



Bilateral dermal cyst in the white matter tracts from cerebrum to cerebellum of a female cadaver

Published online June 12th, 2014 © <http://www.ijav.org>Peter J. WARD⁺

West Virginia School of Osteopathic Medicine, Lewisburg, WV, USA.



⁺ Peter J. Ward, PhD
400 N. Lee St.
West Virginia School of
Osteopathic Medicine
Lewisburg, WV, 24901, USA.
☎ +1 (304) 647-6371
✉ pward@wvsom.edu

Abstract

During a medical neuroscience course an unusual cyst in the brain of an 84-year-old female cadaver was found. The cyst extended bilaterally from the white matter of the parietal lobe along the internal capsule to the pons where it traveled through the middle cerebellar peduncle to disappear in the white matter of the cerebellum. The cyst occurred bilaterally but was much larger in the right cerebrum. A dense collection of brown hair was present as the cyst passed through the right middle cerebellar peduncle. Dermal cysts are thought to be the result of faulty neurulation resulting in the inclusion of epidermal ectoderm alongside presumptive neural tissue. Dermal cysts differ from epidermal cysts by the inclusion of sebaceous glandular tissue and hair follicles along with squamous epithelium within the developing nervous system.

© *Int J Anat Var (IJAV)*. 2014; 7: 71–73.

Received July 10th, 2013; accepted April 2nd, 2014

Key words [dermal cyst] [epidermal cyst] [dermoid cyst] [ectoderm] [development]

Introduction

This paper reports the incidental finding of a large dermal cyst during the normal anatomic dissection of an 84-year-old female cadaver. On the right side the cyst extended from the cortex to the cerebellum with a large dilation at its superior aspect. The same cyst was seen in the same locations on the left side but without the superior dilation. The cysts were entirely separate from the ventricular system.

Case Report

During the routine dissection of a cadaver brain during a medical neuroscience class students discovered a large cavity in the parietal region of the right cerebral cortex containing approximately 5-10 ml. of yellow fluid. Further sectioning revealed a normal lateral ventricle located medial to the cavity and no connection was found between the cyst and the ventricular system. The cavity extended from the telencephalon through the white matter tracts of the internal capsule, decreasing drastically in size as it traveled inferiorly. Continuing through the crus cerebri to the pons, it turned posteriorly and entered the cerebellum via the middle cerebellar peduncle. It dwindled and disappeared entirely in the vicinity of the deep cerebellar nuclei.

The left half of the brain and brainstem was sectioned in the coronal plane to see if a similar cavity was present. The left hemisphere did contain a similar cyst following the same pattern through the white matter but without the dilated portion in the cortex. Beginning in the white matter lateral to the body of the caudate nucleus it traveled inferiorly through the internal capsule and crus cerebri to the pons. As it made a 90° turn into the middle cerebellar peduncle, there was a small but dense accumulation of dark hair inside the lumen of this cavity. Closer examination also demonstrated the presence of hair in the right cyst wall, although there were no dense tufts as the one seen on the left side.

Discussion

The presence of the hair in the left cavity along with the yellowish fluid, which was very unlike cerebrospinal fluid, suggested that the defect originated from an ectodermal inclusion during the folding of the neural tube between the 3rd and 5th week of development [1, 2]. Closure of the cranial neuropore generally occurs on day 25 of development, two days prior to closure of the caudal neuropore [3, 4] and presumptive skin cells of ectoderm can become trapped in the central nervous system as either ectodermal or dermal

cysts. Specifically, ectodermal cysts are spaces lined by a stratified squamous epithelium similar to the epidermis of the skin while dermal cysts are lined by a squamous epithelium that also includes deeper integumental structures such as sebaceous glands and hair follicles [5]. Both types of cyst shed a waxy keratinous substance into the cyst lumen along with dead squamous cells [6]. Due to the poor preservation of the embalmed cadaver, sections of the cyst lining did not definitively reveal a stratified squamous epithelial covering

