

SPINAL CORD MEDICINE

HANDBOOK FOR PATIENT AND FAMILY



Medical Concerns



Frazier Rehab Institute

A service of Jewish Hospital & St. Mary's HealthCare

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THE PATIENT AND FAMILY HANDBOOK

This Handbook is designed to give you the information to better understand spinal cord injury and the tools needed to manage your health care needs successfully. Information is intended for you and your family because, those who love you, will often be involved in assisting you with your care needs while in the hospital, and in the home environment. As you read through the Handbook, your rehab team at Frazier is available to address your questions and provide you more information pertinent to your needs.

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A BRIEF NOTE ABOUT THE FOUNDER OF FRAZIER REHAB INSTITUTE

In her early 20's, Amelia Brown of Louisville sustained a spinal injury in a car accident in the 1940's. With no rehabilitation services in Louisville, she traveled to New York for treatment. After returning to Louisville, she married a physician, Dr. Harry Frazier. Believing Louisville needed its own rehabilitation facility, Mrs. Frazier founded the Frazier Institute of Physical Medicine and Rehabilitation in the early 1950s. Her son, Owsley Brown Frazier, served as Chairman of the Fund Raising Committee for Frazier's new building, named the Frazier Rehab and Neuroscience Center, which opened in 2006.

DISCLAIMER

The information contained herein is intended to be used in accordance with the treatment plan prescribed by your physician and with the prior approval of your physician. You should not begin using any of the methods described in this publication until you have consulted your physician. Jewish Hospital & St. Mary's HealthCare, Inc. D.B.A. Frazier Rehab Institute, its affiliates, associates, successors and assigns, as well as its trustees, officers, directors, agents and employees are not liable for any damages resulting from the use of this publication.

NOTE: Words *italicized* in the text below are defined in the Glossary at the end of this Chapter.

MEDICAL CONCERNS

AUTONOMIC DYSREFLEXIA

Autonomic dysreflexia, also known as dysreflexia, is a medical emergency which can occur if your spinal cord injury is at the T₆ level or above. Autonomic dysreflexia can develop suddenly, and if not treated promptly, it can lead to seizures, stroke or death.

Autonomic dysreflexia occurs when an irritating stimulus happens in the body below the level of spinal cord injury. This produces a mass body response leading to constriction or narrowing of the blood vessels and an immediate increase in blood pressure. In a person with a spinal cord injury T₆ and above, the blood pressure cannot be regulated because the message from the brain to dilate (open up) the blood vessels and lower blood pressure cannot pass down the spinal cord past the level of injury. The blood pressure may continue to rise until the cause or the irritating stimulus is eliminated.

Causes of Autonomic Dysreflexia. Autonomic dysreflexia is triggered by something painful or uncomfortable often associated with bladder or bowel problems. Common triggers are identified below.

Bladder

- Distended or overstretched bladder
- Kinked or clogged catheter tube
- Urinary tract infections
- Spasms
- Overfilled collection bag

Bowel

- Constipation or impaction
- Stretching of the rectum during improper digital stimulation
- Excess gas causing distention of the bowel

Skin Related Problems

- Pressure on skin for prolonged periods of time (tight jeans, too tight shoes, wrinkles in linens or clothes)
- Pressure sore (another reason to prevent skin breakdown)
- Burns, cuts, abrasions

Sexuality Activity

- Over stimulation during sexual activity
- Menstrual cramps and labor pains can also be a source of dysreflexia in the female.

Other Sources

- Heterotopic ossification (HO)
- Bone fractures
- Abdominal conditions such as *ulcers, colitis, and peritonitis*

Signs and Symptoms of Autonomic Dysreflexia. There are many danger signals that may alert you to the onset of dysreflexia and they may vary from one episode to another. The most common and obvious symptom is onset of a sudden severe and pounding headache. This is caused by the rise in blood pressure. Other signs and symptoms may include:

- Vision changes such as blurring, seeing spots and narrowing of vision
- Nasal congestion or stuffiness
- Flushing or splotching of the face, neck or chest above the level of injury
- Goose bumps or excessive sweating above the level of injury
- Slow heart rate

Treatment for Autonomic Dysreflexia. Autonomic dysreflexia represents a significant and imminent threat and will not go away until the cause has been eliminated. Treatment should begin quickly to prevent complications.

