

Use of intranasal pledgets for localization of cerebrospinal fluid rhinorrhea (notes on technique)

David M. Barrs and Eugene B. Kern, Rochester (Minn.), USA

SUMMARY

The site of cerebrospinal fluid leaks from the nose can be localized by means of radioactive substances. The technical aspects are important for success.

The main purpose of this communication is to demonstrate graphically the methods and procedure used for localizing the site of cerebrospinal fluid leaks from the nose by means of a radioactive substance. Some of the technical aspects of placing intranasal cotton pledgets will be emphasized. Previous workers (Chidlow et al., 1973; Coleman and Troland, 1947; Galen, 1854; Johnson and Johnson, 1969; Kaufman, 1969; Meyer et al., 1960; Miller, 1826; Montgomery, 1971; Ommaya, 1964; Ommaya et al., 1968; Rovit et al., 1969; St. Clair, 1899; Timmons and Johnson, 1970) have discussed the causes and treatment of cerebrospinal fluid rhinorrhea, and this aspect will not be reviewed.

The pledgets are constructed by cutting cotton approximately 2 by 2 cm and tying a 1-0 silk suture around the cotton pledgets securely, leaving approximately 15 cm in length (Figure 1). If the nose is narrow, the cotton must be trimmed to facilitate placement. Seven cotton pledgets are prepared, and each is labeled with an adhesive tape applied to the distal end and numbered 1 through 6. The seventh pledget is labeled "C" for control. A solution of 1% phenylephrine (Neo-Synephrine) is applied topically to effect maximal decongestion of the nasal mucosa. After topical cocaineization with a 5% solution, the pledgets are placed in the following regions (Figure 2): pledget 1 on the right side in the area of the sphenoethmoid recess; pledget 2 into the middle meatus; and pledget 3 in the area of the cribriform between the middle turbinate and the septum. A similar procedure is carried out on the left side with pledget 4 placed in the sphenoethmoid recess, pledget 5 in the middle meatus, and pledget 6 in the cribriform region. With the first and

Figure 1. Cotton pledget is prepared by tying a 1-0 silk suture around the cotton, securing it with a square knot and leaving an approximately 15-cm length so that the distal end can be labeled with adhesive tape.

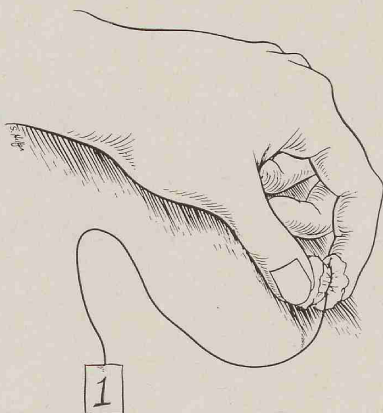
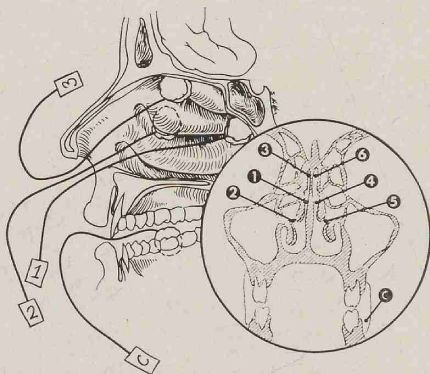


Figure 2. Sites of placement of cotton pledgets. The first site is the sphenothmoid recess to detect leaks from the sphenoid sinus; the second in the middle meatus to detect leaks from the frontal sinus or anterior ethmoid; and the third in the cribriform area to detect leaks from that region. The fourth, fifth, and sixth pledgets are placed to parallel the first three on the opposite side. The seventh pledget, labeled "C", is a control pledget placed in the buccogingival fold.



fourth pledgets in the sphenothmoid recess, leaks from the sphenoid sinus can be detected; the second and fifth pledgets in the region of the middle meatus will be able to detect leaks coming from the frontal sinus or the anterior ethmoids, and the third and sixth pledgets placed in the cribriform area will detect leaks from this region. A seventh pledget labeled "C" is placed transorally in the buccogingival fold to serve as a control.

After the pledgets have been taped to the skin, the patient is sent for cisternography. A spinal tap is performed, and a radioactive substance such as ytterbium-169 is injected intrathecally. After approximately 6 hours, the pledgets are removed and placed into separate test tubes for individual determination of the amount of radioactivity. The details of methods and technique may be found in standard texts of nuclear medicine (Early et al., 1975; Gottschalk and Potchen, 1976). Spinal headaches may occur after the procedure, and the patient should be advised accordingly. Preferably, the

examiner who places the pledgets should remove them, making sure the location of the pledgets has not changed.

