

Adult & Pediatric Resuscitation

presented by **Donald Jenkins, DO**

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Target Audience: Anesthesiologists, Burn Surgeons, Emergency Medicine Physicians, Family Medicine Physicians, General Surgeons, Internists, Neurosurgeons, Ophthalmologists, Orthopedic Surgeons, Otolaryngologists, Pediatricians, Pediatric Surgeons, Psychiatrists, Radiologists, Oral Max Surgeons, Trauma Surgeons, Registered Nurses, Pharmacists, Physician Assistants, Social Workers, Paramedics/Emergency Medical Technicians, Flight Personnel

Course Description: As speaker for the special event program “*11th Annual Adult & Pediatric Trauma Symposium --Head Injuries Across the Ages – From the Field to Beyond*”, Dr. Jenkins addresses resuscitation issues of adult and pediatric patients presenting to the emergency room with injuries to the brain. This lecture was previously recorded as part of a live CME approved conference and is now made available through this online program. A voice recording, PowerPoint slides, and web technology are utilized. Click on the link above to begin this online educational activity.

Learning Objectives: *Upon completion of this course, the learner should be able to:*

- **Discuss priorities and order of priorities in the resuscitation of brain injured adult and pediatric patients.**
- **Verbalize the difference between primary and secondary brain injury.**
- **Identify the major causes of secondary brain injury.**
- **Explain the necessary steps involved in securing the airways of injured patients.**
- **Describe the team approach and its’ contribution to the successful resuscitation of trauma victims.**
- **Gain some familiarity with the medicines used in airway control.**

Estimated time to complete the educational activity -- 1.0 hr(s)

Donald Jenkins, DO,

Department of Emergency Medicine, Crozer-Chester Medical Center

Dr. Jenkins attended medical school at Philadelphia College of Osteopathic Medicine and trained locally at Albert Einstein Medical Center in Philadelphia. He joined the medical staff at the Crozer-Chester Medical Center in Upland, PA in July of 1998 and has remained a full-time staff attending for the Department of Emergency Medicine.

Accreditation

Accreditation Statement

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Pennsylvania Medical Society and the Accreditation Council for Continuing Medical Education (ACCME). The Crozer-Chester Medical Center is accredited by the Pennsylvania Medical Society to sponsor continuing medical education for physicians.

Designation of Credit

The Crozer-Chester Medical Center designates this educational activity for a maximum of 1.0 AMA PRA Category I Credit(s)[™]. Physicians should claim credit commensurate with the extent of their participation in the activity.

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Dr. Jenkins has disclosed that he will not present on an unapproved/investigative use of a commercial product or device. Dr. Jenkins further disclosed that he does not have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation. A signed Investigative Disclosure/Conflict of Interest Statement is on file in the Office of Continuing Medical Education at the Crozer-Chester Medical Center.

Adult & Pediatric Resuscitation by Dr. Jenkins

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Dr. Jacobs CME06 15e – Trauma Resuscitation

Slide 1

My name is Don Jacobs, and I am one of the attendings in the Department of Emergency Medicine here at Crozer, and I would like to welcome you to one of the most embarrassing episodes of my professional life. I actually brought to the lecture on two different glass jars, just to be prepared and be redundant, and neither one of them can open, and all my other lectures on here apparently open, but there was nothing that was really germane to what I wanted to talk about or have enough slides to keep your interest for an hour. So I am not going to just pick and choose slides that probably wouldn't be a good idea. And I have to say, you know, any time something bad happens, the blame must be assigned in our society. And I think the 14-year-old technical wizard who helped me get CT scans loaded up on here last night, also somehow corrupted the file. And I was going to give him credit for, you know, helping me out and getting the CT scans to hold your interest, and unfortunately, the whole file is corrupted. It's not even sending through e-mail, my wife can open up on the home computer, it's not showing up, although we did make some efforts to try to rectify this.