The first appropriate response is for you to remain calm and get into a comfortable position. If in bed, raise the head of the bed or sit up. This will help to lower your blood pressure. If in a wheelchair perform a pressure relief. The cause of the autonomic dysreflexia may be in one of the areas described below.

Bladder. If your bladder management program is intermittent catheterization, you may need to drain your bladder by performing a straight cath. This should be done slowly to prevent bladder spasms. You may wish to use an anesthetic lubricant when inserting the catheter. If you have an indwelling catheter, empty the leg or bed bag if full. Check to make sure the drain tube is not kinked or clogged.

Bowel. Check your bowels. If autonomic dysreflexia occurs during digital stimulation, stop until symptoms stop. Consider using an anesthetic lubricant prescribed by your physician. If the bowel is full, remove the stool. This should be done as gently as possible and an anesthetic lubricant may be needed.

Skin. Check your skin for any problems. Loosen clothing and remove stocking, socks and shoes. Check for any potential source of noxious stimulus and remove it. Look for skin breakdown, blisters and infections. Check for ingrown toenails.

Medications for Autonomic Dysreflexia. Quick action and trouble-shooting will usually resolve autonomic dysreflexia. However, if the offending trigger or stimulus cannot be identified and removed, it may be necessary to utilize medications. They generally include:

- Clonidine, 0.1 to 0.2 mg by mouth -- the drug of choice
- Procardia, 10 mg under the tongue or by mouth

- Nitroglycerin, 1/150 under the tongue or 1/2 inch topical
- Hydralazine, 10 to 20 mg by shot into the muscle or vein

These are general guidelines and you should consult your physician before using blood pressure medications to control the symptoms associated with autonomic dysreflexia.

Prevention of Autonomic Dysreflexia. With proper precautions you should be able to prevent or reduce the number of autonomic dysreflexia episodes. These include:

- Frequent pressure relief in the wheelchair and bed. Perform wheelchair pressure relief at least every 20-30 minutes and change positions in the bed at least every 2 hours.
- Avoid becoming sunburned and protect your skin with sunscreen when outdoors. Because your sensation is impaired, you may not realize when your skin is being burned. Always test water temperature to avoid being burned by hot water. Dress appropriately in cold weather to prevent frostbite. The skin below the level of spinal cord injury is more susceptible to frostbite than skin above the level of injury.
- Maintain a regular bowel and bladder program. Always have proper supplies available. These may include cath kits, gloves, anesthetic lubricants, and urinary supplies.
- Discuss with your doctor the need to have a prescription for blood pressure medicine available for the treatment of autonomic dysreflexia.

Conclusion. Remember, autonomic dysreflexia is an emergency situation that can occur in anyone that has suffered a spinal cord injury at the T₆ level and above. Become familiar with the causes, signs, symptoms and treatment of autonomic dysreflexia and make sure those close to you understand these as well. Quick assessment and action may prevent the complications associated with autonomic dysreflexia.

DEEP VEIN THROMBUS

Deep vein thrombus (DVT) occurs when a blood clot develops in one of the large deep veins of the body. This generally occurs in the veins of the lower leg and thigh, but can occur in any large vein, including blood vessels in the pelvis and arms.

The blood clot or thrombus can cause circulation problems, pain and more serious complications. For example, a piece of the clot can break off, travel through the blood stream and lodge in the lungs. This is called a *pulmonary embolus*, and can be life threatening. The most serious complications occur when the clot lodges in the brain, heart or lungs.

Risk Factors. After spinal cord injury, you are at a greater risk for developing DVT's because blood can remain or pool in the leg veins and lower trunk due to paralysis and decreased mobility. Normally, the actions of the muscles help keep blood moving, but after a spinal cord injury, this action may be limited or lost. Other possible risk factors include:

- Prolonged bed rest
- Abnormal blood clotting
- Major injury

- Surgery, especially to the hips or knees

Signs and Symptoms

- Redness, swelling and increased warmth occur along the path of the vein. This is due to inflammation of the lining of the vein during the initial formation of DVT.
- Pain, tenderness and skin color changes may occur in the affected extremity. This is caused by a reduction of blood flow as the clot or thrombus enlarges.
- Low-grade fever. There may be a slight increase in temperature without any signs of infection.

