

## Device Alert! Instant Hemoglobin Monitor

The group at the University of Arizona has been fooling around with an instant-read hemoglobin monitor manufactured by Masimo Corp, the Pronto-7. Interesting little device. It's a hand-held unit that looks like it uses near-infrared light to calculate the hemoglobin concentration. An optical probe is applied to a finger (like an oximeter probe), and the result is displayed almost immediately. It can also be printed or emailed.

Previous iterations of this technology for continuous readings did not correlate well with invasive blood draws. Use of an instant-read system in trauma patients has not been explored to date. The Arizona group looked at the correlation between the results of the Pronto-7 and the usual blood draw in acute trauma patients using a prospective design. Three spot-check results were obtained for every invasive blood draw.

Here are the factoids:

- 525 patients were spot-checked, with a success rate of 86% (no explanation why!)
- 173 (38%) of patients had a Hgb  $\leq$  8

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### TRAUMA CALENDAR OF EVENTS

#### AMERICAN ASSOCIATION FOR THE SURGERY OF TRAUMA

LOCATION: PHILADELPHIA, PENNSYLVANIA

DATE: SEPTEMBER 10-13, 2014

#### ORTHOPEDIC TRAUMA ASSOCIATION

LOCATION: TAMPA, FLORIDA

DATE: OCTOBER 15-18, 2014

- The mean difference between spot-check and blood draw results was only 0.1 g/dL (!)
- Sensitivity was 96%, accuracy 77%

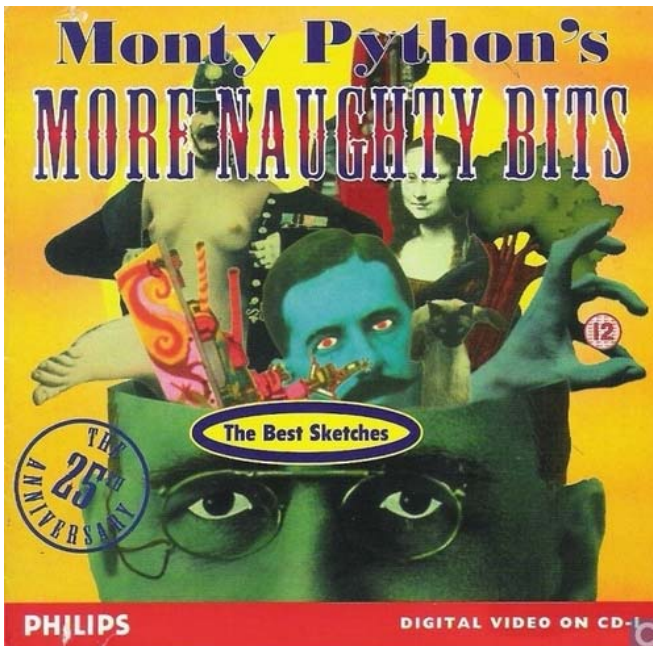
**Bottom line: This is an interesting new tool for acute trauma care. The only downside that I see is that we may lose sight of the fact that hemoglobin values lag behind the true blood volume in rapidly bleeding patients. We mustn't be fooled into thinking that everything is fine just because a number is normal. There's still room for common sense!**

*Reference: Transforming hemoglobin measurement in trauma patients: non-invasive spot check hemoglobin. EAST 2014, poster #20.*



## Don't Ignore The Naughty Bits!

A major part of any patient encounter is the physical exam. This is particularly true in the trauma patient, because it allows trauma professionals to identify potential life and limb threatening injuries quickly and deal with them. Unfortunately, we tend to mentally block out certain parts of the body, typically the genitalia and perineum, and may not do a complete exam of the area. I call these areas the naughty bits. For those of you who don't get the reference, here's the origin of this phrase:



Specifically, the naughty bits are the penis, vagina, perineum, anus and natal cleft (aka the butt crack or arse crack). These areas are more likely to remain covered when the patient arrives, and are less likely to be examined thoroughly.