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So, what I want to talk about is resuscitation in order to ___ the initial phase of a patient encounter with our part of the trauma system. The patient is already entered into the system, hopefully, skilled pre-hospital providers have picked that patient up. They've let us know the patient's coming. Not every trauma works that way. Some are surprise traumas. We know that head trauma is kind of a bimodal disease, it's a disease of the young, and it's a disease of the elderly, and sometimes the old person who has just been shuffling around for a few days, and have noticed grandma's not doing so good anymore, comes to the ER. We see something we don't like, we get a CT scan, and yikes, there's an acute and chronic subdural and we calling ___ scan, and we say, hey, get down here, we are going to need you. We are calling rehab and saying sorry, we didn't get this guy in the trauma system soon enough. But, one of the points I wanted to bring up early on, and I had some nice CT scans to show you this, is primary versus secondary brain injury. There's nothing any of us can really do about primary brain injuries other than prevention. Put helmets on kids, be careful with firearms, wear your seatbelt, drive in a reasonable manner, and don't drive when your mental status is altered. But once those neurons, once you have had the initial insult, neurons are killed, neurons are injured. They are not coming back.

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And so, then, secondary brain ___ and neural people got into this this morning, but there are all kinds of mediators in secondary brain injury. Increased intracranial pressure, vasogenic edema, cytotoxic edema, and some of those things we can do something about, but the two major determinants of secondary brain injury are the things that are alterable and potentially treatable in the emergency department are hypoxemia, that is a PAO₂ of less than 16 mm/Hg, and hypotension, and that is a systolic blood pressure of less than 90. I don't want to get into the whole mean arterial pressure thing, but just know that, if you drop the mean arterial pressure low enough, the brain can't auto regulate, and brain tissue is starving. And those are the things that, in the emergency department, in the initial phase of the resuscitation, we can probably due something about. And we don't know, at that point, what kind of brain injury the patients have. They come to the emergency department, they have a macrophysm. They may have a normal Glasgow coma scale score, or it may be diminished. But we are not going to find out what their brain injury is until we get them to the scanner. And that's part of the secondary survey, and I think the studies you are going to be choosing. But, you're not going to make a diagnosis of exactly what their primary brain injury was, until you get them well enough to get to the scanner.

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And so how do we do that? We do that with an orderly, or I guess sometimes if you're in the room, it doesn't seem so orderly, but we do that with a primary survey that addresses some of the problems that may be ongoing and you get the patient stable enough to go to CT scan. When we are looking at a patient that comes in, even before the patient arrives, you need to be thinking to yourself, the decision that we ask the residents to make, and that we have to make, is this patient sick versus not so sick. Are they really sick? Do they require an emergent intervention before they can go to the scanner? And if they do, that's what that primary survey is all about. So, what I want to do is just touch on an orderly

primary survey. You've all heard it, ACLS and PALS, and all that kind of good stuff, but I just want to expand on the primary survey a little bit, the airway breathing, circulation, disability, expose the patient. I am going to give you maybe an expanded primary survey, and allow you to think a little bit beyond what you are seeing right in front of you. So, when you are looking at somebody, is their airway patent? That's an easy question to answer right away. You've got to actually look in the mouth. I'll give you a patent airway story. Early on in my career, first night on call in the ICU as an intern, someone comes up to me and slaps a chart down and says, write an order for sedation. She's rammy. I'll go see the patient in a minute. And I got caught up doing whatever I was doing, and the nurse comes back, and sometimes downtown nurses can be a little brutal. Finally, she sits down next to me and says I hope your either writing an order or you're getting up and seeing the patient. I get up and I go in the room. Every light on the ventilator is flashing, the alarms turned off. There's a bunch of people in the room. She's rammy, she's rammy, she's rammy. I look at the medicines, and she's had all her p.r.n. meds, and actually, repeat doses of them _____. And I look, and the endotracheal tube is at a depth of maybe 13 cm, so I know her tubes not in the airway. I put the tube back in the patient fell asleep on the bench. Airway.

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So is the airway patent or not, and then what are we going to do about it. We'll talk about that in a minute. Things that can get in the airway, vomitus secretions, and we see a lot of elderly people with dentures, teeth, blood, but what's the most common cause of airway obstruction? You've got it, the tongue. That whole block of tissue when the patient is relaxed, the mental status is altered, and you've got to get the tongue out. So in the trauma patient, you just kind of want to kind of do the _____. _____ that's the time to control the airway, and we'll talk about airway control later on. And if you are looking at somebody and their airway is patent, you are looking at their breathing. Yes, it's a good thing that they're breathing. But how fast? Are they breathing too fast, too slow? Are they ventilating, are they really exchanging gas? And one of the vital signs that tells us is the respiratory rate. That's a breath every three seconds, let's just two it for thirty seconds. Breathe, breathe, breathe, breathe, breathe, breathe. To you get the idea? That's not a tachypnea. That's, you're hyperventilating when your breathing is 20 times a minute.