Prevention

- Drink plenty of fluids, preferably water (6-8 glasses each day).
- Stay as active as possible. Perform daily range of motion exercises.
- Check your legs for signs of DVT's on a daily basis.
- Minimize swelling by elevating legs or wear compressive stockings if ordered by your physician.
- Take anticoagulants if ordered by your physician.

Treatment

- Call your physician immediately if you think a DVT is present.
- Stay in bed with the affected leg elevated and in a straight position.
- Do not rub or massage affected leg. Do not exercise your affected leg as this may cause a piece of the clot to break free and travel to other areas of the body.
- Increase your fluid intake.
- Remove tight shoes and clothing.
- Take prescribed medicine, if ordered. You may be placed on anticoagulant medications.

HETEROTOPIC OSSIFICATION (HO)

Heterotopic Ossification (HO) is the development of new bone in soft tissue where bone is not normally found. This may occur anywhere in the body but most frequently is found around the joints or long bones of the hips, knees, shoulders, and elbows. In individuals with spinal cord injury, HO may begin below the level of injury. The highest risk period for the occurrence of HO is soon after injury.

Early signs and symptoms of HO include swelling, erythema, redness, and warmth over the area. If only a small amount of bone is forming, you may not notice any clinical signs or symptoms. In later stages of HO development, you will notice limitations in joint movement and pain with range of motion exercises.

The primary problems associated with HO include decreased mobility and range of motion, and may predispose the individual to skin breakdown and contractures. This may in turn interfere with your

ability to perform normal activities of daily living and may ultimately decrease your independence. Diagnosis is based on clinical assessments of signs and symptoms, lab tests, x-rays and bone scans.

Management of Heterotrophic Ossification. Management generally involves therapy, medications, and/or surgical intervention. The role of therapy is to prevent ankylosis (freezing or fixation of the joint due to fusion of bones). This is done through gentle range of motion exercises. The drug of choice is Didronel. This does not prevent HO from forming during the initial inflammatory process, but helps to inhibit new bone formation. Certain drugs like Ibuprofen can be used for inflammation. Surgery is indicated only when HO interferes with self-care and mobility. Occasionally, radiation therapy can be used to minimize HO.

Summary. Heterotrophic Ossification generally occurs soon after spinal cord injury and consists of the formation of new bone in soft tissues where it is not normally found. You should be alert to the signs and symptoms of HO and contact your physician immediately if these become present. Initial symptoms include swelling, redness, and warmth over the area. Later symptoms include decreased range of motion. While there is no cure, quick and early intervention can minimize the possible problems caused by HO.

ORTHOSTATIC HYPOTENSION

Orthostatic hypotension is a sudden drop in blood pressure that occurs when you change positions. It often happens to those with spinal cord injury when you sit up or get up out of bed too fast. This may lead to dizziness or fainting.

Most people with spinal cord injury have a daily blood pressure that is lower than that of the general public because arteries do not get messages from the brain to constrict and keep the blood pressure regulated at a higher level. After injury when you sit up with your legs down or when you stand up, your blood pressure may drop even lower than is typical for you. This happens because the blood tends to collect or pool in the veins and arteries of the legs and feet instead of being pumped back to the heart. This lower blood pressure decreases the amount of blood reaching the brain and may cause dizziness or fainting.

Preventing Orthostatic Hypotension

- Before getting out of bed, raise the head of the bed for at least 15 to 20 seconds.
- Sit up slowly.
- Wear compressive stockings and an abdominal binder, if ordered. These will help prevent pooling of blood in arteries and help pump the blood back to your heart.
- Move slowly, moving too fast may cause dizziness or make it worse.
- Drink one or two glasses of fluids prior to getting up.

If you become extremely light-headed and faint, your family or caregivers should know to lie you down and elevate your legs above the level of your heart. If you are sitting in a wheelchair, have your family member or caregiver tilt your wheelchair backward lowering your head and raising your feet. If you continue to have problems with dizziness or fainting, consult your physician.

SPASTICITY

Spasticity is uncontrolled muscle activity. Spasticity usually begins a few weeks after spinal cord injury and may continue over the life span. Spasms can affect the arms, legs and/or trunk. Sometimes muscles in spasm will cause the limb to quickly jump and release-several times before stopping. Some spasms will cause a muscle to contract and hold an arm, leg or other body part in one position for many seconds before releasing. Any spasms you may have will likely change over time.

