Traumatic Brain Injury with Neurosurgeon Gregory Hawryluk, MD, PhD Transcript

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Introduction and Guest Welcome

Welcome to the Art of medicine, the program that explores the arts, business and clinical aspects of the practice of medicine. I'm your host, Doctor Andrew Wilner.

Today, I am pleased to welcome Doctor Gregory Harlock. Doctor Harlock is a neurosurgeon and medical director of the Brain Trauma Foundation. I'm thrilled to have Doctor Harlock with us today to discuss traumatic brain injury, especially concussion, what it means and what to do about it.

Traumatic brain injury affects athletes, soldiers, people in motor vehicle, and many other types of accidents. I work at a level one trauma center in downtown Memphis, Tennessee.

Unfortunately, not a day goes by. I don't see a patient with a traumatic brain injury. I'm looking forward to a meaningful and informative discussion in just a few moments.

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And now to my guest welcome, Doctor Gregory Harlock. Pleasure to be with you, sir. Thanks so much for joining me. Okay. So neurosurgeon, just just give us a quick synopsis of how you get from, I don't know, idealistic college student to, practicing neurosurgeon.

How does that happen? Well, I basically stayed in school till I got to grade 42 or so. So, No, I it's, I think that to do neurosurgery, you really have to like school and learning and, because there's there's no fast way, you know, to get there.

Training to Become a Neurosurgeon

So, really, after medical school, in Canada, at least at the time, I went through with six years of residency training, and I decided to make that longer with a five year PhD.

It's now become seven years, you know, both in the U. S. and Canada. So, awful lot of training. But, you know, obviously we have a great privilege and, you know, we we have to be well trained to do what we do.

So. Right. You mentioned Canada. I actually trained at the Montreal Neurologic Institute at, McGill for my, neurology and epilepsy fellowship. Where did you train?

So I trained, med school was, University of Alberta. My, residency was University of Toronto, and, my, my fellowship was at University of, sorry, University of California, San Francisco, then UCSF. So.

All right, so now, the Brain Trauma Foundation. Tell us about that. Yeah. So, it's really an interesting story. So in fact, the origin story of the Brain Trust Foundation, is is really, documented the movie Reversal of Fortune.

So it grew out of, the semi von Bulow Coma Foundation, and I'll let people watch the movie to, to learn more about that involves Alan Dershowitz, who, over the last few years is, has been back in the media again.

So, really, you know, there was a desire, with the advancement of science in the 1980s to, to really learn more about the brain and coma. And, the foundation shifted, in its early years to, to be more focused on brain injury.

So, the semi von Bulow Coma Foundation became the Brain Trust Foundation. It really since its inception, it's been led by its founder, Doctor Jim Gauger.

You could probably call him a bonafide Peruvian prince. Is his family ruled Iran, about 200 years ago. And, it's really evolved over the years. So I think there's no question that its biggest contribution to medicine has been evidence based guidelines.

So, in fact, the guidelines that that we published back in 1996, they were the very first clinical practice guidelines ever published by a surgical specialty.

And, you know, I guess the question is, why did that happen?

Brain Trauma Foundation and Evidence-Based Guidelines

I think, you know, it was really a rise of evidence based medicine. But I think there's there's actually a lack of evidence, in head injury. So it actually made it relatively easy compared to other aspects of medicine.

You know, there's sort of limited pool of studies to work with. So, so our guidelines are really had an important legacy. So we've now done or certainly over 15 full guideline projects.

And then when you think about each one of those takes over 30 people, but five years of work to do, that's a pretty substantial accomplishment. But I think the thing that we're most proud of is that, whenever it's been looked at, whether it's Eastern Europe or New York State, our guidelines have been associated with a 50% reduction in mortality.

And the way I look at that is, if you were to think of our guidelines as being like a pill, if you had a pill that reduced hand injury mortality by 50%, that's probably a Nobel Prize.

So, I'm not claiming that we deserve one of those, but but I think, you know, we we have achieved something very substantial for for patients with head injuries. So.

Yeah. And what that means is collating the science, understanding the science, and then spreading the science, you know, guidelines, are a way of managing patients.

You know, doctor wants to be told what to do. On the other hand, if a patient shows up with a severe head injury, you want to have a clear path. It's like, well, should I give antibiotics or not?

