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Introduction

A BRAIN INJURY CAN CHANGE YOUR LIFE IN AN INSTANT. IT MAY AFFECT HOW YOU THINK, HOW YOU FEEL, HOW YOU BEHAVE, HOW YOU MOVE, AND WHAT YOU REMEMBER. HOWEVER, REMARKABLE PROGRESS HAS BEEN MADE IN THE TREATMENT AND REHABILITATION OF PATIENTS WHO HAVE HAD A BRAIN INJURY.

The multidisciplinary team at the Mischer Neuroscience Institute (MNI) at Memorial Hermann-Texas Medical Center is dedicated to providing exceptional care to patients with brain injury.

In addition to the personalized care that you receive at the MNI, please refer to this booklet to help you and your loved one navigate the journey to recovery. Along with learning about key milestones and expectations of brain injury patients, you will find important resources, clinical details and helpful suggestions for rehabilitation.

We look forward to answering your questions and navigating the road to recovery with you. Please feel free to ask our brain injury team members any questions about treatment or rehabilitation. We aim to be your partner as together we help you and your loved one recover from a brain injury.
What Is a Brain Injury?

According to the Centers for Disease Control and Prevention (CDC), 1.7 million persons sustain a traumatic brain injury annually. Of those, around 120,000 people will have long-term, substantial loss of function. For this reason, it is important to understand the risk factors and causes of brain injury.

A brain injury occurs when there is damage to the brain. A traumatic brain injury (TBI) can be the result of a physical or head trauma resulting from a car accident, assault or fall that causes the brain to collide with the inside of the skull.
Types of Brain Injury

TO UNDERSTAND THE TYPES OF BRAIN INJURY, IT IS IMPORTANT TO KNOW THE DIFFERENT FUNCTIONS OF THE BRAIN.

**Lobes of the Cerebral Cortex**

- The **brain stem** is responsible for basic life functions such as breathing, arousal and consciousness, attention and concentration, heart rate, and sleep and wake cycles.
- The **frontal lobes** are responsible for problem-solving, judgment and motor function.
- The **parietal lobes** manage sensation, handwriting and body position.
- The **temporal lobes** are involved with memory and hearing.
- The **occipital lobes** contain the brain’s visual processing system.

**Skull Fracture**

A break in one or more bones that surround the brain. Many times these fractures heal on their own.

**Contusion**

A mild bruise to the brain. Side effects of a contusion may include headaches, nausea, vomiting, dizziness, and problems with memory and concentration. Surgery is usually not indicated.

**Epidural Hematoma**

A collection of blood that forms between the dura (outer covering of the brain) and the skull. Due to possible increases in pressure inside the brain, surgery may be needed.

**Subdural Hematoma**

A collection of blood outside of the brain. An acute subdural hematoma occurs when there is rapid bleeding in the brain. A chronic subdural hematoma may occur days or weeks after a minor injury to the brain. Due to possible increases in intracranial pressure, surgery may be needed.

**Anoxic Brain Injury**

Occurs when there is a lack of oxygen supplied to the brain.
Meet Our Directors and Attending Physicians

Dong Kim, M.D.
Director, Mischer Neuroscience Institute

Arthur L. Day, M.D.
Director of Clinical Education, Mischer Neuroscience Institute

James C. Grotta, M.D.
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Imoigele P. Aisiku, M.D.
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Karl M. Schmitt, M.D.
Spine and Brain Trauma, Neurosurgery

Kiwon Lee, M.D.
Co-Director, Neurocritical Care

Monica Verduzco-Gutierrez, M.D.
Brain Injury Specialist, Physical Medicine and Rehabilitation
Who is... 

**Below is a list of people who may be part of the multidisciplinary team that is caring for the patient.**

**Attending Physician or Primary Physician:** Provides supervision and care for the patients’ medical problems and coordinates treatment plans. He or she will likely be a neurosurgeon, who specializes in traumatic brain injury.

**Intensivist:** A critical-care-trained physician that works in the Intensive Care Unit.

**Physiatrist (Physical Medicine and Rehabilitation):** A physician trained in rehab medicine. He or she will assist with determining a patient’s rehabilitation needs.

**Resident:** A physician who has finished medical schooling but is currently in training. He or she will be supervised by the attending physician.

**Nurse:** Provides daily clinical care, such as assistance in taking medications, bathing, dressing and toileting until patients can do more for themselves. He or she works closely with patients, their families and the healthcare team. The charge nurse works closely with the bedside nurse to assist with the patient’s care and is usually responsible for the operations of the unit. A team lead is a nurse who works closely with the charge nurse and bedside nurse to advocate for any clinical, medical or patient satisfaction needs.

**Pharmacist:** Provides prescribed medications and can answer any medication-related questions.

**Physical Therapist:** An expert in maintaining and improving the movement of joints and limbs. He or she will suggest special exercises and techniques to improve patients’ muscle control and balance.

