



PATIENT/FAMILY INFORMATION & RESOURCE GUIDE



**Neurocritical
Care Society**

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WHAT IS NEUROCRITICAL CARE?

Patients in the hospital with the most serious illnesses need to be cared for in an intensive care unit or ICU. There are many types of ICUs. The Neuro ICU is the place where patients with brain and spine illnesses come for care. The illnesses may include:

- A blood clot in the brain (stroke)
- Bleeding in or around the brain (subarachnoid hemorrhage, intracerebral hemorrhage, subdural hemorrhage, intraventricular hemorrhage)
- Brain tumors (abnormal growth of tissue)
- Head trauma
- Status epilepticus (many seizures)
- Nerve and muscle diseases (myasthenia gravis, Guillain-Barre Syndrome)
- Spinal cord injury or tumors and spine surgeries
- Any complications from these diseases

In the ICU, patients receive care from a specialized care team. The team members are experts in managing the needs of patients with brain and spine problems.





MEMBERS OF THE NEUROCRITICAL CARE TEAM

Neurocritical care is a multi-disciplinary field comprised of a collaborative effort by:



Neurointensivists (ICU Physicians)

Neurointensivists are physicians who receive special training. Their training focuses on caring for people with brain and spine problems. They may come from many backgrounds such as:

- Neurology
- Neurosurgery
- Anesthesiology
- Internal Medicine
- Emergency Medicine
- Pediatrics

These physicians also care for the rest of the body. Neurointensivists perform many procedures such as placing breathing tubes to help patients breathe. They also may use a needle or small tube to sample fluid around the spine or brain. Neurointensivists work with a team of people including those mentioned below.

Neurosurgery Physicians

Neurosurgeons perform brain and spine surgery.

Typical surgeries include:

- Removal of brain tumors
- Removal of blood clots that have formed when a blood vessel in the brain breaks
- Repair of blood vessels
- Spine surgery
- Placing a small tube in the brain to check pressures in the brain
- Removing a part of the skull to treat brain swelling

They help make decisions for people in the Neuro ICU.





Interventional Endovascular Physicians

These physicians treat problem blood vessels in the brain and spine by using small tubes and wires which are slowly moved through blood vessels in the body up to the brain. They perform many different types of procedures. One of the procedures is called an angiogram. An angiogram involves the placement of a small tube called a catheter into a large blood vessel in the thigh area. Using medicine, pictures of brain vessels are taken.

If the patient had a blood clot inside the blood vessel, these physicians can remove the blood clot by putting special medicine inside the blood vessel. They can also put a wire stent inside the brain vessels to keep them open.

If the patient has the type of stroke where the blood vessel in the brain has broken open due to an aneurysm (weakened blood vessel), they can close the hole in the blood vessel by filling it with metal coils.

Nurses

Nurses care for patients in the Neuro ICU. Nurses receive special training to work in this unit. Nurses closely watch the patient's condition all day and night. They give medications. They also perform treatments. Nurses educate patients and families. The special monitoring and training allows quick treatment.



Advanced Practice Nurses and Physician Assistants

These special trained caregivers include:

- Nurse Practitioners
- Clinical Nurse Specialists
- Physician Assistants

Advanced practice nurses and physician assistants receive special training to work in the Neuro ICU. They work with the team to care for patients. They deliver medical care and perform procedures. They educate the team. And they help to improve care.



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Housestaff

Interns, residents and fellows are called housestaff. They are physicians in training. Interns are first year residents. They have just graduated from medical school. Residents are physicians in specialty training. Fellows have completed their residency training and are in additional specialty training. Neurocritical Care is a specialty with its own training.

Clinical Pharmacists

Clinical Pharmacists are an important part of the Neuro ICU team. They work with the physicians and nurses. They are experts in the safe and correct use of medications. Clinical Pharmacists help select the correct medications. They also help with the right medication amount. They monitor for side effects. They work with the team to make changes if needed.



Rehabilitation

People with brain or spine problems may need rehab. This helps prevent future problems. Also, rehab helps people get back to their normal life. This process begins early in the hospital. People who provide rehabilitation include:

- Physical therapists
- Physiatrists
- Occupational therapists
- Speech language pathologists

Other Professionals

Respiratory therapists (RTs) work with the ICU team. They are experts in breathing. RTs help with oxygen and breathing machines. They help with other lung treatments as needed.

