

Crowdfunding Medical Research

Many readers are familiar with the concept of “**crowdsourcing**”, or tapping into a pool of people connected via the internet to obtain something of value. This something might be information, services (think Uber), or content (99designs). And with the advent of websites like KickStarter, it is now possible to crowdsource money.

As anyone who has an academic focus can attest, there is tremendous pressure to pursue (hopefully) meaningful research. In many cases at academic institutions, this is an integral part of keeping one's job.

But research is expensive. Even the simplest retrospective study requires some kind of statistical analysis, and statisticians don't work for free. And in more sophisticated research labs, there are huge personnel, equipment, as well as other infrastructure costs.

Traditionally, researchers have pursued grant dollars from single sources like the federal government, local agencies, corporations, and charitable organizations. But this is very competitive, and it's usually an all or none proposition. Only one of many applications gets all the cash, and the rest get none.

But now, crowdsourcing has moved beyond the technology and design type projects seen on

TRAUMA CALENDAR OF EVENTS

TRAUMA EDUCATION: THE NEXT GENERATION III

LOCATION: ST. PAUL, MINNESOTA

DATE: SEPTEMBER 17, 2015

EASTERN ASSOCIATION FOR THE SURGERY OF TRAUMA

LOCATION: JW MARRIOTT, SAN ANTONIO, TEXAS

DATE: JANUARY 12-16, 2015

KickStarter to what is now called crowdfunding. There are a number of sites that solicit small donations from individuals, pooling them together into large amounts. The largest campaign on KickStarter was able to amass over \$20 million to create a new version of the Pebble watch. A small campaign to get \$10 to develop a potato salad recipe ended up collecting over \$55 thousand. Go figure.

Typically, these sites provide a nice write-up about the project, usually accompanied by a slick YouTube video. There are a variety of levels of support, or donation amounts. Some type of recognition is always given to each donor. It may be something as simple as a name mention in the product brochure, a free or discounted product, or a trip to hang out with the company founders for big donors.

So why not fund research this way? Unfortunately, existing crowdfunding sites aren't really set up for this or don't allow it. But a number of up and coming research sites do exist and are listed below. The tough part is deciding how to recognize donors. Perhaps a listing of the names of major contributors in a special thanks block in the published article. Or periodic phone conferences with the investigators to hear about the progress of the study. The sky is the limit, depending on the dollars involved.

Bottom line: The concept of crowdfunding has now made the jump to funding research. There

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are a number of sites that are structured similarly to KickStarter that allow researchers to solicit donations from the public. Some are relatively rudimentary, and some are naive in their approach to soliciting funds. In order to engage the public to contribute sums of money, large or small, research teams will need to explain their ideas simply and describe some practical or potential application. And it won't hurt to offer some type of schwa for donors at various financial levels.

Sample research crowdfunding sites:

- www.USeed.com
- To see a sample USeed campaign, enter www.bit.ly/PSUSEED into your browser (must use caps)
- Experiment.com
- Petridish.org

McSwain's Rules of Patient Care

Many of you know that Norm McSwain died last month. He was a trauma surgery giant, and someone I had great respect for over many years.

He developed and promoted a list of 18 rules of patient care to his trainees. I think they will strike a chord in most of you, and I will share them here. Take them to heart; they will serve you well, whatever discipline you are in.

1. Death is your adversary and competitor — fight to win.
2. Treat the patient as if they were your mother, father or child.
3. Each minute has only 60 seconds. Do not waste any of them.
4. Assume nothing, trust no one, do it yourself.
5. Know anatomy cold.
6. Be technically quick.
7. Do not panic in the face of blood.
8. Work with physiology, not against it
9. Maintain energy production.
10. Know what to fix and what to leave alone.
11. Know when to run.

12. Paranoia prevents disasters.
 - a. The patient's disease is out to embarrass you.
 - b. The patient does not tell you the whole truth.
 - c. The most severe injury is under the unremoved clothes.
 - d. The infection is hidden by the dressing.
 - e. The patient has a problem that you do not know about.
13. Never talk a patient into or out of any operation.
14. The nurses' notes do not say what the nurse told you.
15. Do not procrastinate. Make a decision and carry it out.
16. Learn from your successes and from your failures.
17. Always question everything you do.
18. Don't whine, just get the job done.