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So you know, somebody who is breathing rapidly. That's more shallow respiration, very toxic, respirations is somebody is breathing rapidly is someone who is oxygen hungry. So you look at their airway, see _____, the you look at their breathing, are they tachypneic? Tachypnea, some people will tell you it's the first sign of shock that you might recognize by just looking at the patient, and I'll give you another sign of shock in a minute. But this is a patient who requires oxygen, and then you need to start thinking, is there a metabolic derangement that they want to just exchange gas and blow out CO₂? Or is this patient hungry for oxygen? Maybe, they're anemic. Their SADS 100, down 100 percent FIO₂ they have the little thing on there, their SADS 100. If the patient's tachypneic, maybe they are losing red cells. They are filling up the ones they have, but they just don't have enough. Their body is screaming for oxygen. Circulation. What I like to do is, in trauma patients, I actually like to have a fairly clean _____ if I can, and I like to see the patient when they're coming through the ambulance doors and ask them if they know where they are, ask them _____. And that gives you the airway which opens up mental status, and the mental status of course, poor circulation is end organ perfusion, and that's one of the ways to evaluate, what's their mental status. And then what I typically do, depending on how close I can get to the bed, and we're blessed with an abundance of resources, you've got residents, you've got more respiratory therapists than you can imagine showing up _____. I'd just like to get to the patient's foot. Can I feel a posterior tibial artery pulse, and do they have good capillary reflex. If they have good capillary refilters, there's probably not a lot we can do emergently, and no matter what the resident wants to do, the case is probably going to go okay_____.

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The skin exam, I think is really important in assessing circulation. Are they pink, warm and well perfused? Or are they cold and clammy? Are they diaphoretic? When the patient sweats, so _____. The other thing with circulation is, especially in the elderly, I get them on a monitor right away. If they fall, was it a syncope? Did they fall because of syncope? And then think about ordering at least a 12 minute EKG. Every once in a while, someone presents as a trauma patient and has persistent hypotension, is hypotensive because they are having an MI. So that's something we like to think about, and we see a lot of elderly patients with _____. And then disability. And that's simply, you know, that you want to do Glasgow coma scale scores as part of our trauma chart, but a quicker way is the AVTE. Are they alert? AVTE. Are they alert? Can they respond to verbal stimuli? Do you have to cause them pain to get a response? Or are they completely unresponsive? So I'll suggest to you that the closer you are to _____ the higher your GCS is going to be, and the closer you are to _____, the lower your GCS is going to be. Remember the GCS is not with _____. This table gets a three. Eyes are closed, it's nonverbal, and its not responding.

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And then the E is exposure. And I have several Es in my primary survey, so we are going to stay on E for a while. We want to expose the patient fully, and that's actually part, or key at least in my view, I am the one up at the head of the bed, doing the breathing part ___ and I see people all the time with a stethoscope here, here, over clothes, and pronounce the breath sounds. You need to expose the chest. I like to get my stethoscope _____ trauma. Then I really have a better sense of whether or not _____. Another reason you need to expose the patient is, if you don't look, you don't mind, and three cases I can think about where stuff was happening, there is the patient who underwent an excellent resuscitation, and then her course was complicated by toxic shock syndrome, as no one found the tampon. So, some people put an _____. There is the apparent motor vehicle crash, that actually was a gunshot. And other exposure, what I am thinking of, especially, is a fall victim, or people where the events are unclear, is there an _____. _____ and ___ the same patient who supposedly fell down the stairs. Well, she was real stoned, and she wanted to kill herself, she did fall down the stairs, but because her blood glucose was _____. The next E is events surrounding the patient's admission to our system. There is an easy mnemonic for how to figure out these events, and that's everybody gets an ample _____. And by the way, I do this with all my patients, not just trauma patients. But I come in and look at you, and you come and tell me your ankle hurts, I'm still thinking to myself, okay, his airway looks good, but sometimes you look at the person and their panting, and the reason they twisted their ankle is ___ slip and _____ sometimes _____. So I kind of do this on all my patients. So everybody gets an ample history. Do you know what that is?

