Rhinorrhea: The medical term for

A Runny Nose

When is it a sign of a more serious medical condition?

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Having a “runny nose“ is very common and is

frequently associated with a cold, virus, allergy or sinus infection. Thirty-seven million Americans suffer with chronic sinusitis and fifty million have some form of respiratory allergies. Recently, Cathy, a forty-three year old overweight diabetic woman called her primary care doctor (PCP) with a new problem. Her nose started to “run” without sustaining any trauma. She asked what should she do? She denied any symptoms of facial pressure, headache, fever, postnasal drip or congestion. Her PCP thought it sounded like allergies and told her to start the over the counter anti-histamine Loratidine. Cathy had some health issues which were controlled but had no history of sinusitis, asthma or allergies. She did note some increased blurring of vision but attributed this to requiring stronger glasses. After a few days the nasal discharge worsened especially when she leaned forward (Figure #2). She kept a tissue up by her nose for most of the day. She visited her ENT doctor who determined she had one-sided (unilateral) clear rhinorrhea consistent with a cerebro-spinal fluid leak (CSF). She was sent to the Emergency room at Long Island Jewish Hospital and came under the care of Dr. B. Todd Schaeffer, an endoscopic sinus and skull base surgeon and Dr. Steven Schneider, an endoscopic neurosurgeon. A CT scan showed a very large pneumatized lateral sphenoid sinus with a skull base defect (Figure #1). Inflammatory tissue was in the most lateral recess on the left side.

CSF Rhinorrhea

Cerebrospinal Fluid (CSF) is a clear fluid produced by the choroid plexus in the ventricles of the brain. It acts as a shock absorber and cushions the brain and spine. The CSF circulates around them in the sub-arachnoid space. A communication with this space through the arachnoid (thin layer), dura (thick fibrous layer) and a bony defect at the skull base, into the paranasal sinuses, leads to a leakage of clear fluid from one side of the nose.

Figure #1 Left Sphenoid
Bony defect in left lateral sinus with encephalocele
CSF Rhinorrhea

CSF Rhinorrhea
Traumatic vs Spontaneous
Motor Vehicle Accidents
Gun Shot Wounds
Surgery i.e tumor removal, sinus surgery

Elevated Intracranial Pressure
Pseudotumor Cerebri

A lumbar drain was placed and an eye exam confirmed papilledema consistent with benign intracranial hypertension most likely due to pseudotumor cerebri. Cerebrospinal Fluid (CSF) is a clear fluid produced by the chorid plexus located in the ventricles of the brain. It acts as a shock absorber and cushions the brain and spine. The CSF circulates in the subarachnoid space. A communication with this space through the arachnoid (thin layer), dura (thick fibrous layer) and a bony defect at the skull base, (in the paranasal sinuses), causes the unilateral clear fluid “runny nose.” Cross contamination of nasal contents with CSF is a set-up for meningitis and intracranial infection and therefore sealing the leak is paramount.

A CT cisternogram confirmed the sphenoid sinus as the site of leakage. An endoscopic transnasal trans-sphenoidal repair with nasoseptal flap was performed. This was extremely difficult since the lateral recess where the leak was found was lateral and posterior to the pterygopalatine fossa in the infratemporal fossa. This was especially challenging since the repair was lateral and inferior to foramen rotundum and ovale. The instruments were just barely able to reach with visualization supplied with angled scopes transnasally. Pseudotumor Cerebri is benign intracranial hypertension found in obese females with complaints of headache, nausea, vomiting, tinnitus, double vision that can cause papilledema and eventually visual loss. CSF leak is a complication due to chronically high intracranial pressure leading to bony defects and spontaneous leaks.

Figure #2: Clear rhinorhea

Figure #3: Second patient with spontaneous cribriform CSF leak. Skull base defect with meningocele. This was repaired endoscopically transnasally with local mucosal flap. Repaired with Dr. Mark Eisenberg (Endoscopic Skull Base Neurosurgeon).
Diagnostic Testing For CSF Leak

CSF rhinorrhea can easily be misdiagnosed because it is often left off the differential diagnosis of rhinorrhea. While a “runny nose” is commonly thought to be from an allergy, cold, virus or sinus infection, a careful history of unilateral crystal clear watery rhinorrhea may help elucidate the correct diagnosis. If the diagnosis is in doubt, a nuclear medicine pledget test can confirm there is a leak. After a lumbar puncture, a radioactive tagged isotope is placed back into the CSF. If a cotton pledget placed in the nose is positive for the isotope this confirms an active leak and the side. A CT Cisternogram helps confirm the site of a leak. After a lumbar puncture, contrast material is injected into the subarachnoid space where the CSF circulates. The patient is tilted upside down followed by a CT scan with the head down leaning forward. The contrast material seen in the nasal cavity elucidates the area of leak. Beta-2 transferrin is found almost exclusively in CSF and not in blood, mucous or tears. When clear nasal fluid collected is positive for this marker, it confirms a CSF leak on that side. The specific site is determined by CT, CT cisternogram or endoscopy. Intraoperative localization using fluorescein produces greenish/yellow CSF fluid. An off-label use of fluorescein is used when this is injected preoperatively into the CSF in diluted amounts.

Figure #4: Third patient with CSF leak at Left Supraorbital ethmoid. This was an encephalocele repaired through a transnasal endoscopic approach

Etiology of CSF Leaks
Trauma
Tumors
Iatrogenic
Spontaneous/Unknown

Key Points to CSF Repair
Transnasal endoscopic repair with navigation. Lumbar drain as needed

Materials used for multilayer closure
Bone
Fat
Fascia
Duragen/Dural repair
Tisseel™ (glue)
DuraSeal™ (non-toxic hydrogel)
Nasoseptal Flap
B. Todd Schaeffer, M.D., F.A.C.S

Endoscopic Sinus and Skull Base Surgeon Dr Schaeffer has been performing advanced endoscopic sinus surgery for twenty years. He has performed more endoscopic skull base surgery than any other sinus surgeon on Long Island. He commonly works with skull base neurosurgeon Dr. Mark Eisenberg. As a team, they have successfully treated pituitary tumor removal, closure of CSF leaks, removal of encephaloceles, chordomas, clival tumors, meningiomas, craniopharyngiomas, odontoidectomy, spinal cord decompression, biopsies at the skull base, removal of malignant sinus/nasal tumors and skull base reconstruction. The key to their success is collaboration together and the support staff of North Shore University Hospital and Long Island Jewish Medical Center. Experience and team collaboration counts. Visit NOSEMD at YouTube or Google NOSEMD.


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