

What's the Difference Between a Subdural and Epidural Hematoma?

Source: Produced by Victoria Tilney McDonough and Brian King

Video Link: <http://www.brainline.org/content/multimedia.php?id=3267>

Dr. Jane Gillett: So what's the difference between an epidural hematoma and a subdural hematoma? Requires a little bit of knowledge about the brain, and brain anatomy.

So as you know, your brain sits covered with 3 layers of what we call meninges, which are basically 3 layers coating the brain. And then there's just skull. So there's the brain, then there's what's called the pia mater, which most people will never see, then there's the arachnoid mater because it looks like a spider; and then there's the dura mater which is a big fibrous material like paper that covers the brain, and then there's the skull. And normally the dura mater adheres to the skull so they're tightly up beside each other.

But running in between the skull and the dura mater are the arteries that supply the skull and the scalp, and that kind of thing. And the big one that most people know about is called the meningeal artery, the middle meningeal artery that runs right through here. And so when you fall and you fracture your skull somewhere on this side, often, you will tear the middle meningeal artery. The artery, because it's an artery, is under pressure; and so it will continue to bleed, and it bleeds quickly because it's under pressure. So you get a collection of blood between the skull and the dura mater, which is why it's an epidural, because it's above the dura. And it collects quickly, but the hallmark of an epidural hematoma is it tends to occur in people under the age of 45, and it tends to present with a fall with a brief loss of consciousness. Person wakes up, perfectly fine, seems to be great, and not have any difficulties whatsoever, and for an epidural hematoma on the side of the head usually about an hour or 2, 3 hours later, they start to get drowsy, they start to throw up, they start to have symptoms. That's because at that point the collection of blood in that space has gotten so big that it's now pushing the brain across in the skull, and pushing the brain down into the skull and compressing the brain stem so that your heart becomes irregular, your breathing becomes irregular, and you're slipping into a coma. And if not treated, it will eventually kill you.

The other type of epidural hematoma is one where it occurs at the back of the brain where you fracture back here, and because it's right by the brain stem, which is the part of the brain that has to do with breathing and being awake, and having a heartbeat; that collection of blood will compress your brain stem faster, there's less space, and it's hitting the bad area, or the area that's going to kill you, much more quickly. So you will die from that kind of an epidural hematoma really very quickly, but it's a very rare form and not recognized very often.

In a subdural hematoma the veins of your brain run in the space between the arachnoid and the dura. They are under low pressure. So as you get older and you start losing your brain cells, by the time you're 45 or older our brains have shrunk. So instead of the brains being tightly up against the skull, they're now somewhat pulled away, so there's a bit more space. And then when you have your fall, or the car accident, or whatever, the brain gets jostled and it sort of moves like Jello; so it runs from one side to the other side, and it stretches those veins

because they're stuck to the... adherent to the dura on the other side. So the veins stretch. Now if you've got too much space in your brain and they stretch, they'll stretch and tear, and then they start to bleed. But because it's a vein, they're low pressure, they tend to not bleed as fast and they tend to ooze a bit more. The older you are the more space you have for that blood to accumulate. Sometimes subdural hematomas aren't recognized for weeks after the injury because it's taken that long for them to become symptomatic, because they just slowly, slowly collect it. If you're 45 and you end up with a subdural, you tend to be symptomatic a little bit faster because your brain hasn't shrunk so much, and so you don't have as much space.

So you can end up presenting with a headache and the nausea and the vomiting, and the cognitive changes for the subdural, a faster period of time. Those are sort of the 2 main differences between them, whereas a subarachnoid hemorrhage is caused by the arteries within the brain, and they run in the arachnoid space which was the middle layer covering the brain. They can... the small ones can rip and tear when you have a trauma, which gives you blood in the subarachnoid space, or of course you can have an aneurysm that ruptures, and then you have a big huge subarachnoid hemorrhage which will, depending on where the aneurysm is, depends on how you present and whether you end up with weakness down 1 side, or whether you end up being blind, or whether you end up having frontal lobe damage, or combinations thereof.

So that's sort of what a subarachnoid hemorrhage is. And then there's the intracerebral hemorrhage, which is where you get actual blood inside the brain parenchyma itself, and that's usually caused by a direct blow to the brain, or you've had like a stroke-like event so that there's a lack of blood to the brain for a part of the time; and then the brain gets re-perfused so there's blood again but there's nothing stopping it from leaking out, so you've got a big collection of blood. And then finally there's the intraventricular hemorrhages, which is where you have the blood that goes into the ventricles, which is the spaces within the brain, where the cerebral spinal fluid is made. And that gives you a bad headache and put you at risk for developing something like hydrocephalus, which is known as water on the brain, which give you bad headaches and make you sleepy and puts you into a coma as well. So those are the main types of bleeds in the brain.