- Social workers provide emotional support. They help with financial concerns. Social workers help patients and families prepare to go home. Some hospitals have case managers or discharge planners to help people go home.
- Chaplains provide spiritual support
- Palliative care teams help relieve pain and suffering



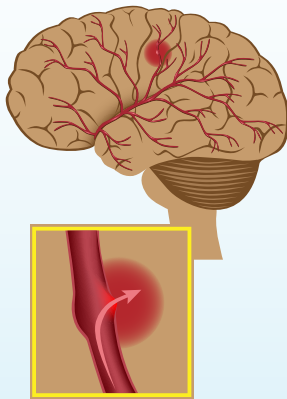
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DISEASES TREATED:

People in the Neuro ICU have many types of problems. Below is basic information on some of these problems. Please ask your care team for more information about any of these problems.



Rupture of blood vessels; leakage of blood

SUBARACHNOID HEMORRHAGE (SAH)

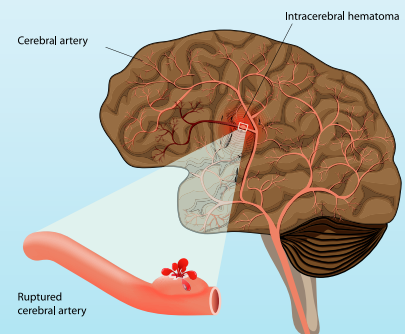
SAH is a type of bleeding in the brain. It is often caused by trauma or aneurysm. An aneurysm is a weak artery. Smoking, high blood pressure and drug use can make aneurysms worse. Aneurysms with bleeding should be fixed as soon as possible. Surgery or a procedure is done to fix the aneurysm. After aneurysms are fixed, blood vessels may become smaller. This is called vasospasm. This can lead to stroke. The Neuro ICU team tries to prevent stroke. People with SAH usually stay in the Neuro ICU for at least 1 week.

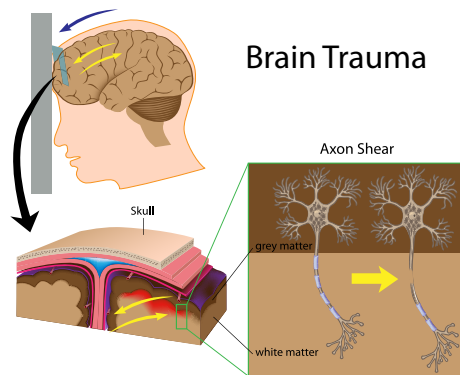
INTRACEREBRAL HEMORRHAGE (ICH)

ICH is another type of bleeding in the brain. Bleeding happens in the brain tissue. ICH is often caused by high blood pressure. Problem blood vessels called vascular malformations may cause ICH. ICH may also be caused by:

- Brain tumors that bleed
- Blood thinners
- Blood vessel problems

Some types of ICH are treated with surgery. People with ICH may need a special drain to relieve brain pressure.





TRAUMATIC BRAIN INJURY (TBI)

TBI can be caused by:

- Falls
- Car accidents
- Gunshot wounds
- Stab wounds
- Other injuries

There are many types of brain injury following TBI. These include;

- Bleeding in the brain
- Bruising of the brain tissue
- Rapid injury can cause shearing of the brain tissue. This is called diffuse axonal injury

TBI may cause elevated pressure in the brain. This is a serious problem. TBI may be treated with surgery. Special medications can also be given to lower brain pressure.

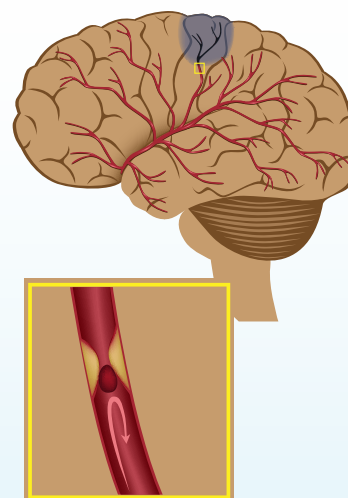
ISCHEMIC STROKE

Ischemic stroke is when blood flow is stopped to the brain by a blood clot. Clots may travel to the brain from the heart or other blood vessels. They may also come from narrowed blood vessels. High blood pressure is a cause of stroke.

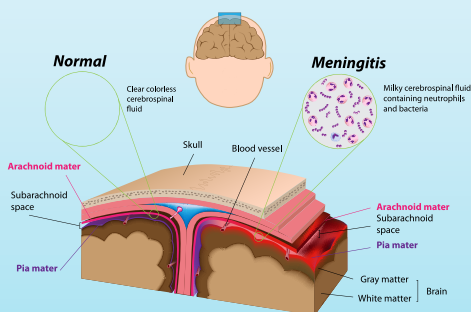
It is important to recognize the warning signs of stroke. Stroke symptoms include face weakness, arm weakness, and speech difficulties. When someone has these symptoms, call 911 to go to the hospital. FAST will help you to remember the symptoms;

- F** = Face
- A** = Arms
- S** = Speech
- T** = Time

Call 911 to go to the hospital so special medication can be given. The medication can only be given within the first few hours after stroke. Patients with ischemic stroke may need surgery. Surgery may help to suck out the clot or to help with swelling.