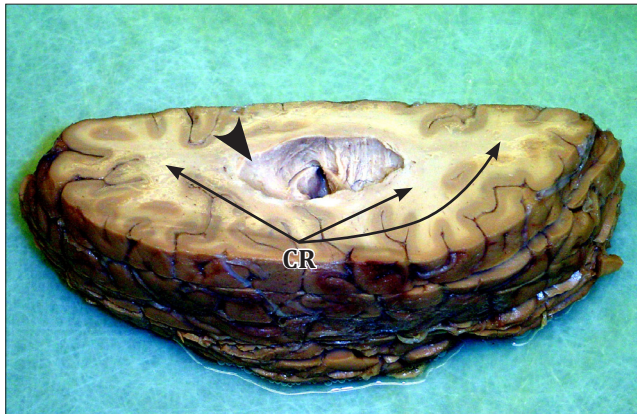


Figure 1. The dermal cyst (arrowhead) is clearly visible in the white matter tracts of the right hemisphere of the brain. The cyst is separate from the lateral ventricle, which was found medial to the cyst in subsequent sections. (CR: white matter of corona radiata)

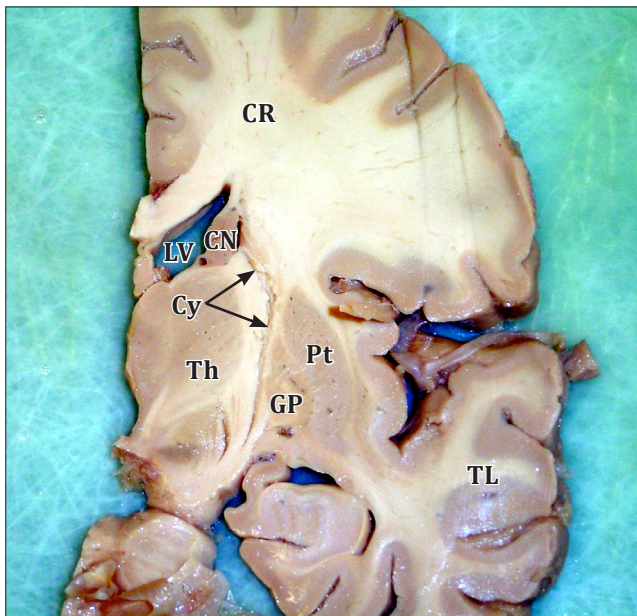


Figure 2. This coronal section of the left hemisphere shows the extent of the smaller cyst on the left side of the cortex. (CR: corona radiata; CN: caudate nucleus; LV: lateral ventricle; Cy: dermal cyst; Th: thalamus; Pt: Putamen; GP: globus pallidus; TL: temporal lobe)