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Allergies, meds, and you want to pay particular attention to _____ patient. Medicines that thin the blood. Medicines that add platelets, and anybody on cardiac knows, medicines that may mask abnormal vital signs. It may mask the normal physiologic response to shock. So, we have people all the time who are on beta blockers, calcium channel blockers, ___ and their heart wants to speed up, and it can't. Even though it's ____, it can't speed up. So you know, when you slap them on a monitor, and their heart rate is 60, that doesn't necessarily mean that they don't want to go faster, and that's a person that still may be in shock. So allergy to meds, past medical and surgical history. I like to know their last _____. Especially if this is somebody that we are going to have to control their airway or we're going to have to think about _____ operate later on. Last oral intake, and E is their surrounding, how they got into our system. The next E for me is environment. We need to control the environment around the patient. Cold patients are coagulopathic. I don't like when patients get too cold, especially in the wintertime, people will see me with a little stocking net hat like they put on the newborns. I put them on adults. That's where they are losing their heat. And if I think that patient stands a chance of being cold on their way to the scanner, or in the hallway, or on the way to the operating room, I'm putting a hat on them. If the patient is cold to begin with, I'm putting a hat on them. It will help them to warm up.

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The other thing about controlling the environment in the pediatric population is, sometimes kids come into our trauma system, and we're rendering excellent care, and yet that child is getting an education that their parents did not imagine they'd get. So that's really a consideration for pediatric patients. They may see things that frighten them. They may hear and smell things that frighten them. A frightened child is not going to be as cooperative a patient. It's just going to add complications to their care, so I try to protect little kids when they are in Trauma One, that hallway get's really busy in any trauma center, the place gets busy, I try to protect impressionable children from seeing things that they ought not see, and hearing things that they ought not hear, and I think it probably does lend to their comfort. If they are well enough to be responsive to the environment, you don't want them _____. The next E is enough people. I had a, and usually we don't have that problem here, but maybe you are walking into a room somewhere, and you are evaluating a patient, and you can do this on any patient. Any ____, you walk into the room, you call to see the patient, you are looking at them, and you need to be doing the primary survey yourself. The patient looks ill. It looks like he may need help. Get it now. Don't try to deal with it yourself. I had an attending who used to drum that in. The next E is enough people and resources to help him deal with your patient. And the last E, I have five E's on my ABC ____, is ongoing evaluation. Every time the vital signs change, I like to repeat my primary survey. Every time I think the patient's mental status has changed, I look from the top to the bottom. And I try not to tie, I don't try to tie my ego to my initial findings. Things change. The history becomes more clear. Relatives have arrived, or friends, or the patient's medical record has become available to you and you've finally figured out who John Doe is. Oh yeah, he is on Warfarin. Okay, maybe we need to go even faster to the scanner.

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So ongoing evaluation of your patient. And every time the vital signs change, and sometimes every time you do a significant intervention, I like to repeat the primary survey. From top to bottom look at this patient. Are they ____, or are they a little bit better as a result of my intervention. So, in terms of resuscitation, and in terms of what we can do to meaningfully impact a trauma, a head trauma patient, you need to stabilize them quickly to get them to ____, and we need to ____ forces of secondary brain injury, hypoxemia _____. Deal with the airway issues first. When do we control somebody's airway? For me there are five reasons to control a patient's airway. Failure to oxygen – that's easy. ____ people get injured. Smurf's get injured. The comment ____ chances are you're not doing very well, and you need to control the airway, and we need to control it emergently. And that's when I'm wishing that we had already called anesthesia, or they are there, and then do we need to proceed down that path. Failure to ventilate. That's a harder one to pick up than the trauma patient. By failure to ventilate, I mean poor gas exchange resulting in hypercardia. If they are hypercardiac enough, it's going to cause you all kinds of problems with _____. So you have a bad arterial blood gas, or if you are looking at the patient, and they are just not moving air. Their pulse-ox is 100, but they are not moving air, and that's a patient probably not ventilating. And they may need to have the airway controlled. The next one is failure to maintain a patent airway. So, people with a low Glasgow coma scale score get intubated, people who we are going to need to sedate, and we are going to take away their protective airway reflexes. Those are people who we need to control the airway.