To download a pdf file, enter this link in your browser:

<http://bit.ly/114D6NJ> (first character is the numeral one, the next is a capital "eye")

What If You Don't Have TEG For Trauma?

The new hot items in trauma care are thrombo-elastography (TEG) and ROTEM (rotational thrombo-elastometry), a new "spin" on TEG from the TEM Corporation. These tools allow for in-depth assessment of the many factors that influence clotting. We know that rapidly recognizing and treating coagulopathy in major trauma patients can reduce mortality. So many trauma centers are clamoring to buy this technology, citing improved patient care as the reason.

But new technology is always expensive, and isn't always all it's cracked up to be. TEG and ROTEM require an expensive machine and a never-ending supply of disposable cartridges for use. Some hospitals are reluctant to provide the funds unless there is a compelling clinical need.

Surgeons at the University of Cincinnati compared the use of TEG with good, old-fashioned point-of-care (POC) INR testing in a series of major trauma patients seen at their Level I center.

Here are the factoids:

- This was a retrospective review of 628 major trauma patients who received both TEG and POC INR testing using an iSTAT device over a 1.5 year period

- Median ISS was 13, and there were many sick patients (20% in shock, 21% received blood, 11% died)
- INR correlated with all TEG values, with better correlation in patients in shock
- Both INR and TEG correlated well with treatment with blood, plasma, and cryoprecipitate
- Processing time was 2 minutes for POC INR vs about 30 minutes for TEG
- Charges for POC INR were \$22,000 vs \$397,000 for TEG(!!)

Bottom line: Point of care INR testing and TEG both correlate well with the need for blood products in major trauma patients. But POC INR is much cheaper and faster. Granted, the TEG gurus will say that you can tailor the products administered to meet the exact needs of the patient. But in all my travels, I have visited very few centers that have fully and effectively incorporated TEG or ROTEM into their massive transfusion protocol. Most try to achieve 1:1:1 transfusion ratios, then use TEG to “mop up” with factors once the patient is stable.

The biggest obstacles to adopting these tools are 1) having a person available to read the chart, and 2) the learning curve to actually figure out how to interpret it. The technology is unfortunately not yet ready for prime time. It needs to be more like an EKG machine. Instead of (or in addition to) displaying the curve, the system should automatically interpret the curve in real time, and make specific recommendations like “infuse 6 pack of platelets.” Before you make the financial leap to buy these new toys, make sure that you have a very good clinical reason to do so.

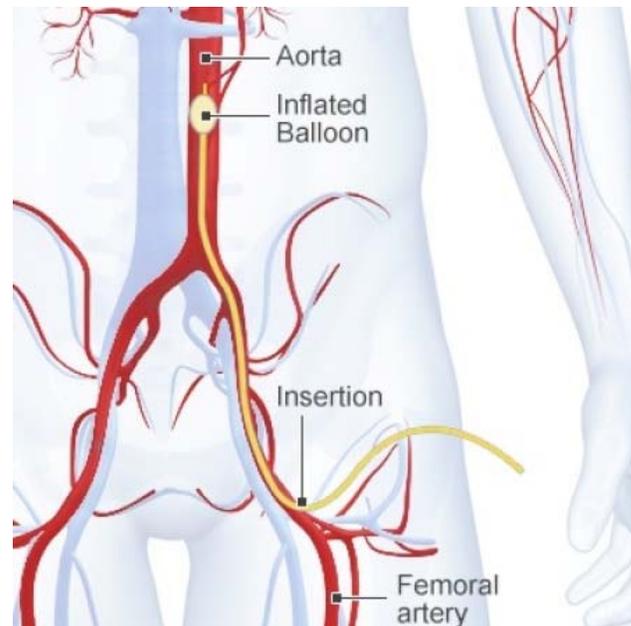
Reference: All the bang without the bucks: defining essential point-of-care testing for traumatic coagulopathy. J Trauma 79(1):117-124, 2015.

