaccid the patients became, and what their response was on the vent. So we were taught to use the "Peripheral Nerve Stimulator".

Here's the idea. The stimulator delivers a series of four electrical signals, (called a "train-of-four" – there's a button that says "TOF" on the box), to a specific site over the ulnar nerve. You hold the patient's hand as though shaking hands, with your thumb hooked in theirs. If the patient is not paralyzed at all, each of the four signals in the TOF will generate a "twitch" response in the patient's thumb – you'll feel it pull against yours: 1,2,3,4. If the patient is fully paralyzed, you won't feel any twitch response at all. Try the twitch with the output dial on the

box at different settings – the knob can be set from 1-10. I try 5 at first, and I go to ten after that if necessary, then I try to find the lowest setting that gives a response. The whole procedure doesn't take more than a few minutes.

Here's how it's done. You find the ulnar pulse, and you put two sticky chest electrodes over the line that the pulse follows, moving upwards from the wrist. I put the electrodes right next to each other, with the gel part in the center over the points where I felt the pulse. Sometimes I use a doppler to find the pulse, mark the points with a pen, and benzoin the sites so the electrodes don't get sweated off.

Now you connect the wires of the PNS box, turn the box on with the dial, and try to assess the patient's response. The goal is a response of one or two twitches out of a train of four – meaning, you feel the patient's thumb twitch under yours once, or twice, in response to the first, or first two signals in the train. I guess they've done the studies: this level of paralysis means that your patient will be "paralyzed enough", but will not be so saturated with the drug that it takes too long to wear off.

#### **14-1- Problems with our paralysis system ...**

There are a couple of problems with this system:

Some people don't seem to paralyze 'normally'. This is a weird but true thing – you can Nimbex load some of these people, and titrate the drip up to max, and they just won't paralyze. Doesn't happen often, but it happens enough that experienced RNs recognize it when it does. Just make sure that the patient is actually getting the drug – an infiltrated peripheral line will make the whole situation that much harder to figure out.

Some people paralyze properly, but they don't 'twitch' in response to the nerve stimulator. Clearly they are paralyzed: they're flaccid, and they respond the right way to the vent, but they won't twitch – maybe because they're very edematous. Some non-edematous people also just won't twitch. Any ideas about this one from the group? In this situation, you have to just assess the patient carefully, as we did in the old days, and try to titrate for the least amount of drug that keeps the patient safely in synch with the ventilator. Obviously, you want to be ready to re-bolus and re-titrate them if they need it. Also obviously, there are situations when the patient is so "tight" – moving so little air – that you wouldn't even want to think about letting them become un-paralyzed even briefly. Make sure that you and the team are clear about the paralysis plan for your patient.

#### **15- How do we wean paralysis?**

Even though we try to titrate the dose and the effect very carefully, the net effect is that the patient is still either 'paralyzed enough', or 'not really paralyzed at all'. So when it comes time to 'wean' a paralytic drug, we usually just shut it off.

#### **16- How do I know if my patient is ready for a wean?**

Well, you're going to have to try it sometime. It can be a scary thing to do, if your patient was, say, critically acidotic going into paralysis, and only now is their pH above 7.2. (New RNs- remember why their pH would be so low?, and how paralysis would fix that?)

This is your basic medical judgment-call situation. Sometimes it's quite clear – you paralyze your patient for, say, status asthmaticus – your patient is moving a tidal volume of 75cc. Yikes! Afterwards, using a heliox mix (look at the Vents and ABGs FAQ for a little more on heliox and

how cool it is), you get the tidal volume up around, oh, 300cc, running nebs continuously, but you still hear wheezing. Would you want to think about un-paralyzing this patient before their wheezes went away? Noooo, you would not! Judgment call. Suppose a physician came along and told you to do just that. Now what?

Take a look at the "Starting Out New in the MICU" FAQ for some ideas on "What should I do if I think the doctors are telling me to do the wrong thing."

### **17- What is a "paralysis holiday"?**

This sounds like going off on Nimbex to the caribbean, right? Actually, the idea here is to do a 'trial run' off the paralytic, to see what happens. This is a better idea than just having someone give you an order to 'shut the drug off'.