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The next one is failure to maintain or impending failure to maintain or sustain work of breathing. This is one of my favorites. Because I think it gets missed a lot. If the patient is panting, think of how long are they going to be able to do that. And we were talking about that one _____. And the last reason, and unfortunately, this is why a lot of trauma patients get intubated, and I think rightfully so, is failure to cooperate with necessary diagnostic and therapeutic maneuvers. You have somebody with a significant mechanism. And they come in and they are, they are behaving unreasonably. They need to be intubated so that you can work them up properly, but I just want to spend a second on this. This is not a punishment. They are not being intubated for bad behavior. See here, now watch, I'll prove to you that I can control the situation, and you're waking up with plastic in your throat. If you are in shock, if you are in occult shock, your brain is getting a huge sympathetic surge. Your epinephrine is turned on. You have a fight or flight response. Maybe you have frontal lobe contusion. I'll prove it to you that somebody who has been in a serious trauma, and is either sick to begin with, or is getting sick, is on their way to getting sick, they are not going to behave reasonably, necessarily, and they want out of there. And they want the IV out, and they just want to go, they want to go, they want to go. They are not understanding how sick they are, because of how sick they are. It's not a punishment. Now sometimes, you know, it's their normal bad behavior that causes ____ their altered state in doing whatever ____ is, and that's what caused the trauma to begin with. But you can't really reason with somebody like that, and it's very, you know, I like the "oh, he's calming down, he's calming down, he's calming down". How much time does that patient have before they deteriorate, and how much time are you willing to bet that, oh, he'll calm down. He's going to calm down, don't expect he's going to calm down. You need to think about that. How much time are you going to gamble on your patient

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Now let's go back to the failure to maintain or sustain work of breathing. First of all, it begs the question, why did they have increased work of breathing, and it's not necessarily part of the primary survey. But I love the, the pulse-ox is 100, the patient doesn't need to be intubated if the pulse-ox is 100. The last clinical shift I worked, it wasn't here at Crozer, but one of our affiliated hospitals, the patient came in, the last patient _____ at like 6:30 in the morning. This poor lady is breathing 56 times a minute – 56 times a minute, and that's what was documented on the triage note, the monitor shows the respiratory rate, and that's what she was doing when I walked in the room. Ah, the pulse-ox is 100, what do you do? Try it. They are just breathing every three seconds, 20 times a minute for less than 30 seconds, and gave them a break. Tell me what that was like. This lady is laying there flopping around on the bed, and yah, your pulse-ox is 100. This is a patient who is not going to maintain that work of breathing very much longer. And if we don't control her airway right away, she's going to go into respiratory failure, and my analogy for this is, how many sit ups can you do? Think right now, how many sit ups? Now, if I whip out a gun and put it to your head, and say start doing sit ups, when you stop I'm pulling the trigger, you're going to do a lot of sit ups, aren't you? You are going to do more sit ups than you ever thought you could do in your whole life, but eventually, you're going to fail. Eventually you're going to fail. And then here's what happens. _____ stay home, maybe you ____ you know, up on the floor, and you were discovered blue in your room, or you failed in the ICU and you get a stat visit to the ICU,

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and then the next day, someone wants you to start doing sit ups again. That patient's not going to wean. The patient that you neglect their airway and neglect to ease their work of breathing. That patient is not going to wean the next day, or maybe not the next day. _____ failure. Another thing is your cardiac output. You can actually shunt up to 20 percent of your cardiac output with accessory muscles and the diaphragm _____. So the vital signs might improve so that's just failure to maintain _____. I think it's important _____. So how do we do it? Well, we do the trauma mask as part of our initial resuscitation and we decide to control somebody's airway is what we call RSI, rapid sequence induction and intubation. And the key word here is rapid. We want to give them drugs to sedate them so that their experience is forgotten. And we want to give them drugs to relax them. And when I say relax, I'm talking about neuromuscular relaxation, i.e., the _____. We studied time and again the safest way to control somebody's airway, you know, it used to be, give them enough versaid and then try to slam the tube down, the patient's gagging. It's like having a patient who recalled their position said it was like having his mouth pried open with a large wrench, needing to vomit but being unable to, and then he felt himself vomiting and aspirating. The guy was taking care of _____. So it's an interesting article _____.