In penetrating trauma, a detailed exam of these areas is extremely important in every patient to avoid hidden injuries and to determine if nearby internal structures (rectum, urethra) might have been injured.

Here are some tips for each of the areas:

- Penis - Always look for any blood at the meatus (or a little blood in the underwear) as a possible sign of urethral injury. This is frequently associated with pelvic fractures.

- Scrotum - Blood staining here is usually from blood dissecting away from pelvic fractures. Patients with this finding are more likely to need angiographic embolization of pelvic bleeding.
- Vagina - external exam should always be done. Internal and/or speculum exam should be done in pregnant patients, and those with external bleeding or pelvic fractures
- Perineum - Also associated with pelvic fracture and significant bleeding. Skin tears in this area are usually lacerations indicating an open pelvic fracture. Alert your orthopaedic surgeons early, and do a good, clean rectal exam (carefully wipe away all external blood). Rectal injuries are common with this finding, and a formal proctoscopic will probably be required.
- Anus - Skin tears virtually guarantee that a deeper rectal injury will be found. Proctoscopic exam in the OR is mandatory.
- Natal cleft - Usually not a lot going on in this area, except in penetrating injury. This is the only area of the naughty bits that can be safely examined in the lateral position.

**Bottom line: The naughty bits are important because the occasional missed injury in this area can be catastrophic! Do your job and force yourself to overcome any reluctance to examine them.**

## The Referral Hospital Trauma Rule

The majority of trauma patients are seen initially at non-trauma centers. And the majority of those patients can be treated just fine at that local hospital. However, a few (some say about 15%) do need to be transferred. The question frequently arises, **“what studies do I need to do before transferring?”**

The danger is that doing things that slow down the transfer can result in bad outcomes. For example, a patient may have a spleen injury that is actively bleeding. Every minute that this patient is not receiving “definitive treatment”, she loses more blood. And every cc of blood lost causes her to inch closer to shock, other complications, or death.

**The key is to get people who need a higher level of trauma care on their way to a higher level trauma center as soon as the need is recognized.** There is a natural tendency to do diagnostic studies, such as CT scan, in these patients. Sometimes they are needed to actually figure out what is going on. But more often they are obtained to “do a complete workup” or because “the trauma center expects me to.”

**Unfortunately, these are incorrect assumptions.**

The complete workup cannot be used by the referral center if they are shipping the patient, and for a variety of reasons they may not be useful to the trauma center. This is one of the major reasons that referral patients receive extra radiation exposure. About half of the studies performed at the referral hospitals need to be repeated!

***The Referral Hospital Trauma Rule: Do any simple study needed to ensure the patient will stay alive until the helicopter/ambulance arrives (typically chest or pelvic xray). If at any point, you see something obviously not treatable at your hospital (i.e. open fracture, GCS 8, partial amputation), DO NO FURTHER STUDIES AND PREPARE TO TRANSFER. If the patient does not have such an obvious problem, do only the tests you need to determine if you can keep the patient. But as soon as you find anything that you cannot treat, stop further studies and prepare to send the patient onward. And don't forget to send working copies of the few studies that you did get.***

## The Dogma Of Putting Chest Tubes to Suction

Chest trauma is a very common occurrence. One of the more common procedures for managing it is insertion of a chest tube. In the majority of cases, the drain is connected to a system to collect blood and vent air. And they are nearly always automatically hooked up to 20cm of suction.

A study was constructed to randomize the use of suction vs water seal in patients with pneumothorax, hemothorax, or a combination of both. Patients who had early positive pressure ventilation (ventilated, emergency OR), chronic lung disease, or severe TBI (?) were excluded.