**Occupational Therapist:** An expert in helping patients learn to perform daily tasks on their own and learn new, practical skills for everyday life.

**Speech-Language Pathologist:** An expert in helping patients with speech and language difficulties learn ways to communicate and deal with swallowing problems.

**Respiratory Therapist:** An expert in airway management. He or she will provide assistance with breathing treatments and assist with operating any respiratory equipment.

**Dietitian:** An expert in the feeding and nutritional needs of patients.

**Case Manager:** Responsible for reviewing admission and discharge plans. He or she will coordinate both events based on individual patient needs and educate the patient’s family members in collaboration with other healthcare team members.

**Social Worker:** Assists patients and family members in planning ways to deal with social, emotional or financial problems that may arise during hospitalization. He or she will also assist with discharge planning.

**Chaplain:** Helps patients and family members cope with grief, feelings of loss of control, depression, desire for religious sacraments, short-term counseling needs and loneliness. They also offer spiritual support to people of all faiths.

**Clinical Liaison:** A patient-relations representative who assists with any concerns or issues that might arise during hospitalization in regards to the services provided to patients and their families.
What to Expect—Initial Evaluation

When arriving at the Mischer Neuroscience Institute, the healthcare team will measure a patient’s temperature, pulse and blood pressure, and generally performs urine and blood tests. A physician also will perform a physical examination of the patient, which may include testing the reflexes, eye movements, speech, muscle strength and tone, and coordination. A physician also may test attention and concentration, memory and cognitive reasoning.

COMMON DIAGNOSTIC TESTS FOR BRAIN INJURY PATIENTS

While physical examination helps physicians determine the type of brain injury suffered by a patient, other tests can provide more detailed information regarding treatment. Some common treatments include:

**Computed Tomography (CAT Scan)**
A CAT, or CT, scan uses a computer system to give a detailed picture of brain tissue to determine where the brain was injured. During the test, the patient lies on a table with his or her head in a large, donut-shaped machine that takes pictures of the brain. The scan generally takes approximately 15 minutes to complete and is painless.

**Magnetic Resonance Imaging (MRI)**
An MRI is a test that uses a strong magnetic field and radio waves to give physicians a 3-D picture of the brain. During an MRI, which is painless, a patient must lie still within the MRI scanner for approximately 30 minutes. An MRI can be used for a more in-depth look of the brain than other imaging methods.

**Electroencephalography (EEG)**
An EEG measures and records the electrical activity in the brain. An EEG is painless and can be helpful in diagnosing seizures.
During the Hospital Stay…

Upon admission to the hospital, a patient may be admitted to the Neuroscience Intensive Care Unit (NSICU), Neuroscience Intermediate Care Unit (NIMU), or the Neuroscience Acute Care Unit depending on their current condition. All units are located in the Jones Pavilion.

IMPORTANT NUMBERS

Main Hospital: 713.704.4000
NSICU (7th Floor): 713.704.8740
NIMU (5th Floor): 713.704.4008
Neuroscience Acute Care Unit (5th Floor): 713.704.8500 or 713.704.4008
Case Management/Social Work Department: 713.704.4190
Chaplaincy Department: 713.704.4160
Patient Relations: 713.704.4540
Clinical Liaison: 713.704.3455
Signs and Symptoms After a Brain Injury

MANY BRAIN INJURY PATIENTS MAY CONTINUE TO EXPERIENCE NEUROLOGICAL OR PHYSICAL SYMPTOMS FOLLOWING HOSPITALIZATION. THESE MAY INCLUDE COGNITIVE, PHYSICAL, PERSONALITY AND BEHAVIORAL CHANGES. BELOW IS A LIST OF POSSIBLE CHANGES THAT MAY OCCUR, DEPENDING ON THE SEVERITY AND LOCATION OF THE BRAIN INJURY.

Confusion following brain injury can be very common. This may cause some agitation which may be treated with medications. Supervision by family may be recommended.

Cognitive deficits that may occur after a brain injury include memory loss, impaired decision-making skills, impaired communication, lack of safety awareness, and attention deficits.

Physical deficits could include inability to walk, decreased balance, impaired speech, weakness, impaired hearing or vision, and increased fatigue.

Sometimes the most difficult effects of a brain injury are the changes to the personality of the individual who may experience more stress, irritability, agitation, and may feel denial, lack of motivation, depression and anxiety. There may be a loss of emotional control accompanied by mood swings. Please be aware of these changes and talk to a physician with any concerns.

Please keep in mind that recovery from a brain injury continues after hospitalization.
Coping and Adjustment to Brain Injury

BRAIN INJURY NOT ONLY IMPACTS THE INDIVIDUAL WITH THE BRAIN INJURY BUT ALSO THE FAMILY AND FRIENDS WHO SURROUND THEM. BELOW IS A LIST OF HELPFUL TIPS FOR CAREGIVERS, FAMILY AND FRIENDS OF PATIENTS ON HOW TO COPE AND ADJUST TO CHANGES FOLLOWING A BRAIN INJURY.