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So, we like to put the patient to sleep, and we like to relax them, and pediatric patients when you wrench on that larynx, you can cause a bradycardia. _____ cause a bradycardia. That's one of the neuromuscular relaxer of choice. So if you are going to control a pediatric airway, you want to consider, the younger the child, the more important it is they get a lytic. That is, specifically, _____. And also, works as an anti_____, you stick anything in the kid's mouth, and he'll start salivating. So you've got all those secretions complicating your airway. The dose of _____ in the pediatric patient is no less than 0.15 mg _____ no less than 0.15 mg, and really you don't need any more than 0.4. That's _____ over at CHOP. They also _____. So you want to give between 0.15 to 0.4 mg of _____. Some people like to give some lidocaine when they are doing RSI, thinking that once increased intracranial pressure that sometimes can be associated with noxious stimuli. I don't know, some people do and some people don't. I tend to if there's time, and if there isn't time, I don't _____. So, the docs can be ordering drugs. Let's talk about the drugs to sedate the patient. Typically, when you use atomidine_____. _____ is an air____ alkaloid, and _____ at a high enough dose can induce a general anesthesia. The patient is asleep, works very, very rapid. What's nice about it's benign hemodynamically, it's thought to lower increased intracranial pressure without the same negative inotropic effect of barbiturates _____. And it doesn't cause a bradycardia. So _____ for me is the drug of choice. It's not going to drop their pressure, and it's going to do what I need it to. And it may lower intracranial pressure.

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Biopenthal was the drug of choice for a long time, it's a barbiturate, it goes 3-7 _____. But that can really drop somebody's blood pressure. Biope – drops blood pressure. Some people use _____. I've seen that _____. If you are giving them a medicine to sedate them, any medicine you give them to sedate them at an intubating dose is going to cause apnea. And this is a key point. Any medicine that you give that's going to knock the patient out enough to intubate them, the general anesthetic dose, is going to cause apnea. Here's the problem. If you gave that medicine and you haven't followed it immediately with your neuromuscular relaxant, you now have a patient who's not breathing, but you can't get the _____ in their mouth, their jaw is tight, and they are hard to intubate. So when we talk about rapid, you push whatever drug is going to knock the patient out, and then you push the neuromuscular relaxant. Sometimes I will push the _____ first, and the patient was so altered that I don't think they will remember this no matter what. Because if they lose the line, then at least I know the _____. The drug we use most of the time is _____ to paralyze the patient. The dose is 1-1.5 mg/kg in adults, and importantly, 1.5 to 2.0 mg/kg in small children and infants. It takes more. I know this may seem excessive to you, but it takes more to really paralyze a little kid. They have active enzymes.

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So, when we get ready to intubate somebody, we're _____ these drugs, I'd like to talk about the, there are two ways I approach it. There's the seven piece rule, you are all familiar with that? Proper attire, _____ actively in a trauma patient comes in. Be prepared to intubate, doesn't mean to _____, it just means to prepare. How do you get prepared to intubate? How do you get prepared to control the airway? One of the things that are going through my mind, anesthesia's mind, and other people who are experienced with airway issues, I have an easy mnemonic, you need to be, every body in the room needs to be thinking about this, because you may be called on to help. So, here's the mnemonic. SOA – Suction. There needs to be working suction. If you yank out the tip, _____ there's no time to find out that what's making the noise, you can't really suck my glove off my hand. It's not when you can't get the vomitus out of the throat, that's not the time to _____ your suction. The time to find out is when you plug it in and _____ skin, or will it pull a glove away from your skin. Small children do not do well when you yank it out or shove it down their throat. Okay? What I like to do for them, small children and infants, is to get a 14-french suction catheter and cut it off to a length about like this. The length of my

forefinger or a little bit more. That's rigid enough that you can manipulate it, it will go all the way down, even in an infant, to the ___ airway, and yet it's not, you know, you put in or yank out of an infant's mouth, you can't see anything else. Okay? So if you see that sometime, when you have a little child coming in, and I've got it plugged in the suction, please don't pull it out and throw it away. You don't have any respiratory therapists here. That's happened to me a couple of time. I go through the suction and I have already got _____ threw it away and _____. It's not going to help them. So, suction.

