Ear drainage and runny noses are common. Most ear drainage and runny noses are associated with relatively innocent causes such as ear infections, upper respiratory infections or allergies. These common causes are usually short-lived and without long-term consequences. Rarely, a persistently draining ear or runny nose can signify something more serious: a cerebrospinal fluid (CSF) leak.

CSF is a clear fluid produced in the ventricles of the brain. This fluid cushions the brain, circulating out waste products and maintaining a balance among other brain fluids. The brain normally produces about 12 ounces of CSF daily, roughly the volume of a soda can. CSF is normally contained within a tough covering that encases the brain called the dura mater. The skull surrounds the dura and is quite thick in most places, but it is thinnest over the nasal cavity and the inner ear.

When the thin bone separating the brain from the nose or the ear is violated, CSF can escape and leak. This can occur with head trauma or surgery around the skull base or spontaneously when small holes in the skull base develop. This condition is known as benign intracranial hypertension or high pressure in the head. Obesity, headaches and vision changes are also features of benign intracranial hypertension.

Cerebrospinal Fluid Leakage: An Under-Recognized Problem

Michael S. Harris, MD, Neuro-Otologist; Christopher M. Long, MD, Otolaryngologist; Nathan T. Zwagerman, MD, Neurosurgeon

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Neuro-otology is a specialty within Ear, Nose and Throat care, also known as otolaryngology. Neuro-otologists have a unique focus on the interface between the ear and the brain. As a neuro-otologist and a new member of the Froedtert & the Medical College of Wisconsin team, I have the privilege of medially and surgically caring for patients with skull base tumors affecting hearing, balance and facial function. Vestibular schwannomas (also known as acoustic neuromas) and meningiomas are two of the most common tumors arising in the lateral skull base.

My essential role as a member of the multidisciplinary Froedtert & MCW Brain and Spine Tumor team is to provide long-term care to patients with lateral skull base disorders from their first visit and diagnosis through treatment (surgery or radiation therapy) and rehabilitation. The symptoms of lateral skull base tumors – hearing loss, imbalance and facial weakness – are all intimately involved with quality of life. Therefore, I actively pursue research to gain a better understanding of these tumors, especially those associated with the need for hearing rehabilitation, and to find ways to improve outcomes.

I am originally from Milwaukee and graduated from the Medical College of Wisconsin. I completed my otolaryngology – head and neck surgery residency and a two-year postdoctoral research fellowship on cochlear implantation at Indiana University School of Medicine. I completed advanced training in otology and neurotologic surgery at The Ohio State University Wexner Medical Center. I am thrilled to have the opportunity to bring my perspective to the Froedtert & MCW health network and join such an inspired and dedicated team.

A CSF leak is more than just a nuisance; it poses a serious concern. This is not because the brain will run out of CSF, but because it represents an abnormal route of communication between the sterile space of the brain and non-sterile spaces of the nose and ear. If CSF can leak out, infection may get in. The most serious outcomes are brain abscess or meningitis — both potentially life-threatening infections.

Symptoms of a CSF leak include clear fluid draining from the nose, particularly when bending over or straining, or a salty taste in the mouth. If CSF is draining into the ear, it may cause hearing loss. If your doctor suspects you have a CSF leak, he or she will send you to an expert familiar with skull base surgery such as a neurosurgeon or ear, nose and throat specialist. A physical examination that involves collecting a sample of the fluid for laboratory testing, as well as imaging studies, can help confirm the origin of the fluid leak.

Management of CSF leaks begins with conservative measures such as bed rest, head elevation even while sleeping, avoiding nose-blowing and close-mouthed sneezing and avoiding bearing down or straining by observing lifting restrictions and using stool softeners. Occasionally, a water pill medication (acetazolamide) may be given on a temporary basis to slow down CSF production.

Despite these measures, surgical intervention is often required to treat a CSF leak. The surgical route depends on the site and size of the skull base defect. Defects in the front or anterior skull base may be accessed and repaired through the nose using specialized cameras and avoiding incisions. Defects in or above the ear may be approached from behind the ear or may require a small craniotomy above the ear. Regardless of location, a layered approach is taken to mend the defect, often using nearby native tissues including bone and connective tissue.

To allow a fresh repair to heal, a temporary drain is often placed in the lower back to relieve pressure of the CSF fluid from the repair site. Less commonly, usually when there is a very large defect or a recurrent leak, a permanent tube, known as a ventroperitoneal shunt, is required to divert CSF from the ventricles into the abdomen, where the fluid is naturally reabsorbed.

Most cases of ear drainage or runny nose are not CSF leaks. However, when suspicion of a CSF leak exists, the first step is referral to a skull base specialist with knowledge and experience in CSF management. Modern techniques and approaches are associated with quicker recoveries, shorter hospitalizations and better overall results. Repair of a CSF leak is important, because it can help the patient avoid life-threatening or debilitating outcomes and restores a better overall quality of life.

Physician Profile:
Neuro-Otologist Michael S. Harris, MD

Michael S. Harris, MD
Neurofibromatosis type 1 (NF1) and neurofibromatosis type 2 (NF2) are among the most common genetic disorders, affecting roughly one in 3,000 and one in 30,000 individuals, respectively. These syndromes are part of a broader group of conditions called phacomatosis (fak’ō-mă-tō’sis), which are characterized by being hereditary (caused by mutant genes that may pass from parents to their children) and by making it more likely that individuals could develop noncancerous tumors in different parts of the body – from directly below the skin to the central nervous system.