Should I intubate or not? Should I put his head up or hit down? You know, there's a lot of, decisions that need to be made. And if you can benefit from, thousands of other physicians who've been through that and figured out what works, that's what ends up in the guidelines.

Yeah. You know, there's absolutely no question that the path that we tried to follow, as you said, if we can figure out through evidence based medicine what's best practice, if we can get more people doing that, how could people not get better?

And that's actually been a, you know, as I described, a very successful model. You know, it's was sort of funny is I sort of joke with people. I oversee the guidelines.

But I don't always follow them. And the reason is that, there's a lot of times where, you know, I think I might know better than the guidelines. I think that the guidelines, set a baseline standard.

And, you know, for the average patient, the guidelines probably worked very well. But I think on every patient, there's reasons why they're a little bit different than the average.

So I think you need to to see why your patient might benefit from some care. That's a little bit different. But, you

know, our guidelines are, you know, they're not to be followed religiously.

But but they certainly do provide, a pathway that we think, you know, help patients to get the best possible care. Yeah. I was, coauthor of, of, several American Academy neurology guidelines on, epilepsy.

And, you know, and there's big committee meetings with all the people who know as much as anybody and read a lot and, sort through the data and try and make some sense out of it.

I think the, the onus of the on the physician is if you do deviate from the guidelines, you you need to justify that. In other words, the guidelines say this.

No, I don't have to follow the guidelines, but if you've got a good reason not to, that's okay. But not, willy nilly. So I think guidelines got a kind of a bad rap that well, I have to do it this way, but in fact, they're they're guidelines.

They're not rules. And regulations. So guidelines are on your website, I presume. They sure are. And, you know, the other thing I would say is that, you know, you know, medicine involves and over the last ten years, I think we've seen a huge upsurge in what we might call personalized medicine.

And, guidelines might be viewed as inherently at odds with that idea, the idea that all people should be treated the same, versus, you know, refining care and in a more digitalized fashion.

So, you know, I think we've certainly got an initial bump in outcomes by, by standardizing a high level of care. And it may be that that we're going to see even better outcomes, by, by building off that with more individualized care.

And in some ways, this sort of seems like the panel on Swing Back. But but but maybe it's not. But, absolutely. I agree with you that, you know, I think we need to get that baseline care up and then and then refine from there.

So you can imagine subsets of patients, right. That would be treated a little differently. Children, elderly maybe. Maybe women versus men, I don't know, but where there are differences in biology, there may be differences, warranted in, management.

Would you agree with that? I absolutely would. You know, one of the problems, for instance, in elderly patients is that a lot of times their brains are shrunken away from the inside of the skull.

And it doesn't company excepted that. Exactly. So, you know, that that that there's a couple things.

Personalized Care and Patient Differences

One is that it gives you a little bit of, a buffer zone. So if you get some blood inside your brain, you can compensate a little bit better. But it can actually be a lot harder to put in things like neuro monitors into the brain.

Because if the brain is separate from the inside of the skull, the monitors can bounce off, and and it doesn't work as well. So, you're absolutely right that you have to tailor your, your, your, your approach a little bit to the individual patient characteristics.

All right. I want to talk about a very common injury. And it's not clear to me about the guidelines. They seem to be shifting. So tell us first what is a concussion?

Oh, that's a hard question. So, you know, I could pick amongst the over 20 different definitions of concussion and, and tell you the one I like, but, I guess what I would say is it continues to be a point of some controversy.

There are continual efforts to, to bring people together. You know, the most recent definition, you know, that I saw, was was about a three paragraph definition.

So, the general gist, though, is it's going to be some sort of an energy transfer to the brain. Some sort of an impulse

doesn't have to be a direct blow to the brain.

You don't have to lose consciousness. But it's something that's going to lead to an alteration in brain function. So it's a relatively mild head injury where the skull is in fractured.

There's no bleeding in the brain. Would would you agree with it? Seems to me the old definition was that the the Cat scan had to be normal. Yeah. To be a concussion.

Do we still go with that? Yeah. So so what I would see is that, I think it's fairly well accepted right now. That to be diagnosed as a concussion, both a CT and an MRI should be normal.

So there may be metabolic imaging, things like that. That could be abnormal in a concussion. But but I think that's fairly widely agreed upon right now.