Here are the factoids:

- 110 patients were randomized to either water seal (54) or 20cm of suction (56)
- There was no difference in the length of time the tube was in place between the groups (3 days)
- Incidence of retained hemothorax and empyema was no different (and hopefully rare!)
- Hospital length of stay was the same
- There was a significantly increased incidence of persistent air leak in the suction group

**Bottom line: First, this is a small study so it doesn't have enough power to make definitive statements. However, it is definitely provocative. We blithely put every patient on suction, not thinking about the negative implications such as decreased mobility, increased atelectasis, and DVT. Patients on suction are much less likely to move around at all! A mobile patient is just as likely to push any air and blood out of the tube as an immobile one is to have it sucked out. Let's do a larger study to confirm this! And hey, use a protocol to manage the tube! Three days is too long to have a tube in place.**

*Reference: Negative pleural suction in thoracic trauma patients: a randomized controlled trial. J Trauma 77(2):251-255, 2014.*

## What To Do? Small Hospital, Unstable Patient

**It's the situation that physicians in smaller hospitals dread.** A major trauma patient gets dropped off at the door. You do your evaluation, quickly determining that they need services that you don't just have (head injury and positive FAST in the abdomen, let's say). You call your community EMS service to transport to a Level I trauma center, which is about 30 minutes away by ground. And just as they are rolling out the door to the rig, the blood pressure drops to 60!  
**What to do?!**

The ATLS course is very clear, and very correct. Back into the ED for a quick re-evaluation. **The most common cause for a significant disturbance in vitals or exam lies within the primary survey. You**

**will almost always find a problem with Airway, Breathing, or Circulation.** (A Disability problem can cause a problem on rare occasion (hypotension from impending herniation), but there's not much that you can do about it, really. Hyperventilate, hyperosmolar therapy, okay but probably a poor outcome for the patient anyway.)

So you didn't find any airway or breathing issue. But the abdominal stripe(s) you saw on FAST are larger, so it's circulation. Now what? **And does it matter if you have a surgeon available on call?** The answer is simpler than you think.

**ATLS says that, if you have surgical support available you have to use it in this type of situation.** If you don't have it, package the patient with a lot of blood and plasma and send. If you have a physician or nurse to spare you could consider sending them along to help during transport, but for small community hospitals this is not practical.

**But if you do have a surgeon, does it make sense to use them? Not always!** You must take into account response times and transport times. Let's say it's 2:00 am and you call your surgeon for this hypotensive patient. They may take up to 30 minutes to get in and see the patient. They then agree that the patient needs a laparotomy and she proceeds to call in the OR team. Yet another 30 minutes tick by. Will the patient still even be alive when they roll into the OR?

Or you could just put the patient back in the ambulance (air preferably, but ground if you have to) and get them to your trauma center quickly. They can then be whisked directly into a waiting OR in less than 30 minutes from your door. This is probably the ideal solution here. Obviously this doesn't work as well if you are a few hours away from your resource trauma center.

**Bottom line: Deciding what to do with a patient that needs urgent treatment that you can't immediately deliver is tough! That's why it's always a calculus problem when you're faced with this situation. But take all of the response and transport times into account, and do what's best for your patient!**

## How To Lose A Bet And Still Win!

I recently made a bet with one of my Emergency Medicine colleagues regarding the outcome of an imaging study. The bet was that the results of the study would be negative from a trauma standpoint. The actual outcome was that the result showed a positive but clinically insignificant result.

So I lost, right? I don't think so! How did I actually win? The bet was a monetary one (\$100). **The key to winning is where the money actually goes.** No pizza and beer here. Most hospitals, and a few trauma programs, are associated with a charitable foundation. My pediatric trauma program is linked to one for each of the two hospitals that comprise it (Regions Hospital Foundation and Gillette Children's Specialty Healthcare Foundation). I wrote a check to one of them, and specified the donation be earmarked for the pediatric trauma program.

**Bottom line: Always be a winner! You don't need to make bets to contribute to charitable foundations, either. Encourage your colleagues (or patients) to contribute to your hospital's charitable foundation, and let them know that they can direct their donation to whichever program they (or you) suggest.**



			
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