While sharing the same name, NF1 and NF2 are distinct conditions. The NF1 gene mutation is located on chromosome 17 while the NF2 gene mutation is on chromosome 22. Nevertheless, both share the same genetic pattern of inheritance – autosomal dominant. In other words, there is a 50 percent chance of an affected individual’s child developing the same condition. In addition, NF1 and NF2 may arise in an individual from a family with no past medical history of this condition, which geneticists call "de novo" mutation. NF1 and NF2 share the same pattern of variable genetic expressivity, meaning that two individuals carrying the same gene mutation may develop clinical features that are quite different from one another.

NF1 is usually diagnosed at birth or shortly after – babies can present with multiple classic maroon skin marks (called ‘café-au-lait’ spots). As the child grows, noncancerous tumors called neurofibromas may start to grow underneath the skin. Neurofibromas are soft to the touch and may grow virtually anywhere in the body. Most neurofibromas are limited to a few millimeters in size. In rare instances, giant tumors weighing up to several pounds may occur, causing limited motion, pain and cosmetic deformities, a condition known as elephantiasis neuromatosa. Very rarely, neurofibromas may become cancerous (malignant peripheral nerve sheath tumors). NF1 may also make it more likely that some people could develop benign brain tumors (low-grade gliomas, meningiomas), cognitive impairment, pheochromocytoma (tumors that affect adequate blood pressure control) and vision problems. NF2 is quite different from NF1. Individuals affected by NF2 don’t have the classic skin lesions or neurofibromas characteristic of NF1. Instead, NF2 affects the nervous system, that is, the brain, cranial nerves, spinal cord and nerve roots. NF2 is usually diagnosed in later stages of life. The most common symptom attributed to NF2 is progressive hearing loss, as this condition predisposes individuals to develop noncancerous tumors of the auditory nerves. Other nerves may also be affected by schwannomas causing vision, balance, numbness/tingling and other neurologic disturbances. Here, we also observe increased risk of other types of benign brain tumors (e.g., meningiomas).

Therefore, it is key to make the appropriate diagnosis of NF1 and NF2 in a timely manner. It’s important for people with NF to have routine follow-up visits to keep NF in check. The Froedtert & the Medical College of Wisconsin health network offers comprehensive care to adults with NF1 and NF2 through a multidisciplinary team of specialists, including neurologists; neurosurgeons; plastic surgeons; dermatologists; ear, nose and throat specialists; geneticists; social workers and psychologists, among others. We also facilitate the transition of care of children with NF1 and NF2 from pediatric to adult treatment. If you would like to learn more about neurofibromatosis, please visit the website ctf.org.
Support Groups and Events

The Froedtert & the Medical College of Wisconsin Cancer Network offers support groups and sponsors events of interest to brain tumor patients and their families. For more information about our support groups, please visit froedtert.com, or call 414-805-3666 or 800-272-3666 (unless otherwise noted).

BRAIN AND SPINE TUMOR SUPPORT GROUP

The Brain and Spine Tumor support group is for patients and family members looking for information and encouragement. Meetings are designed for open discussion of concerns related to brain and spine tumors with many sessions featuring speakers who focus on a variety of topics specific to these diseases.

Meets monthly on the third Tuesday of each month. Times vary. Topics shown below.

Froedtert & MCW Clinical Cancer Center at Froedtert Hospital campus.

For information, please see the listing in the Hope Clinic at the Clinical Cancer Center, or call 414-805-3666 or 800-272-3666.

Topics in 2019

June 18 Nutrition and Cancer
July 16 Open Forum: Q and A session presented by Joseph Bovi, MD, and Fernando Santos-Pinheiro, MD
Aug. 20 Open discussion facilitated by Lyndsey Wallace, PsyD
Sept. 17 Optune Support
Oct. 15 Coping with Cancer Through the Holidays
Nov. 19 Q and A with Social Worker
Dec. 17 Holiday Celebration

YOUNG ADULT ONCOLOGY GROUP

Children's Hospital of Wisconsin offers the Young Adult Oncology Group for cancer survivors (on and off treatment) ages 18 to 39. This group provides survivorship support, education and social activities.

Meets monthly. Dates and times vary.

Sponsored by Children's Hospital of Wisconsin, the Medical College of Wisconsin and the Clinical Cancer Center.

More information: Kristin Bingen, 414-955-4148 or aya@mcw.edu.

EPILEPSY SUPPORT GROUP

This support group is open to people with epilepsy, their family members and caregivers. Each month, a guest speaks on topics related to seizures.

Meets monthly on the fourth Wednesday of each month. (No meeting in November or December.) 6:30-8 p.m.

Froedtert Hospital
2NT Conference Room
North Tower, Second Floor

For questions, concerns or suggestions, please call Linda Allen, RN, Epilepsy Program coordinator, at 414-805-3641 or LeeAnn Lathrop, MSW, social worker, at 414-805-2894.

PLEASE JOIN US ON SOCIAL MEDIA

A Facebook page has been created to share information and provide opportunities to connect with and learn from others affected by a brain or spine tumor. You'll find information about events, meetings and classes and the latest research and treatments. If you are interested, follow the page at: facebook.com/MCWBrainSpine/

You can also follow our group on Twitter: @MCWBrain_Spine