But, you know, in terms of the distinction between, you know, a mild TBI versus a concussion, you know, that's that's continues to be a point of some controversy.

There's, real movement to try and unify those. But but, I think that the preferred view is that although a mild TBI may have some imaging anomalies, a concussion, at least a CT and MRI should not.

What about you know, we've recently recognized that a lot of head injuries where the scanning was normal. If you look at the scanning with fancy sequences like, it's why you see diffuse axonal injury.

So is is that compatible with the term concussion or does that does that mean you've got a mild brain injury outside of the bounds of concussion. Yeah.

Defining Concussion and Mild TBI

Again, I think that would be you probably could get, ten experts in a room and get 12 opinions on it. So you my my take on that is that probably the MRI lesions would put you, out of the realm of concussion to morning to a mild TBI.

And certainly I think it's it's been pretty well described now that people that have normal CTS very often have abnormal memories. And in fact, we're finding it very hard to find controls for concussion patients.

There is a view that perhaps we could we could take orthopedic patients that had a limb fracture. But it turns out that they have a very high prevalence of, brain lesions on MRI and, and positive biomarkers, that there were necessary to look at.

So, I think one of the things we're finding is that concussion or mild TBI, they're both far more prevalent than we thought they were. And another big thing that one of my mentors, Geoff Manley, has, has discovered, is that these are really being, under triage.

So a lot of these people actually have a lot of deficits. But too often they're sort of left to, you know, leave the emergency department. They look pretty normal.

And yet they suffer, you know, job losses. Yeah. You know, various cognitive, functional deficits, they don't get enough medical attention. So I think there's been a real push in recent years to, to try and improve the care that these patients are getting.

One, observation I think you can help me with. I remember when I was a resident, I had the opportunity to scrub in on a few neurosurgery cases. And of course, you do that on a a pretty regular basis.

The I think most people don't realize, perhaps because, you know, the the brain is nicely nestled in into what is quite often a hard head, that the brain is a very soft, vulnerable structure.

Tell me, tell me what you see when you're operating on the brain. Yeah. I don't know if it would be better to compare it to jello or pudding, but it it sure absolutely is.

Is pretty soft, especially once you get through the P. The P has a, a little bit of a turn to it, but, everything below that is, is a lot more like pudding.

So, it's absolutely a very delicate organ. And, you know, smashing, something that's like putting up against, you know, the bony skull base, you know, tends to lead to injury, so.

Right. So, okay, so I'm going to use that to segue. And what do you think as an expert in concussion and mild traumatic brain injury about contact sports?

So, jeez, everything we're talking about this morning is controversial. So so, you know, my my view is that, I, I still play contact sports, and I encourage my, my kids to.

And frankly, even collision sports. So, you know, I probably wouldn't box I know physicians that do. But, you know, I think the benefits of physical activity really outweigh some of the risks of, of the sports that are that are a concern these days.

I think that it's a complex discussion. I think, you know, whenever you're engaging in a sport like football or frankly, even soccer, you know, is another one that's that's correlated with a lot of, concussions.

It really comes down to having respect for your own body, having respect for, you know, your competitors, not, you know, going out trying to hurt them.

You know, I think that there's there's been a lot of work, with rules. So for instance, things like mouth guards have been shown to reduce concussion by 30%.

There's been work in hockey. So they brought in things like, you know, stop signs that in the back of people's, uniforms to discourage checking from behind.

So a lot of the measures in hockey have reduced concussions by 50%. So, I, I continue to feel that the benefits of, of these sports, really outweighs the potential risks.

They've looked at all sorts of different things. They've looked at, you know, NFL players and they found that their overall health is not worse than the average population from from a cognitive and brain standpoint.

In fact, one of my colleagues, sparkle, who's my Sam Madani, published a paper looking at neurosurgery and orthopedic chairman. And what she found is that, they played far more, contact in collision sports than their, their college, classmates.

A lot of them reported concussions, and you had to have gone on to do well in their careers. So, I think that the jury is still out. I think that CTE remains a controversial diagnosis.

Very interesting. A lot of the work that the Dan Perle does, because he's a very prominent pathologist and, I think every time we think we're making progress in understanding CTE, there's this sort of a new range that comes up.