**Acknowledge Your Feelings About the Brain Injury**
A brain injury may bring about emotional, physical and financial stress for the caregiver. Other emotions that may arise are denial, anger, depression, guilt or responsibility. These feelings are normal and are expected.

**Remember to Take Care of Yourself**
It can be physically and emotionally exhausting caring for a loved one. It is important for caregivers to take moments out of the day to focus on other things and do things that are part of their daily routine (e.g., read a book, call a friend, exercise, take a bath, etc.).

**Rely on Your Support Network**
Prior to leaving the hospital, caregivers should think about family and friends who may be able to assist the patient with the brain injury. Rely on the support system to help with the patient’s care, and also to assist with everyday tasks such as grocery shopping, running errands, cooking meals, doing laundry or cleaning the house. Some brain injury patients may require some type of supervision after discharge, so it is important to work with family, friends or community resources to work out a supervision plan for the patient.

**Educate Yourself**
It is important to speak with the medical team, nursing staff and therapists about the needs of the patient following brain injury. Take time to read articles and attend support groups if possible.

**DISTRACTION TECHNIQUES:**
Some brain injury patients may experience increased agitation following their injury. If the patient becomes agitated or refuses to follow instructions, please try the following:

**Re-direct:** Change the topic or task by discussing topics of interest to the individual.

**Give the individual time to calm down:** Move away and give them time to calm down.

**Notice any type of stimulation that might cause the agitation (lights, outside noises, etc.):** Try to reduce the amount of stimulation by closing the door, go to a quiet room, etc.
Discharge, Care and Rehabilitation Following Brain Injury

The road to recovery following a brain injury will vary depending on the extent of the brain injury. During the hospital stay, patients may be evaluated by physical, occupational and speech therapists to determine their rehabilitation needs. A physiatrist (physical medicine and rehabilitation physician) may also be consulted by the attending team to determine a patient’s rehabilitation needs. Some patients may be able to return home with home health or outpatient therapy while others may require a long-term, acute-care hospital stay (LTACH), inpatient rehabilitation or a skilled nursing facility (SNF). A case manager or social worker will be available to review the discharge plan prior to discharge from the hospital.

DISCHARGE RECOMMENDATIONS

Upon a patient’s discharge from the hospital, a physician will provide a list of specific discharge instructions that will include medications, follow-up instructions and follow-up appointments needed. Below is a list of helpful tips upon discharge for brain injury patients. Please always refer to the discharge instructions for specific instructions as the needs of each brain injury patient can be different.

1. Do not operate any power tools, such as saws or electrical appliances, due to slower reaction times and reduced attention.
2. Avoid environments with loud noises, flashing lights or strobe lights as these environments may be distracting and make it difficult to focus attention adequately.
3. Follow a structured and consistent routine at home.
4. Do not drink alcoholic beverages until cleared by a physician.
5. Do not drive until cleared by a physician.
6. Follow the medication schedule as instructed by the medical team.
7. Do not climb ladders or step-stools due to reduced balance and slow reaction times.
8. Supervision may be required due to impaired safety awareness. Please build a network of family or friends who might be able to assist with supervision needs.
Discharge Worksheet

IMPORTANT INFORMATION TO KNOW PRIOR TO DISCHARGE:

I will follow up with the neurosurgeon at:
Mischer Neuroscience Associates
6400 Fannin St.
Suite 2800
Houston, TX 77030
713.704.7100
www.mhmni.com

Appointment Date/Time: _________________________________

Prior to my follow-up appointment I will need (imaging, labs, etc.):
________________________________________________________________________________________________________
________________________________________________________________________________________________________
________________________________________________________________________________________________________

I will be discharged on the following medications:
________________________________________________________________________________________________________
________________________________________________________________________________________________________
________________________________________________________________________________________________________

Special instructions (home health, outpatient therapy, additional follow-up appointments):
________________________________________________________________________________________________________
________________________________________________________________________________________________________
________________________________________________________________________________________________________
Resources

CONTACT THE FOLLOWING FOR MORE INFORMATION ON SERVICES FOR BRAIN INJURY PATIENTS:

**DARS (Department of Assistive and Rehab Service)**
4900 North Lamar Blvd.
Austin, TX 78751
Toll Free 1.800.628.5115
www.dars.state.tx.us/index.shtml

**Brain Injury Association of Texas**
316 W. 12th Street, Suite 405
Austin, TX 78701
Telephone: 512.326.1212
Toll Free 1.800.392.0040
Fax: 512.478.3370
Email: info@biatx.org

**Social Security Administration**
Toll Free 1.800.772.1213

**Crime Victims Compensation**
P.O. Box 12198
Austin, TX 78711-2198
Toll Free 1.800.983.9933

**Texas Department of Aging and Disability Services**
701 W. 51st St.
Austin, TX 78751
Telephone: 512.438.3011
Toll Free 1.888.834.7406