Basic points apply here:

- Watch this patient very carefully if you think they might get right back into the trouble that they required the paralysis for in the first place. Watch them carefully anyway!
- Document what happens when the drug starts to wear off: heart rate, blood pressure, O2 saturation, respiratory rate, tidal volume - mark the times clearly, so that events make sense.
- Send off blood gases to document the patient's response.
- Have a plan ready in case your patient gets into trouble. This is precisely the kind of thing that house officers sometimes don't remember to do, often enough because they've been told by their higher-ups to 'do this', or 'do that' - 'shut off the nimbex - the patient will be fine.' Just make sure you are ready. What kind of plan could you have?
- Make sure the team is fully aware of everything the patient does, and of everything you do, want to do, plan to do, or think you could do. Physically pull them into the room if you think you need them there.

### **17- How do I tell if my patient isn't tolerating the wean?**

This will usually be pretty clear - the patient will go right back into the same set of symptoms that got them paralyzed in the first place. As above, have a plan, and talk very seriously with the team if you think that weaning might be dangerous in the first place - such as that the patient's pH is still 7.10, and maybe that's why she needs so much Levophed? And maybe if she had another day or so to normalize acid-base-wise she could have more room to move on the vent? Sometimes we nurses have to be stubborn this way. Just make your case calmly and clearly, and lay out your reasoning - then document it in your notes, and describe what happened when you tried the wean.

### **18- Steroids and paralysis.**

Apparently steroid myopathy can be made much worse by paralytic treatment, which in the MICU may mean that it will take an extremely long time for the patient to come out of paralysis. Weeks, maybe. We've heard about this for a while now in the MICU - as a result, we try to use deep sedation before paralysis, if we can, especially in situations that are going to require a lot of steroid use. In fact, we seem to be paralyzing less frequently lately. Something to remember, though.

## **20- What are some of the emotional issues surrounding sedation?**

This is actually a pretty complicated question. First of all, there are a number of people involved:

- the patient (we knew that one)
- the patient's family
- the nurse caring for the patient
- the physicians caring for the patient

That gives us plenty to start with, so let's take them one at a time.

**20-1- The patient:** the goals here are relatively simple, although achieving them may not be:

- That the patient is given enough sedation so that he is comfortable, free of perceived pain and or distress, during the period that their condition demands it.
- That the patient is weaned from their sedation slowly enough that they can tolerate the process comfortably.
- That the patient is given emotional support and reassurance throughout the whole sedation period. And during a sedation wean. And afterwards.

There are various stories that come back from patients that have been sedated for long periods: most of them don't remember anything, which is probably a very good thing. But some of them do remember things – it's always been stressed, and I always do this – that you should talk to your sedated/paralyzed patients every time you do things to them, and even when you're not doing anything to them. Reassure them. Tell them that their loved ones called.

A word here about assessment. Your goal is to provide a smooth effect in the patient, right? You don't want to terrify them. Sometimes, passing along messages from loved ones will make a patient's heart rate shoot up. This tells you two useful things: first, they're alert to some degree under there. Second, you might not be sedating them enough. Remember, a patient can be quite terrified under paralysis if they're not receiving enough sedation.

### **20-2- The patient's family:**

Strange to say, that part of a patient's sedation plan may include the family. Families will probably not benefit from seeing their loved one becoming very distressed while being weaned from sedation. Again, this should tell you two things: first, you may be weaning sedation too fast. Second, the family probably doesn't need to be in the room while most of this is going on. It's true that this is partly just my opinion, and this certainly varies from one family to the next. But I think that it doesn't really serve the families well to over-expose them to situations in which the patient may be going through periods of distress. Some distress is probably going to be unavoidable. Would you want to watch every minute of this, if it was your wife? I wouldn't.

I often tell families that they need to leave certain parts of this whole thing to the nurses. That is of course why God made nurses. And that they, the family members, need to rest, and eat, and care for themselves, and let the nurses take the brunt of all this, because they, the families, need to be strong to get through all of this. And that they need to be strong in case decisions need to be made for their loved one: consents for procedures, getting bad news, even getting good news. It's often a long, tough roller-coaster ride for them.

### **20-3- The nurse:**

Obviously very important, but too often ignored. Among the other twelve million things that nobody knows about nurses is the fact that we bear the emotional brunt of working with these patients, long-term, up and down, year in and year out, at an emotional distance of about eight inches. Maybe four inches.