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Oxygen. You need oxygen and it needs to be working and turned on. And, hopefully, one of the more important ___. And that also means oxygen is to preoxygenate the patient. If you know you are going to control the airway, give them some reserve. Give them every oxygen molecule you can, but everybody being intubated, about 100 percent have _____. Airway equipment and redundant airway equipment. I like to have at least two working laryngoscopes, I like to have a selection of ET kits. Where I trained, it was nice. They understood that intubating people is not a sterile procedure, so we had the tubes already loaded up on Cyantin, and you never had to take your eyes off the patient to reach over and grab, oh, that one's too big, drop it, ___. Intubation, by the way, is not a sterile procedure. I know everything comes wrapped, it's not a sterile procedure. Get that out of your mind. P is for pharmacologics, which we have just discussed. They need to be given rapidly, they work best when all the drugs are having their peak affect at the same time. M is for monitors. Get the patient on monitors. Monitor their blood pressure, monitor their heart rate, monitor their pulse-oxymetry, and E is enough people. Enough people to help you with the situation. So, if your role is you'll be performing intubation and you need to have people to your left and to the right to hand you things who know what's going on. If your role is supportive, or you are pushing meds, you're pushing the meds, bang, bang, you are not pushing the meds, and then turning and writing down. I gave 100 mg _____, no. ___ bang, bang, bang. And you have gloves on. Because after that, after you push the meds, you may be called upon to pull the ___, pull the larynx ... so if you are in a critical resuscitation, you are controlling somebody's airway, once we do that, it has become a critical resuscitation. Have your gloves on and be ready to go.

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So, intubating the patient is I guess the most radical way of dealing with their hypoxemia, but that is how we try to eliminate secondary brain injury with initial resuscitation. So the next thing is hypotension. And what I wanted to go over briefly, is for kids you want to give them 20 cc/kg of normal saline intravenously, and if you can't get an IV in, have a hypotensive it is not cruel and unusual punishment to start _____. The child is hypotensive, requires a resuscitation. What's cruel and unusual is to stick them 20 times, and watch their vital signs deteriorate while you are still unable to give them an IV. And the _____ includes cardiac arrest, and ___ 30 seconds. The hospital _____. And then again, how many seconds? Thirty seconds, or a minute? Ninety? Yeah. The latest recommendation is not spending more than 90 seconds. So, if you can't get the line, give them some intravascular volume, with an intraosseous line, you may be able to get an IV after you have restored some volume. It is not cruel and unusual to put an IO in a kid. What's cruel and unusual is to wait and let them deteriorate. Two fluid boluses of 20/kg in a child and then you switch the plug. Adults, you should give them a liter and then a second liter, and we are thinking about blood. If you have a hypotensive head injured patient, it begs the question, why are they hypotensive? This is somebody you really need to get over to the CAT scanner,

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and this is probably somebody who is probably going to get everything scanned. A hypotensive patient requires a diligent search for ongoing, for occult and ongoing hemorrhage. Do they have pelvic ___? Do they have enough long bone ___? You can lose a liter _____. Do they have a solid _____ injury where they are losing blood? And then, if you don't find ongoing blood loss, then you have to think about other causes for hypotension, especially in the elderly. Are they having an MI? Have you gotten that cardiogram yet that you thought about with the initial C for circulation? Why did they fall? Where is their monitor or their rhythm strip? Now might be a good time, and _____. And the last, another cause for hypotension, _____, especially with _____. ___a cocktail of medication? _____. Or could this be an occult suicide attempt? _____ we've had some. So you are thinking search for ongoing causes of hypotension, somebody who is persistently hypotensive, if you've excluded ongoing hemorrhage, we really need to _____ going back _____ their initial primary survey. That is all I was prepared to talk to you about, and at least the better part of an hour. So, I guess, you want to give them a break? Does anybody have any questions for my about my approach to initial resuscitation? Essentially, you can sum it up, and you do a good primary survey, and a standard primary survey, in order to prevent hypoxemia and hypotension and secondary brain injury. That's it.