

Potpourri! These are my favorite issues. They smell good and are fun to read. But unfortunately, since you are perusing the PDF version of this newsletter, you won't be able to take advantage of the scratch and sniff version on paper. Enjoy anyway!



Trauma And The Gut Microbiome

One of the newest frontiers in health-related research recognizes the importance of the human *microbiome*. This term describes the collection of all genomes from the microorganisms found in a particular environment, such as in, on, or around a human. The term *microbiota* refers to the specific bacteria, viruses, and fungi that colonize the areas within this environment.

Within the last decade or so, we have just begun to appreciate the importance of the microorganisms that live within us. From a purely numerical standpoint, there are 10 times as many of them as there are our own human cells. However, since they are so small in

INSIDE THIS ISSUE

- 1 **Trauma And The Gut Microbiome**
- 2 **Complications Of Single Look Laparotomy**
- 3 **Best Prehospital Stretcher For MCI Extrication**
- 3 **The Mistaken ID Problem**
- 4 **Pet Peeve: Bad Acronyms**

SPEAKING ENGAGEMENTS

30TH ANNUAL TRAUMA SYMPOSIUM

PARKVIEW TRAUMA CENTERS

CERUTI'S BANQUET & EVENT CENTER, FORT WAYNE IN

MAY 8, 2019

POMONA VALLEY HOSPITAL TRAUMA GRAND ROUNDS

POMONA VALLEY HOSPITAL MEDICAL CENTER, POMONA CA

JUNE 11, 2019

comparison, we can't really appreciate the huge number of "other" cells in and on us.

These tiny cohabitants provide many, many functions that are important to our health and well-being. They protect us from pathogenic organisms, help digest our food, fine-tune our immune system, and synthesize proteins, amino acids, and vitamins that are essential to our health. And much more!

The usual microbiota can be disrupted by disease, poor diet, stress, and even a single dose of antibiotics. With each new research paper, we recognize new functions for and disruptors of our microbiota.

The surgery groups at two San Antonio hospitals, UT Health and the US Army Institute of Surgical Research, recognize the importance of the gut microbiota, building upon prior work demonstrating changes within it in the presence of trauma and burn injury.

The authors performed a prospective, observational cohort study of severely injured patients over a two-year period. They attempted to characterize differences in the microbiota between trauma patients and to identify changes in these communities over time.

A rectal swab was obtained from each patient shortly after admission and the microbial DNA present was identified. This was repeated regularly throughout the hospital stay.

Here are the factoids:

- 72 patients and 13 healthy controls were enrolled

- Patients were severely injured with a mean ISS of 21; an average of 6 units of blood products were given in the first 24 hours
- **Only one fourth of the injured patients had a microbiome similar to the healthy controls**
- These 26% received significantly more blood products than the dissimilar patients (14 units vs 3)
- There were **significant decreases in the numbers and ratios of normal gut bacteria and increases in the numbers of pathogenic bacteria.**
These changes increased with time in hospital.

Bottom line: Yes, this is new and bizarre territory. It appears that shock, hypoxia, medications (and not just antibiotics), surgical intervention, and poor nutrition can adversely affect the microflora in our gut. Conversely, early transfusion seems to ameliorate this effect to some degree.

At this point in time, there is nothing you can do with this knowledge. Just be aware that everything you routinely do to your patients can change their microbiota, and this may in turn have unexpected effects on their health and recovery. I anticipate seeing many more papers like this one in the near future.

Reference: A prospective study in severely injured patients reveals an altered gut microbiome is associated with transfusion volume. J Trauma 86(4):573-582, 2019.

Complications Of Single-Look Trauma Laparotomy

Damage control laparotomy (DCL) has been around now for over 25 years. Many, many papers have been written on its benefits, and the decreased mortality for abdominal trauma specifically. In fact, its use has been generalized to trauma for all other body cavities as well.

However, with this improved mortality came an increase in complications. Incisional hernias remain common, as do episodes of delayed small bowel obstruction. Much of the emphasis in traumatic damage control surgery has now shifted to finding ways to close wounds more quickly and reduce the overall complication rate.

In contrast to damage control laparotomy, **much less is known about the potential complications associated with the single-look trauma laparotomy.**

This procedure is carried out more frequently than DCL, but we have spent less time studying outcomes and risk factors for complications in this group of patients.

The surgery group at Scripps Mercy Hospital in San Diego conducted a statewide retrospective review of a hospital discharge database of adult trauma patients over an eight-year period. Patients with multiple laparotomies were excluded, as it was assumed that these were damage control patients.