So, for instance, in the military, we're finding that, people in the military are getting CTE, CTE really seem specific, to, to contact sports. In the military, they're getting these boundary, scarring lesions.

So, and really a low rate of CTE, only about 4%.

Brain Injury in Contact Sports

The people in the military, they're getting it, had a history of contact sports. So, I think that, the jury's still really out.

On on potential harms.

And I think there's unquestionable benefits. So I, I continue to feel that, with, with appropriate safeguards, things like football, hockey, soccer, people should be out doing that stuff if they enjoy it.

Well, okay. That's reassuring. Now let's get to first of all, concussions are, as you mentioned, incredibly common. And, I remember when the treatment for concussion was strict bed rest.

Yeah. You lie there. No video games don't do anything difficult. Just relax. Let the brain heal. And then there was a flip. It's like, nope, out of bed.

As soon as you can do as much as you can, but not too much. And, get back with the program. Plus, there's a lot of, I don't know, we call nonspecific symptoms, right?

Fatigue, headache. I just don't feel, well, lack of energy. Dizzy. You know, things that are hard to, for anyone else to quantify. So where are we now with the treatment of concussion?

Yeah, you're absolutely right. And, you know, concussion is really been a hard thing to, to study, which is why I think that, you know, there's been a lot of back and forth and flip flopping.

At the end of the day, if you can't define it, you know, sort of alluding to things we talked about earlier, and it's going to be hard to study something that you can't, can't define as a baseline.

So, you're absolutely right that, you know, even five years ago, there were a lot of doctors that were recommending strict rest. I think the idea there is that you've got some strain neurons and and if we can keep those, those neurons from firing, we hopefully might be able to preserve them a little bit better.

The studies that have been done over the last five years, though, really haven't shown a benefit to that approach. So, and now the, the, the thinking is, is flipped a little bit, where we know that, a key trigger for neurons to grow and to heal is activation, actually, so it's one of the benefits to physical therapy.

It's not just you're building up a muscle. You're you're sending a signal from the muscle to the nerves and come innervate me. So I think that this is the reason that underlies the switch.

I think there's a happy medium, though. So I think that, you know, a lot of patients, are going to report some fatigue or a sense of feeling unwell when they overdo it.

For a lot of my patients, the thing that that really does them in is a trip to, a big department store. Your place is really busy. And the brain, I think, struggles after a concussion for a lot of people to integrate.

You know, a lot of the complex sensory stimuli. So the advice that certainly I'm giving to patients, and I think a lot are, is, you know, to expose yourself to that stimulation, the ease in, when you're feeling tired or overwhelmed, rest.

You don't necessarily have to sleep, but just put your head down and close your eyes for an hour. And, and sort of expose yourself, you know, integrated fashion and take rest as often as you need to.

Thanks for that. Maybe we can squeeze in a little public service announcement about seatbelts and helmets. You want to say something about those motorcycles?

What do you think? Yeah. No. The bottom line is that those things work. So early in my career. I went to train with, a luminary in the field, Ross Bullock, down in Richmond, Virginia.

And, there had been a big push, in terms of, you know, safety measures in automobiles. And they had a public campaign. And, I didn't see as many head injuries as, as I hate to wish them on anyone, but when you when you're doctor, you want to go train and and learn.

So, we didn't see a lot of head injuries, over that three month period. So it was very clear that these things work. I think another key message is that, you know, doctors, a lot of times think that their role is really in the hospital.

But I think, you know, there's a lot of doctors that have great talents with engineering. I think doctors have learned that we can be very influential with public policy.

So I think that preventing hand injury is not only effective, but it's a domain where we're doctors can really have an impact. So I think we, all of us that work in this field, need to do the things we're able to do to try and, reduce the incidence of, of of head injury and concussion, because at the end of the day, no treatment will ever be as good as prevention.

Yes. No treatment will ever be as good as prevention. Be kind to your brain.

Modern Concussion Treatment and Recovery

All right. One last, topic I'd like you to address, alternative therapies for a traumatic brain injury. You know, we don't have a lot of treatments other than, make sure it doesn't get infected and fix up the wound and physical therapy.

And there are a lot of, people, not necessarily doctors, offering, alternative therapies that are not FDA approved, but where they claim great success.