Blockage of blood vessels; lack of blood flow to affected area



INFECTIONS

Meningitis is an irritation of the coverings surrounding the brain. Encephalitis is an irritation of the brain tissue. Meningitis and encephalitis are often caused by an infection. Bacteria or viruses may cause the brain infection. Pockets of infection within the brain are called abscesses. Most infections are treated with antibiotics. Sometimes, people need more than one antibiotic. Some infections require surgery. Patients with heart infections are at risk for brain infections.



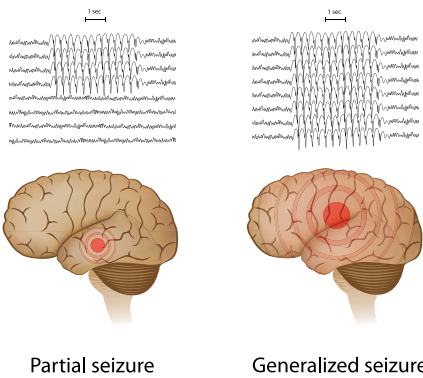
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SEIZURES

Seizures are abnormal signals in the brain. People with seizure may have jerking of the body or become sleepy. Seizures are caused by many different brain problems such as:

- Epilepsy
- Trauma
- Stroke
- Tumor
- Infection
- Alcohol
- Blood imbalance
- Drugs



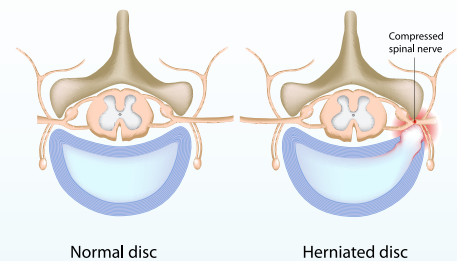
Partial seizure

Generalized seizure

Status epilepticus is a seizure that does not stop. It may also be from many seizures in a short period of time. This can lead to brain injury. This is an emergency and must be treated right away. Patients with seizure may need a special test called electroencephalogram (EEG). Many different medications are available for the treatment of seizures.

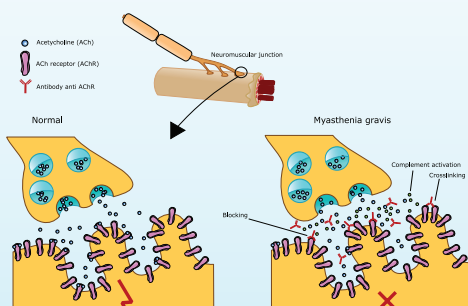
SPINAL CORD INJURY

Spinal cord injury may be from accidents, infections, or strokes. Spinal cord injury causes weakness. People with spinal cord injury may also have less feeling in their arms and legs. Some people with spinal cord injury need surgery. Some special medications may help with spinal cord injury.



Normal disc

Herniated disc



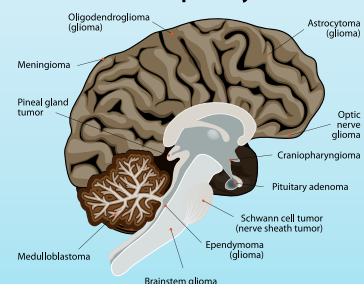
NEUROMUSCULAR DISEASE

Some diseases cause weakness and difficulty breathing. Myasthenia Gravis and Guillain-Barre Syndrome are two diseases affecting the nerves. People suffering from these diseases need care in the Neuro ICU. A breathing tube and machine may help breathing. Special medications may be given to slow or stop the disease. These medications may help improve movement.

BRAIN TUMORS

People who have brain tumors may need medical or surgical treatment. Surgery for a brain tumor may need a stay in the neuro ICU. They are monitored closely for problems. If any problems are found, the team can respond.