The primary outcomes studied were surgical complications, including bowel obstruction, hernia, fistula, wound infection or dehiscence, and evisceration. Complications were recorded during the initial admission, and during any readmissions in the study period.

Here are the factoids:

- Over 3700 patients were identified as undergoing trauma laparotomy during the study period
- About 2100 were left for review after excluding those with multiple laparotomies (DCL) or an unclear trauma mechanism
- 80% of patients were male and 60% had a penetrating mechanism
- **One third of patients were readmitted for a surgery-related complication:** SBO 18%, hernia 12%, infection 9%
- **Median time to readmission was about 4 months** (range 1 week to 1.5 years)
- **Patients with blunt injury tended to present with complications earlier** (6 days) than penetrating injuries (6 weeks)

Bottom line: This paper is unique in that it is one of the few that was able to follow a large patient population for complications occurring both during and after the initial admission. The overall complication rate was surprisingly high (33%), which is similar to that seen after emergency surgery.

Knowing all of this, what should we do? To date, we have not come close to solving the problems of postop adhesive small bowel obstruction, wound infection, and incisional hernia in any surgical population. However, this work points out the importance of counseling our patients about the potential for complications, how to recognize them, and when to present for evaluation and treatment.

Reference: Outcomes after single-look trauma laparotomy: A large population-based study. J Trauma 86(4):565-572, 2019.

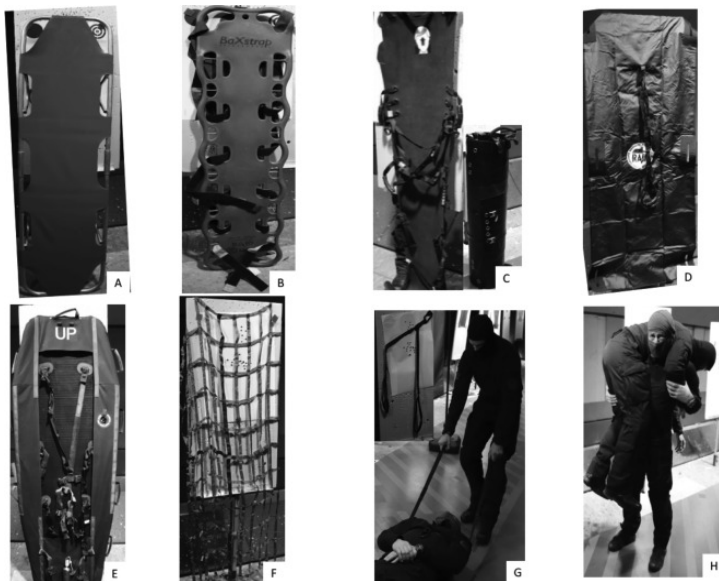
Best Prehospital Stretcher For MCI Extrication

There is a long-standing debate in the prehospital community as to which stretcher is the best. And it's obvious that there is no real consensus because just about every EMS unit that brings a patient into my hospital has their own favorite type and brand.

What this really means in general civilian practice is that, for the most part, it doesn't matter! However, there is one scenario where having the right stretcher makes a world of difference: the mass casualty incident (MCI). In critical field situations, prehospital providers must rapidly and safely move the injured from the danger zone to a safe zone. At the same time, they have to ensure their own safety and that of their patient, as well as work without disturbing any ongoing police operation. While the usual priorities of immobilization, hemorrhage control, and temperature control are laudable, these fall by the wayside when an overarching need to escape a danger zone is present.

The proper choice of stretcher may save time in these time critical situations. The RAID tactical unit for the French National Police partnered with two hospitals in France and the UK to conduct a simulation study using eight different extraction devices. They included **three civilian devices** (snogg (A), immobilization board (B), firefighters' worn (H) [not a device at all but a carry by another person]), **two military devices** (foxtrot (C), net (F)), and **three tactical devices** (flexible tarp (D), inflated stretcher (E), strap (G)).

For the simulations, a victim was positioned on the



floor in a building in an urban environment. The testing monitored deployment of the device involving a **20 meter run, loading the victim, carrying them flat along a 10 meter corridor with a corner passage and a staircase descent.** Sound like fun?

Five groups of RAID officers participated, and each wore 30 kg of gear and garb (!). The victim weighed 80 kg. Twenty simulations were carried out on each device and all performance times were analyzed.

Here are the factoids:

- **Average extraction time was 46 seconds across all devices (!)**
- Best for ease of transport were firefighters' worn, strap, and flexible tarp
- Best for obstacle crossing were inflated stretcher, flexible tarp, and firefighters' worn
- Best for stability were the inflated stretcher, flexible tarp, and firefighters' worn

Bottom line: For MCI incidents where time and safety are paramount, the firefighters' worn and flexible tarp were the most efficient options for use in a hot zone. Although the others are of use in other operations, these two excelled in MCI.