Mentioned one hyperbaric medicine that I'm familiar with, which which does have, definite, you know, FDA approved indications, but it's also being used for, post traumatic injuries.

And I wondered if, and of course, these are expensive. And, you know, the problem with these therapies is that it's kind of, saps energy and, dollars out of the patient's account.

That could maybe be better spent. So, but I don't want to put words in your mouth, so. Well, tell me what. What's your take? Are there any alternative therapies that are worth worth it or which ones should, are there any that you see that are commonly used that ought to be avoided?

Yeah. No, that's a really great question. And the one I often see as well as stem cells. And unfortunately, that was what I did, my PhD. And so, I really have to sit down with, with patients that are considering that.

And, as you allude to, it's often the patients who have some financial means that, are particularly vulnerable because people will pay a lot of money for, for hope and something that might help them.

You know, for, for a lot of these treatments, if I don't think it's something that's going to be harmful and not something that I think there's strong evidence for, you know, I certainly tell people I don't have a problem if you want to pursue it.

But I think for the more invasive or expensive things I do tend to offer some words of caution. And I think we have to be a bit careful. I, you know, I have a very memorable patient that swore by the hyperbaric oxygen treatment that she got.

You know, pretty hard to tell how much that could be a placebo effect. Or, you know, she had just achieved the normal curve that she would have had anyways.

You know, it's hard to know. And there is some evidence, it's not a very strong evidence. So, you know what I, what I would really like to see is that, a lot of these treatments, are done under the auspices of trials and studies that generate really good evidence.

So it's it's it's a it's a tricky point, right now. So, you know, the other thing is that, you know, in head injury, we're often dealing with people that are a bit vulnerable.

They don't have their full cognitive capacity. And, I think that, we, we really have to, you know, make sure that they aren't getting themselves into things that have, a lot of financial commitments without proven benefits.

So later today, I'm going to be interviewing a Matt, hangul tackling who just wrote a book about sort of, alternative therapies. Not not necessarily for head injury, but for just about everything.

And the that it's a big business, exploiting, people.

Prevention and Safety Measures

So I think, you know, pretty soon what I'd like to see is these alternative therapies included in your guidelines, when they when there's some evidence behind them, one way or the other so that people really, know what to do.

You know, it's interesting. So there is so little evidence for a lot of the mainstream stuff and head injury. And the bar with guidelines has gone up over the years.

So what used to be enough evidence isn't anymore. And, so what's really interesting is that we've had to change our approach. So for the Brain Trauma Foundation to produce usable guidelines, we've actually had to incorporate expert opinion.

And we've tried to do it in a rigorous formal way. So we use a Delphi consensus process. This blinded and that we don't have the expert in the room sort of potentially bullying other people to, you know, to also to, you know, come over to the viewpoint of that, that high expert.

So we, we've had to incorporate that. So that's going to be the real challenge, I think, with some of these alternative things is, I think, we may end up being left wholly with expert opinion, but, I think this is a challenge to all of us to, to go out and do those studies.

I think everything and head injuries is fair game. I think we we don't have good enough evidence for anything that we do. In all of our guidelines, there's only one level, one evidence recommendation.

And that is not to give steroids. Everything else, is up for revision and further study. So, Greg, this has been a great, conversation. Is there anything you'd like to add?

No, I really enjoyed speaking with you today. So, you know, I think head injury, really continues to be, a big problem is an especially big problem in the military.

I would say that we're we're very proud. We've now partnered with, with the military.

Alternative Therapies and Research Gaps

They've had a big push, to, to do some things that are, going to bring some, some quick benefits to soldiers, I think instead of, some of the pre-clinical trials that can take 5 or 10 years, they've made a big investment in the Brain Trust Foundation, or guidelines to try and identify best evidence and bring some new things to soldiers pretty quickly.

So, we're looking at, right now penetrating head injury. We're looking at, head injury care in combat and austere environments. We're going to be doing some new concussion stuff, as well, in the next few years.

So, a lot of stuff on the docket for us and, really appreciate, your, your interest and everyone out there, you know, trying to provide best care to their patients. So thanks for that, doctor Gregory Harlock, thanks for joining me on the Art of medicine.

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Thanks again to Locum story.com for sponsoring this episode of the Art of medicine. I'm Doctor Andrew Wilner. See you next time.

Military Partnerships and Closing Remarks

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