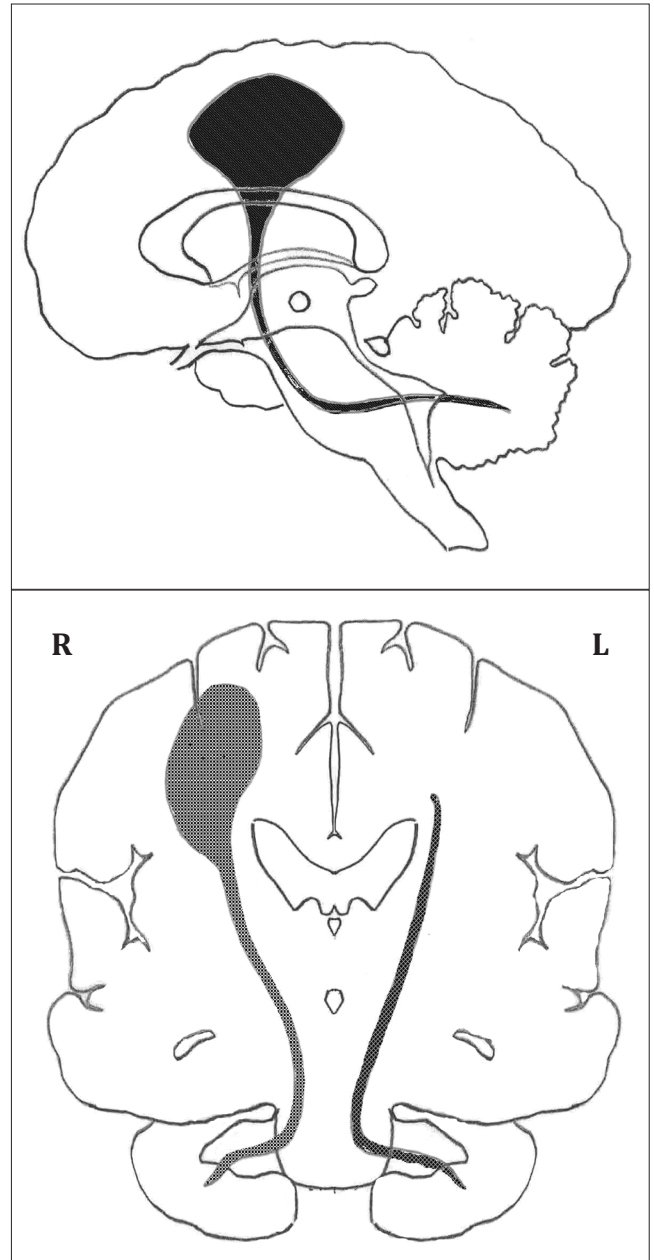


Figure 3. The bilateral dermal cysts extend from the cortical hemispheres through the midbrain, pons, and into the cerebellum via the middle cerebellar peduncle. The right cyst was notably larger in the cortex while the left contained a tuft of dark hair in the region of the pons and middle cerebellar peduncle.

but the cyst lining was thicker and more friable than a similar section of ventricular wall.

Epidermal cysts are more commonly seen in the brain while dermal cysts are most frequently seen in the spinal cord [2]. Dermal or epidermal cysts may also increase the likelihood of malignant neoplasia [6] and some authors have advocated surgical removal of these structures immediately

after discovery [1]. More common than the cysts, dermal and epidermal sinuses connect the lumen of the ectodermal inclusion to the outside environment [7, 8]. These direct conduits from the external environment into the central nervous system, may predispose a person to abscesses or meningitis [9].

Due to confidentiality policies relating to willed bodies, no follow-up regarding the cadaver's medical history was possible. However, the pathologist's report that accompanied her body

made no mention of any nervous disorders and listed the causes of death as ovarian cancer/ischemic cardiomyopathy at age 86. While this cannot tell us anything about her quality of life, it appears that this unusual developmental condition did not negatively affect her longevity. This report gives some evidence that such cysts, entirely separated from the external environment by nervous tissue, may not have a negative effect on longevity.

References

- [1] Smith, GF, Altman DH. Occipital dermal sinus; clinical and radiological findings when a complete occipital dermal sinus is associated with a dermoid cyst. *AMA J Dis Child*. 1959; 98: 713–719.
- [2] Sundaram C, Paul TR, Raju BV, Ramakrishna Murthy T, Sinha AK, Prasad VS, Purohit AK. Cysts of the central nervous system: a clinopathologic study of 145 cases. *Neurol India*. 2001; 49: 237–242.
- [3] Moore KL, Persaud TVN. *The Developing Human*. 7th Ed., Philadelphia, Saunders. 2003; 428.
- [4] Sadler TW. *Langman's Medical Embryology*. 12th Ed., Baltimore, Lippincott Williams & Wilkins. 2006; 63–66, 287.
- [5] Shackelford GD, Shackelford PG, Schwetschenau PR, McAlister WH. Congenital occipital dermal sinus. *Radiology*. 1974; 111: 161–166.
- [6] Nosaka Y, Nagao S, Tabuchi K, Nishimoto A. Primary intracranial epidermoid carcinoma. Case report. *J Neurosurg*. 1979; 50: 830–833.
- [7] Diaz A, Taha S, Vinikoff L, Allaoui M, Comoy J, Leriche B. Dermoid cyst of the lateral ventricle associated with ethmoidal dermal sinus. *Neurochirurgie*. 2000; 46: 39–42. (French)
- [8] Akhaddar A, Jiddane M, Chakir N, El Hassani R, Moustarchid B, Bellakhdar F. Cerebellar abscesses secondary to occipital dermoid cyst with dermal sinus: case report. *Surg Neurol*. 2002; 58: 266–270.
- [9] Schijman E, Monges J, Cagnaz R. Congenital dermal sinuses, dermoid and epidermoid cysts of the posterior fossa. *Childs Nerv Syst*. 1986; 2: 83–89.