Here it is in plain words: No one, no one gets as close to a patient, or stays as close to that patient, or is as involved with that patient, or for that matter suffers as much with that patient, as the ICU nurse. The family members go home, the respiratory therapists go from room to room, the physicians make their rounds, but a primary nurse will stay with his assigned patient for as long as it takes. Which may be months. Until the patient either gets better, or until they die. At a distance of four inches. Maybe eight inches. And they follow this career for what, maybe 30 years?

It's worth asking, at some point anyhow, what this does or doesn't do to the nurse as a person. And actually, this is not an unrelated digression here, because how the nurse is coping with all this may affect her perception of her patient's suffering. In other words, is the nurse interpreting her patient's need for sedation through her own colored lenses?

This brings up the question of relative distance. We spend weeks almost completely in bed with these patients, and we sometimes get angry when doctors stand back, and give what may seem like relatively cold, clinical opinions about this, or that point of patient management.

Here's my point: we need both perspectives to be at work at the same time – we nurses do, and the patients do. We need to have people almost in the bed with the patients, tuned into them at close range, and we also need people to stand back and be clinical, more “unemotional”. I'll tell you – many of us are soft-hearted, very empathetic, and many, many is the time that we turn to each other and say something like: “Why in the world are they wailing so hard on this poor person? Why can't they just stop all this?”. This is not inappropriate. This is patient advocacy.

But! How many times have I been amazed – to see some of these same patients, who with all my experience I honestly never thought would leave the MICU – go out? Go home? Enough times, I'll tell you, to know that the folks standing at a clinical distance are often right not to stop pushing. Not always. But enough to make me think about it, and to force my opinion to change somewhat. Their kind of work is also patient advocacy – the same, except different. (Old joke...)

My point is that I don't think that either of these positions would serve the patient well without its opposite also being in place.

How does this bear on sedation issues? The nurse, depending on her level of experience, life conditions, age, whatever – the nurse may be at risk of being emotionally overwhelmed by her close proximity to genuine patient suffering.

And here comes a real problem. The nurse at the bedside may have trouble handling this daily emotional burden. So there may be difficulties when it comes to how much sedation she may think her patient needs.

The essential thing is: nurses, take care of yourselves. Remember, this is one of the very hardest jobs there is in the world – think about this – eight inches away from the near-dying for 30 years? You have to find a way to either deal with these stresses, or get out from under them. But keep an eye on your heart, and remember that there's no shame if it turns out the MICU isn't for you – for 30 years, anyhow. And this of course brings us to our next question:

## **24- What if I need sedation?**

I recommend several things, sometimes in order, sometimes all at once:

### **24-1- Non-anesthetic techniques:** (some are mine, some are from my co-workers...)

- Keep a supply of “high-octane” ice cream handy in the unit for the nurses at all times, preferably any flavors containing certain key words: fudge, triple, New York, chunk... there are some others. This is not sedation, actually. But when your heart is hurting, it’s amazing what Waffle Cone can do...

- Own a cat. Probably two cats, so they can keep each other company. Name them after your co-workers. Don’t like cats? Like horses? Go riding twice a week. I like dogs, myself, and I have two, and they understand everything I tell them. About the unit, anyway.

- Send lots of emails to lots of people, check them several times a day, and answer them with weird e-cards attached.

- Take a couple of vacation trips a year if you can, and spend a lot of time figuring out the details. I never get to do this – but I try to have fun at the grocery store. I need to get out more... (It was more fun in the grocery store when my kids were small...)

- Take karate lessons. Two women I work with have been doing this for years, (actually we have a kick-boxer, too), and one of them just got her black belt. Celebrate black belts at work with more ice cream.

### **24-2- Anesthetic techniques:**

I prefer Heineken, myself, at home, with the spouse, and the kids, and the dogs, as a combination with HBO. Or if deep anesthesia is required, as a combination with congressional house tv coverage. Very effective. What were we talking about?

### **24-3- What if I don’t have kids, I hate cats, and I don’t like horses either?**

Team up with your co-workers and friends. Eat out with friends every day. Eat at home with friends every day. The point is: ICU nursing is a group effort at every level. Don’t carry the weight alone.

Thank you peer reviewers!