The most common primary brain tumors



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PATIENT AND FAMILY RESOURCE SITES

GROUP LISTING

ORGANIZATION

WEBSITE

STROKE

National Stroke Association	http://www.stroke.org/site/PageNavigator/HOME
The Internet Stroke Center	http://www.strokecenter.org/
Centers for Disease Control and Prevention	http://www.cdc.gov/stroke/
American Stroke Association	http://www.strokeassociation.org/STROKEORG/

ANEURYSM

Brain Aneurysm Foundation	http://www.bafound.org/
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TRAUMATIC BRAIN INJURY

Brain Injury Association of America	http://www.biausa.org/
Traumatic Brain Injury Survival Guide	http://www.tbiguide.com/
Centers for Disease Control and Prevention	http://www.cdc.gov/TraumaticBrainInjury/index.html
Brain Trauma Foundation.....	https://braintrauma.org/about

SPINAL CORD INJURY

National Spinal Cord Injury Association	http://www.spinalcord.org/
Spinal Cord Injury Model System Information Network	http://www.uab.edu/medicine/sci/

ORGANIZATION	WEBSITE
BRAIN TUMOR	
National Brain Tumor Society	http://www.brainumor.org/
American Brain Tumor Association	http://www.abta.org/
National Cancer Institute Brain Tumor page	http://www.cancer.gov/cancertopics/types/brain
EPILEPSY	
Epilepsy Foundation	http://www.epilepsy.com/
Centers for Disease Control and Prevention	http://www.cdc.gov/epilepsy/index.htm
MENINGITIS	
Centers for Disease Control and Prevention	http://www.cdc.gov/meningitis/index.html
MYASTHENIA GRAVIS (MG)	
Myasthenia Gravis Foundation of America	http://www.myasthenia.org/
GUILLAIN-BARRÉ SYNDROME	
GBS/CIDP Foundation International	http://www.gbs-cidp.org/home/gbs/
AMYOTROPHIC LATERAL SCLEROSIS (ALS)	
ALS Association	http://www.alsa.org/
APHASIA	
The National Aphasia Association	http://www.aphasia.org/
CAREGIVER SUPPORT	
Family Caregiver Alliance	https://www.caregiver.org/
Caring Bridge	http://www.caringbridge.org/
GENERAL WEBSITES FOR INFORMATION ON NEUROLOGICAL DISORDERS (easily searchable)	
American Academy of Neurology Website for Patients and Caregivers	http://patients.aan.com/go/home
NIH National Institute of Neurological Disorders and Stroke	http://www.ninds.nih.gov/index.htm
American Association of Neurological Surgeons Patient Information page	http://www.aans.org/en/Patient%20Information.aspx
Clinical Trials.....	http://www.clinicaltrials.gov



ALPHABETICAL LISTING

ORGANIZATION	WEBSITE
ALS Association	http://www.alsa.org/
American Academy of Neurology Website for Patients and Caregivers	http://patients.aan.com/go/home
American Academy of Physical Medicine and Rehabilitation patient and families page	http://www.aapmr.org/patients/Pages/default.aspx
American Association of Neurological Surgeons Patient Information page	http://www.aans.org/en/Patient%20Information.aspx
American Brain Tumor Association	http://www.abta.org/
American Stroke Association	http://www.strokeassociation.org/STROKEORG/
Brain Aneurysm Foundation	http://www.bafound.org/
Brain Injury Association of America	http://www.biausa.org/
Caring Bridge	http://www.caringbridge.org/
CDC – epilepsy	http://www.cdc.gov/epilepsy/index.htm
CDC – meningitis	http://www.cdc.gov/meningitis/index.html
CDC – stroke	http://www.cdc.gov/stroke/
CDC – TBI	http://www.cdc.gov/TraumaticBrainInjury/index.html
Coma/TBI Recovery Association, Inc	http://www.comarecovery.org/
Epilepsy Foundation	http://www.epilepsy.com/
Family Caregiver Alliance	https://www.caregiver.org/
Myasthenia Gravis Foundation of America	http://www.myasthenia.org/
National Brain Tumor Society	http://www.braintumor.org/
National Cancer Institute Brain Tumor page	http://www.cancer.gov/cancertopics/types/brain
National Spinal Cord Injury Association	http://www.spinalcord.org/
National Stroke Association	http://www.stroke.org/site/PageNavigator/HOME
NIH National Institute of Neurological Disorders and Stroke main page	http://www.ninds.nih.gov/index.htm
Neurocritical Care Society	http://www.neurocriticalcare.org
Spinal Cord Injury Model System Information Network	http://www.uab.edu/medicine/sci/
The Internet Stroke Center	http://www.strokecenter.org/
The National Aphasia Association	http://www.aphasia.org/
Traumatic Brain Injury Survival Guide	http://www.tbiguide.com/
Uniformed Services University of the Health Sciences	http://www.usuhs.edu/cnrm/bicr/



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STORIES OF HOPE

We know that a stay in the neuro-ICU is often unplanned and may be a very stressful experience. A number of people who have survived a critical brain illness would like to share their stories with you. Please visit the NCS Stories of Hope at:

<http://www.neurocriticalcare.org/patients-families/stories-hope>



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