REBOA: All It's Cracked Up To Be?

Resuscitative endovascular balloon occlusion of the aorta (REBOA) is all the rage. Trauma professionals attending meetings and update courses can count on an update on this interesting technology. But what is it, exactly, and does it work?

REBOA has been around in one form or another for 60 years! In theory, there are five steps for using this technique.

1. Access a femoral artery using Seldinger technique
2. Insert a balloon catheter and move it into position proximal to the suspected vascular injury
3. Inflate the balloon to decrease blood loss at the site of injury
4. Once the injury has been addressed in the OR, slowly deflate the balloon
5. Then remove it



The authors of a recent paper performed an epidemiologic study analyzing data from the Japan Trauma Data Bank over an 8 year period. They performed some sophisticated analyses to try to reduce the usual issues that occur when perusing typical trauma data bank data.

Here are the factoids:

- Over 45,000 patient records were reviewed, and 452 were included in the study. This is a very large number, as relatively few centers use this technique.
- The REBOA patients were very badly injured, with a median ISS of 35 and an overall high mortality (76%)
- The non-REBOA matched patients were less severely injured, with a median ISS of 13 and a 16% mortality

- When matched for probability of survival using TRISS methodology, the REBOA patients had a significantly higher mortality

Bottom line: What does this mean? Basically, that there is an association with higher mortality given similar injury severity and physiologic compromise, in Japan. The study is another piece in the jigsaw puzzle, and not a well-fitting one. Sure, things may be done differently in other countries. And the use of REBOA as a “last ditch effort” certainly may result in higher mortality. But it may not be all it’s cracked up to be. Any use of this technique should be critically evaluated, preferably as part of a well-designed study. It’s not for the unprepared or faint of heart.

Reference: Survival of severe blunt trauma patients treated with resuscitative endovascular balloon occlusion of the aorta compared with propensity score-adjusted untreated patients. J Trauma 78(4):721-728, 2015.

Treating Headache After TBI

Most patients with mild traumatic brain injury (TBI) recover quickly and have few sequelae. Headache is common during the first few hours or days. But some patients experience significant and sometimes unrelenting headaches after their injury. How should we treat them? Are they the same as other common headaches?

There are several common types of headaches that are not related to brain injury, but many of these can begin after TBI. These include tension headaches from muscle spasm, cervicogenic headaches from strains, sprains or more significant injury to the neck and cervical spine, musculoskeletal headaches from pain in bone or muscle in the head or neck, and headaches related to the TMJ and jaw.

But many patients experience significant headaches without any of these factors. Why? Sometimes it is due to blood in or around the brain, irritating the meninges. But often, there is nothing that we can detect using our current diagnostic technology. However, even if we can’t find a reason, the headache is very real and very concerning to the patient.

I’ve seen practitioners treat post-TBI headaches with a variety of drugs ranging from acetaminophen and

NSAIDs to anti-seizure and psychotropic drugs. Unfortunately, there is little literature support for any of them. A review article published in 2012 found only one article with Class II data that showed no lasting effect from manipulation therapy.

So what do we do? Here is an algorithm suggested by the review article:

- Consider a workup to rule out intracranial pathology as a source of the headache
- Categorize the headache. If it is one of the non-TBI types listed above, treat appropriately.
- If the headache severely limits function, consider time-release opioids
- For milder headache, consider acetaminophen or NSAIDs
- Treat any comorbidities that may contribute to headache
- If the headache has migraine-type properties, treat as such
- If the headache is associated with cervical spine pain, mobilize the neck as appropriate

Bottom line: There is very little guidance for treatment of headache purely associated with TBI. Time-honored drugs like opioids for severe pain and acetaminophen and NSAIDs for mild to moderate pain help, but generally do not entirely relieve the pain. Only tincture of time will make things better. And it’s probably best to stay away from prescription drugs other than opioids recommended for the pain. They have not been shown to work, and there are plenty of side effects to worry about.

Reference: Systematic review of interventions for post-traumatic headache. PM&R. 4(2):129-140, 2012.

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