Reference: Specific stretchers enhance rapid extraction by tactical medical support teams in mass casualty incidents. Injury 50(2):358-364, 2019.

The Mistaken ID Problem

There was a well-publicized and tragic case of mistaken identity after a motor vehicle crash in Indiana in 2006. A van carrying five college students and one staff member crashed, killing all but one of the students. The survivor sustained a severe TBI and facial trauma, and was transported to a Michigan trauma center. **It wasn't until five weeks later that the identity mix-up was discovered.**

One of the fatally injured students and the survivor were both female, blonde, and about the same height and size. Their identities were not confirmed because the next of kin of the deceased was advised not to look at the body. The face of the surviving woman was significantly contused and she had sustained multiple facial fractures. She remained comatose and intubated for over month after the other was buried (by the wrong family, it turns out). After extubation, she began correcting people who called her by the deceased woman's name, and the correct identification was finally made.

How can this happen?! It's not as difficult as it might seem, for a number of reasons:

- Faces and identifying marks may be mutilated by the traumatic mechanism
- Position in the vehicle may be mistaken
- Bystander descriptions are notoriously inaccurate in these situations

It is neither practical nor safe to delay transport from the scene in the interest of obtaining positive identification. And hospitals have even less information than prehospital providers, whom they rely on almost exclusively for accurate data.



What can be done to avoid a case of mistaken identity? EMS and hospitals must develop protocols to follow in any case where multiple patients are treated at once. The baseline assumption must be that the identities are unclear or unknown until definitively made, and preferably obtained from multiple sources. What are these definitive items?

- An official ID that is still on the victim's person (not cut off in the clothes)
- Self-identification
- Visual identification from someone who personally knows the victim and views or talks to them
- Written description, where the patients have very different identifying characteristics

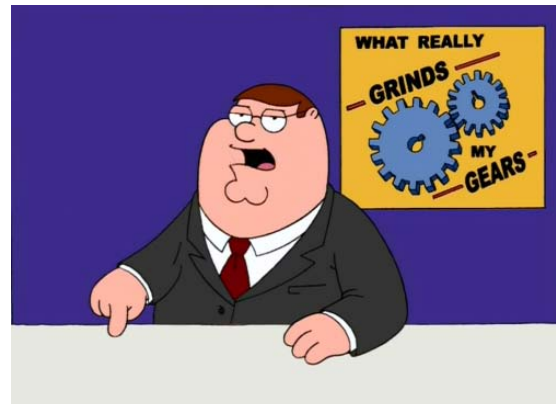
However, remember that every one of these “definitives” can be made in error. This is why multiple sources are so important. If in doubt, the patients should remain a “Doe” and not be given a real name until identity can be absolutely confirmed.

Pet Peeve: Bad Acronyms

I'm not a big fan of acronyms, although they do serve a purpose. We use them all the time providing medical care. CBC. CTA. CXR. ROSC. And a zillion others.

And they can actually be helpful so you don't have to say or write down some ridiculously long phrase. OMG.

But what really bothers me is the rise of researchers designing clever acronyms for medical studies. The first one, documented at the University Group Diabetes Program (UGDP), was developed in the 1970s. It was actually shortened by journals and the media to make for an easier presentation, not by the group itself.



But then in the 1980s, the Multiple Risk Factor Intervention Trial (MRFIT) came along. It evaluated the impact of multiple interventions on cardiovascular mortality. Mr. Fit. Get it? This was the first of an ever-growing number of studies that chose acronyms that were either cleverly related to the work in some way, or that made a catchy new word to help people remember it. The number of these acronyms has been growing rapidly. From 1992 to 2002, they increased from 245 to 4100, a 16-fold increase. There are now so many acronyms that many simple ones are being reused. And unfortunately, it seems like studies without an acronym are now becoming the minority.

Plus, we've moved away from creating pure acronyms like UGDP that are derived from the first letter of each word. Now we use multiple letters from a word, skip some words altogether, or don't even bother to use the words at all. There are MICHELANGELO, MATISSE, PICASSO, and EINSTEIN studies that were given the name just for the positive association. Nothing to do with the study at all. GMAB!

Reference: SearCh for humourIstic and Extravagant acroNyms and Thoroughly Inappropriate names For Important Clinical trials (SCIENTIFIC): qualitative and quantitative systematic study. BMJ. 2014;349:g7092.



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