

## BRAINLINE TALKS WITH DR. JAMES KELLY

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### Second Impact Syndrome

#### Dr. James Kelly

Well, second impact syndrome is fortunately rare, but often devastating and often fatal. Swelling of the brain after what are repeated concussions. That's the way it's been described. And I and others have written about certain cases of that. It can also happen after one blow. We've seen that. Or at least without there having been identified earlier blows to the head and the same massive brain swelling can occur. So this is without a big blood clot pressing on the brain. It actually is a problem with what we call auto regulation of the blood vessels of the brain. But blood vessels then dilate and constrict.

And if they stay dilated, they carry more blood in them. And that leads to pressure elevations in the brain. Because now there's more liquid than there should be.

And so if that's happening, the brain under those circumstances becomes very tight. The circulation is sluggish. The brain doesn't get the nourishment it needs. And so under the pressure that the liquid is creating, the brain becomes dysfunctional. Once that gets far enough down the road in its evolution, oftentimes we can't stop it.

So early on in certain cases with proper medication and positioning of the individual and so forth, that can be halted. And yet, I don't know anybody who's come through that unscathed. If they live through second impact syndrome with that massive brain swelling, they're left with some kind of deficit. It's not just a concussion effect.

#### Dr. James Kelly

Craniectomy can be used. But what that amounts to is a surgery in which a big area of bone is removed and the brain is allowed to swell outside of the normal confinement. The problem with that is that sometimes the edge of the bone where the brain is swelling up against becomes inflected with the stroke along there because it's literally herniated up against and stuck in that way. And you can't get blood supply past there.

So even though it can be lifesaving, it creates in many cases a neurological deficit as well. There have been studies, and I don't know if they're still ongoing, of taking off essentially the entire forehead and letting the brain swell forward where it doesn't get stuck and doesn't herniated up against the edge of the bone. Covering all that with a sterile plastic

that's similar to the lining of the skull or the dura. And I know that there was some interest in doing that in a multi-centered trial around the states. But I have to admit that I don't know if that's gone forward or if it's still in the planning stages.

### **Dr. James Kelly**

Second impact syndrome and shaken baby syndrome are very similar. The pathophysiology, the physiological change that occurs in a baby's brain, is again the swelling after repeated blows. And so there may be many more blows that any individual one of them would not have caused trouble. But it's the repeated blow that causes the problem. And the picture on scan and the picture on examination and the picture at autopsy is very similar between the two.