Spasticity can be triggered by many things including bladder or kidney infections, skin breakdown, pressure sores and putting on clothes. Spasticity is stronger for individuals who do not perform range of motion exercises regularly, making the muscles and joints tight.

Advantages of Spasticity. There are some benefits to spasticity. They include:

- Increases in spasticity can serve as a warning signal to identify pain or problems in areas where there is no sensation. For example, an increase in spasticity can be a warning sign to developing a urinary tract infection or skin breakdown.
- Spasticity helps promote circulation of blood. It assists in pumping fluid and blood out of the veins, which may help decrease edema and DVT's.
- Spasticity may be used to improve some functional activities such as performing transfers or walking with braces.

Disadvantages of Spasticity. The disadvantages of spasticity can include:

- Spasticity may interfere with certain activities like sleeping, driving, sex and walking with braces.
- Spasticity can cause skin damage through friction, shearing or scraping, and/or hitting solid objects.
- Spasticity can limit joint movement and increase the risk of a contracture (a tight, limited joint movement).
- Spasticity can cause pain.

Preventing Spasticity. There are some ways to help control and prevent some of the complications associated with spasticity.

- Performing daily range of motion exercises.
- Avoid certain body positions and fast movement, which may trigger spasticity.
- Try taking a warm bath or shower. Always remember to test the water to make sure it is not too hot.

Treatment Options. If spasticity becomes a problem and interferes with activities of daily living, you should discuss treatment options with your physician.

- Certain medications (Baclofen, Valium, Zanaflex or Dantrium) can be used. These medications act as muscle relaxers to help decrease spasticity.
- Injections of specific medication into muscle or nerves can help reduce spasticity (Botox or Flenol).
- A Baclofen Pump Implantation is a surgically implanted programmable pump that delivers Baclofen directly into the fluid surrounding the spinal cord. This is indicated in cases where

severe spasticity is present and oral medicines have not been successful in controlling spasticity or cause intolerable side effects.

- Surgery may be indicated in severe cases of spasticity. This may be indicated in cases where other treatment options have failed.

REFERENCES AND RESOURCES

<http://calder.med.miami.edu/pointis/automatic.html> - Autonomic dysreflexia

<http://www.emedicine.com/pmr/topic217.htm> - Autonomic dysreflexia

<http://www.emedicine.com/pmr/topic229.htm> - Deep vein thrombus

<http://www.emedicine.com/orthoped/topic425.htm> - Spasticity

<http://www.emedicine.com/pmr/topic52.htm> - Heterotopic ossification

http://www.spinalcord.org/html/factsheets/aut_dysreflexia.php - Autonomic dysreflexia

<http://www.spinalcord.uab.edu/show.asp?durki=21485> - Heterotopic ossification

<http://depts.washington.edu/rehab/sci/spasticity.html> - Spasticity

GLOSSARY

AUTONOMIC DYSREFLEXIA - An emergent, potentially dangerous condition associated with a spinal cord injury patient whose level of injury is T6 or above. This condition is usually related to a noxious stimulus that is not sensed or felt by the individual due to the neural impulses blocked in the spinal cord due to the injury. During an episode of autonomic dysreflexia, the blood pressure can become very and can cause stroke if not treated appropriately.

COLITIS - Inflammation of the colon.

DEEP VEIN THROMBUS - Occurs when a blood clot develops in one of the large deep veins of the body. This generally occurs in the veins of the lower leg and thigh, but can occur in any large vein, including blood vessels in the pelvis and arms.

DIGITAL STIMULATION - Rotating a finger in the rectal vault to assist with bowel elimination.

EMBOLUS - Debris or other foreign object transported by the blood and can include blood clots, pieces of bone, or air bubbles. Debris can move from one place in the body to another such as the heart, lungs or brain and cause serious injury.

HETEROTOPIC OSSIFICATION - Growth of bone tissue in locations where it should not be found. This condition can cause joints to become stiff and limit movement.

ORTHOSTATIC HYPOTENSION - a sudden drop in blood pressure that occurs when you change positions. It often happens to those with spinal cord injury when sitting up or getting up out of bed too fast. This may lead to dizziness or fainting.

PERITONITIS - Inflammation of the abdominal cavity.

SPASTICITY - A state of increased muscle tone and excessive response often occurring when a muscle is stretched. It can cause an arm or leg to feel tight and be difficult to move.

ULCER - Opening, sore or wound in the skin/tissue.