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Severe Brain Trauma: Lessons from Army Medicine

MANAGEMENT OF SEVERE HEAD TRAUMA

You are listening to ReachMD XM 157, the Channel for Medical Professionals. Welcome to the Strength to Heal, brought to you by the United States Army Medical Department.

Your host is **Dr. John Armstrong**, trauma surgeon . **Dr. Armstrong** is a former army colonel, who served as director of the US Army Trauma Training Center in Miami, Florida and is Chair of the ACS Army Committee on trauma.

Management of severe traumatic brain injury at the cutting edge in Army Medicine. Our guest is Colonel and Dr. Leon Moores, consultant in Neurosurgery to the Army Surgeon General and former Chief of Neurosurgery at Walter Reed Army Medical Center.

DR. ARMSTRONG:

Welcome Dr. Moores.

DR. MOORES:

Thank you Dr. John, I appreciate the opportunity to speak with you today.

DR. ARMSTRONG:

Dr. Moores, We are in a time of war and we are seeing injuries in this conflict, which capture the imagination, what can you let us about the spectrum of injuries ?

DR. MOORES:

One of the things that we are noting is that our forward resuscitation capabilities are so extraordinary that the survival rates have increased. This means that our hospitals in Germany and back within the United States such as the Walter Reed Army Medical Center and the National Naval Medical Center were seeing a severity of injury, which is unprecedented and that leaves us with the opportunity to take care of young men and women who otherwise may not have survived the previous conflicts, but create very complicated management problems, which we had been working at some pretty significant solutions for.

DR. JOHN ARMSTRONG:

And what are some of those management problems ?

DR. MOORES:

While the volume of brain injury is significant in many of these men and women. In comparison to previous conflicts we are able to save the lives of and return to a reasonable level of functioning in many, many cases, folks with injuries that have traversed virtually in the entire hemisphere of brain tissue, sometimes dominant hemisphere brain injuries, which in the past might not have survived, will survive, and therefore we are able to not only save them acutely but participate in rehabilitative care for months and years and getting the folks back to a quality of life, which is acceptable. Additionally, as you can imagine particularly with penetrating injuries the degree of soft tissue and bony injury of the overlying brain creates a reconstructive problem for us, which requires complex solutions and a multi disciplined area of approach including neurosurgery, plastic surgeons, facial surgeons, and even our dentists, who participate in some of the facial injuries.

DR. ARMSTRONG:

So you have the brain injuries themselves, you have the injuries to the surrounding bone and soft tissue, and I would imagine that the brain injury initially takes precedence and then there are consequences to management of the brain injury in terms of further reconstruction?

DR. MOORES:

That's absolutely correct. Initially we are most concerned about swelling of the brain. Within the first 24 to 96 hours, the brain can swell tremendously and one of our biggest therapeutic maneuvers in taking care of that is to remove a much larger portion of bone than the initial penetrating injury had created. In blunt injuries, we will do that as well and do an operative procedure to remove a very large portion of the skull and then the brain can swell without creating injury. As you know, when the brain swells inside a fixed skull it can create a significant increase in pressure resulting in decreased blood flow and that can lead to stroke and death. By removing that large piece of bone we are able to allow that swelling to occur without that endpoint. Subsequent to that, when the swelling has gone down and the acute injuries have been treated often several months later we can work on some of the cosmetic repairs that were secondary. Remember too that these injuries to the brain and face typically do not occur in isolation. Often these young men and women have multiple injuries to the torso and extremities, which are being managed simultaneously with the head injury.

DR. ARMSTRONG:

So as a casualty presents with these multidimensional injuries cutting across injuries to the torso and to the extremities and then to the head, the initial priorities and management remain the ABC?

DR. MOORES:

They do indeed, you are absolutely right. There is significant resuscitative effort that takes place far forward and the ability to rapidly stop blood loss to move the casualties to forward resuscitative surgical teams in expeditious fashion often comes within minutes to you know an hour or hour and a half follow those same ABC's that we all know about from our Advanced Trauma Life Support Systems.

DR. ARMSTRONG:

I guess to say it another way the resuscitation of the disability remains ABC.

DR. MOORES:

It does, it does indeed.

DR. ARMSTRONG:

Have there been any lessons from the current conflict in specifics of resuscitation in patients with known severe traumatic brain injury that might lessen the consequences of that injury beyond the promotion of perfusion.

DR. MOORES:

I think that perfusion remains the biggest issue in terms of the entire body, but specific to the cranium we have learnt that in much larger removal of bone tissue to allow an unprecedented level of swelling is therapeutic. We knew from the civilian trauma and stroke literature that removal of a large portion of bone can be helpful and we become very, very aggressive removing even larger segments of the skull, often times portions of the skull from both hemispheres, sometimes both anterior and posterior skull. When these men and women are injured initially there are often unconscious potentially because of the blunt or penetrating trauma that they suffered, they have multiple wounds, and you have to make a decision very quickly about intervening surgically. You have the capability and theater to intervene with virtually every case. Some cases clearly when the initial CAT scan is obtained you recognize that there has been so much tissue disruption that unfortunately that casualty is not going to survive and you do not perform aggressive neurosurgical interventions. What we found is we sort of pushed the envelope forward in terms of the initial exam and initial presentation with which we are willing to intervene. Folks who come in with the Glasgow coma scale score of 3 or 4 potentially with even dilated pupils because of the blast injury or other trauma to the eyes, or their eyes are missing because of the penetrating injury they have undergone, often times we will still performed aggressive neurosurgical resuscitation and in a months later these folks will walk into your clinic, which is not something you will typically see.

Dr. ARMSTRONG:

If you are just tuning in, you are listening to The Strength to Heal brought to by the United States Army on ReachMD XM 157, the Channel for Medical Professionals. I am your host, Dr. John Armstrong, and our guest is Colonel and Dr. Leon Moores. We are discussing the management of severe head trauma.