Problems such as a septum perforation may require special care. If a septal perforation is present, the nose must be separated into a right and left side; otherwise, there might be contralateral contamination of the radioactive substance. A sheet of Silastic sheeting may be placed in the nose or sewn into the nose anteriorly to separate the right from the left nasal chamber. Occasionally, the patient has a significant or severe nasal septal deformity that prevents introduction of the pledgets into the appropriate areas. In this instance, a preliminary nasal septal reconstruction should be done before the site of the cerebrospinal fluid rhinorrhea can be identified.

In addition, intrathecal fluorescein can be used intra-operatively if the site of the leak has not been determined by the isotope method. It must be realized that chemical or irritation meningitis or arachnoiditis can occur subsequent to this procedure. This patient must be informed of these risks prior to injection.

RÉSUMÉ

On peut localiser le site des fuites du liquid céphalorachidien du nez avec les substances radioactifs. Les aspects techniques sont important pour le succès.

REFERENCES

1. Chidlow, J. H., DeSanto, L. W., Facer, G. W. and Rhoton, A. L., Jr., 1973: The diagnosis, localization, and treatment of CSF rhinorrhea. Part 1. Surgical anatomy and etiology. Part 2. Diagnosis, localization and treatment, *ORL Digest*, 35, 9-13; 33-40.
2. Coleman, C. C. and Troland, C. E., 1947: The surgical treatment of spontaneous cerebrospinal rhinorrhea, *Ann. Surg.*, 125, 718-727.
3. Early, P. J., Razzak, M. A. and Sodee, D. B., 1975: *Textbook of Nuclear Medicine Technology*. Second edition. St. Louis, C. V. Mosby Company.
4. Galen, 1854: Du crane, de l'encéphale et des nerfs craniens. *In Oeuvres anatomiques, physiologiques et médicales de Galien*. (Translated by C. Daremberg.) Vol. 1. Paris, J. B. Ballière et fils, pp. 601-602.
5. Gottschalk, A. and Potchen, E. J. (eds), 1976: Section 20: Diagnostic Nuclear Medicine. *In Golden's Diagnostic Radiology Series*. Edited by L. L. Robbins. Baltimore, Williams & Wilkins Company.
6. Johnson, R. T. and Johnson, K. P., 1969: Hydrocephalus as a sequela of experimental myxovirus infections, *Exp. Mol. Pathol.*, 10, 68-80.
7. Kaufman, H. H., 1969: Nontraumatic cerebrospinal fluid rhinorrhea, *Arch. Neurol.* 21, 59-65.
8. Meyer, H. M., Jr., Johnson, R. T., Crawford, I. P., Dascomb, H. E. and Rogers, N. G., 1960: Central nervous system syndromes of "viral" etiology: a study of 713 cases, *Am. J. Med.*, 29, 334-347.
9. Miller, C., 1826: Case of hydrocephalus chronicus, with some unusual symptoms and appearances on dissection. *Tr. Med.-Chir. Soc. Edinb.*, 2, 243-248.

10. Montgomery, W. W., 1971: *Surgery of the Upper Respiratory System*. Vol. 1. Philadelphia, Lea & Febiger.
11. Ommaya, A. K., 1964: Cerebrospinal fluid rhinorrhea, *Neurology (Minneapolis)*, 14, 106-113.
12. Ommaya, A. K., Di Chiro, G., Baldwin, M. and Pennybacker, J. B., 1968: Non-traumatic cerebrospinal fluid rhinorrhoea, *J. Neurol. Neurosurg. Psychiatr.*, 31, 214-225.
13. Rovit, R. L., Schechter, M. M. and Nelson, K., 1969: Spontaneous "high-pressure cerebrospinal rhinorrhea" due to lesions obstructing flow of cerebrospinal fluid, *J. Neurosurg.*, 30, 406-412.
14. St. Clair, T., 1899: *The Cerebro-spinal Fluid: Its Spontaneous Escape From the Nose*. London, Cassell & Co.
15. Timmons, G. D. and Johnson, K. P., 1970: Aqueductal stenosis and hydrocephalus after mumps encephalitis, *N. Engl. J. Med.*, 283, 1505-1507.

David M. Barrs, M.D.
Eugene B. Kern, M.D.
Dept of O.R.L.
Mayo Clinic,
200 First Street SW,
Rochester, MN 55901
USA.