A rare spontaneous cerebrospinal fluid rhinorrhea of long duration due to infection, detected by ^{99m}Tc-DTPA

To the Editor: We have read with interest the case report of Drs O. Kraft, K. Safarcik and V. Bartos in the issue of 2004; 7(1): 55-56 of HJNM, referring to the detection of spontaneous cerebrospinal fluid (CSF) rhinorrhea [1]. We would like to present a related case of a rare "spontaneous" CSF rhinorrhea associated with chronic infection of the paranasal sinuses.

A 34 years old female was referred to us because of a one month history of small secretion of watery discharge from both nasal cavities, on bending her head forwards. A spontaneous CSF rhinorrhea was suspected. The patient reported a three years history of chronic sinusitis and denied any head injury or skull-base surgery. The cerebral CT and MRI revealed only signs of sinusitis on the right maxillary sinus, without pathological intracranial findings (Fig. 1). Plain radiography or CT may identify a fracture and the site of a CSF leak but intrathecal soluble tracers, which are neither absorbed nor metabolized, such as technetium-99m diethylene triamino penta acetic acid (^{99m}Tc-DTPA) or indium-111- DTPA, are more simple and effective diagnostic procedures.

As rhinorrhea was obvious in our case, we used ^{99m}Tc-DTPA to perform the scintigraphic examination. Before the injection of the radiopharmaceutical into the lumbar intrathecal space, intranasal pledgets were placed in the nasal cavity and left in place for at least 6 hours. After the injection of 300 MBq of ^{99m}Tc-DTPA, planar imaging was performed at 2, 4, 6 and 24 hours with anterior, posterior and both lateral skull views in a MPR Millenium, GE, USA gamma camera, with matrix: 128x128 and 500 kcounts/view. When the pledgets were removed to be counted, at 4 hours, 2 mL of blood were taken to estimate the pledget-to-blood counts ratio. Both pledgets and the blood sample were counted in a well type counter (Wallac Wizard, Peruin Elmer Life Sciences, Finland). Using the aforementioned technique we found a pledget / blood count ratio of more than 5 [2, 3]. Also planar scintigraphic images of the lateral skull position demonstrated radioactivity at the ethmoid bone (Fig. 2).

After CSF leakage was confirmed, an intracranial dural closure with the aid of an infolded galeal-periosteal flap (Dietz procedure) was performed. During operation we found erosion of the anterior skull base near the cribriform plate. After surgery, the leakage ceased.

CSF rhinorrhea is a distinct clinical condition requiring surgical treatment to avoid a significant risk of meningitis [4]. Its origin can be traumatic or spontaneous. The former is more common fund in 67%-77% of the cases, including post-trans sphenoidal surgery and post-skull base surgery [5]. CSF fistula of spontaneous origin has been considered rare since it was first reported by Miller in 1826 [4] and may be due to agenesis of the floor of the anterior cerebral fossa, empty sella syndrome, increased intracranial pressure or tumor [5]. Very rarely, infectious processes of the paranasal sinuses may also cause dural CSF fistula by direct erosion of the pial-arachnoid meninx and bone.

Nontraumatic rhinorrhea may be difficult to detect and also difficult to choose its surgical treatment. The demonstration of the fistula is of immence importance. It is our opinion that radionuclide cisternography, supplemented by intranasal pledgets is indicated diagnostically in CSF leaks of infectious etiology. It seems, that such leaks are too slow to show up in a contrast CT cisternography.

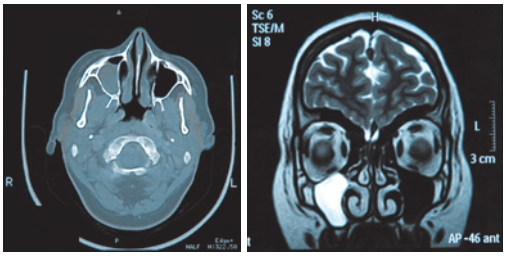

Figure 1. C/T (left picture) and MR imaging (right picture) revealed sinusitis on the right maxillary sinus.

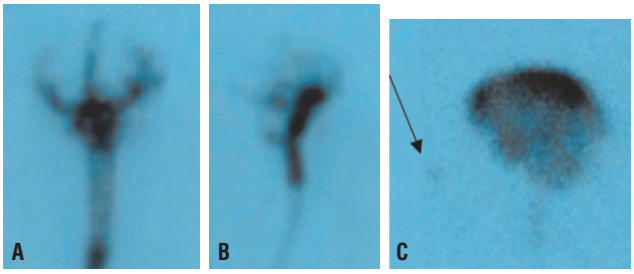

Figure 2. Planar scintigraphic images of the ascending route of the tracer. From left to right: A: anterior view at 2 hours. B: lateral view at 4 hours. C: lateral view at 24 hours. Notice the progressive accumulation of the radioactivity into the hemispheres and the hot spot in the area of nasal cavity, indicating CFS leakage through the ethmoid bone (arrow).

Bibliography

1. Kraft O, Safarcik K, Bartos V. Detection of spontaneous cerebrospinal fluid rhinorrhea. *Hell J Nucl Med* 2004; 7: 56-57.
2. Harbert J, Gonçalves Da Rocha AF. Radionuclide cisternography. *Textbook of Nuclear Medicine.* Vol II: Clinical Applications. 2nd edn. Lea & Febiger, Philadelphia, 1984; 112-121.
3. Howman – Giles R, Uren RF, Johnston I, Cerebrospinal fluid physiology, clearance flow studies and cerebrospinal fluid shunt studies. In: Murray IPC, Ell PJ. Edrs. *Nuclear Medicine in Clinical Diagnosis and Treatment.* Vol I. 2nd edn, Churchill Livingstone, London, 1998; 752-753
4. Spetzler RF, Zabramski JM. Cerebrospinal fluid fistulae: their management and repair. In: Youmans, JR. ed. *Neurological Surgery.* 3nd edn, Saunders WB Co., Philadelphia, 1990; 2269-2289.
5. Spetzler RF, Zabramski JM. Cerebrospinal fluid fistula. *Contemp. Neurosurg.* 1986; 8: 1-7

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