Demographic Comparison of Patients Undergoing Surgical Repair of Anterior Versus Lateral Spontaneous Skull Base Meningoencephaloceles

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Abstract

The aim of this study evaluate demographic characteristics of patients with spontaneous skull base meningoencephaloceles in relation to the location of the defect along the skull base (anterior versus lateral). We hypothesized that there is a strong relationship between obesity and spontaneous meningoencephaloceles, with spontaneous meningoencephaloceles predominantly occurring in middle-aged to older females who were overweight/obese.

Introduction

Spontaneous skull base meningoencephaloceles result from herniation of intracranial contents through osseous defects typically near pneumatized bone in the anterior and lateral skull base [1, 2]. The presenting characteristics and defining features of patients presenting with anterior and lateral skull base meningoencephaloceles are similar suggesting a possible unifying pathophysiology. Specifically, overweight or obese middle-aged women are commonly affected, leading many to hypothesize that idiopathic intracranial hypertension (IIH), a disease process seen frequently in this demographic, is associated with the development of skull base meningoencephaloceles [6-8].

Previous work on the demographic correlations, risk factors, and treatment of skull base meningoencephaloceles is often restricted to patients grouped by anatomic location or etiology of the defect [3 - 5].

This retrospective study aims to broadly examine the demographics of patients presenting with spontaneous meningoencephaloceles, comparing those with anterior versus lateral spontaneous meningoencephaloceles, with a specific emphasis on BMI at presentation, age, gender, and comorbid conditions. We hypothesize that BMI will be associated with the development of spontaneous meningoencephaloceles in both anatomic locations.

Methods and Materials

A chart review was performed on all patients presenting with surgically confirmed skull base meningoencephaloceles between 2004 and 2014 by querying billing records for CPT codes 62120 and 62121. Data recorded included gender, age, BMI, location of defect, etiology of defect, presenting symptoms, clinical history including surgical or trauma history, and major medical comorbidities.

Obesity was defined as BMI greater than 30 kg/m². Normal BMI lies within the range of 18.5 to 24.9 kg/m², with BMI between greater than 25 kg/m² and less than 30 kg/m² considered overweight.

Meningoencephaloceles etiologies were categorized as follows: traumatic, idiopathic, tumorigenic, or spontaneous. Spontaneous meningoencephaloceles were defined as those meningoencephaloceles that were no secondary to trauma, physician intervention or tumor. Congenital meningoencephaloceles were excluded.

Meningoencephaloceles were divided into those occurring in the anterior versus lateral skull base. Anterior meningoencephaloceles included those occurring at the frontal sinuses, the cribiform plate, anterior and posterior ethmoid sinuses, and spheno- frontalis sinuses including the paraseptal area. Lateral meningoencephaloceles included those occurring along the floor of the middle fossa from the tegmen tympani to the lateral surface of the sella turcica (Figure 3).

Discussion / Conclusions

The association between obesity and spontaneous meningoencephaloceles is strong regardless of the location of leak in the skull base. The population at greatest risk for spontaneous skull base meningoencephaloceles at any location along the anterior and lateral skull base is middle-aged to older females who are overweight/obese. IIH is a condition that occurs predominately in overweight/obese, middle-aged females. IIH is characterized by elevated intracranial pressure (ICP), normal CSF studies, and no evidence of other mass lesions contributing to elevated ICP. The similarity in patient characteristics between spontaneous CSF leaks and IIH has led many to propose that a common pathway might produce either syndrome. Why some IIH patients present with CSF leak with or without associated meningoencephalocele and others do not is unclear. It is possible that variations in skull base thickness and integrity at areas typically at risk for meningoencephalocele development may be responsible for the variability in location of defect occurrence in these patients. It is even suggested that those patients who develop occult CSF leak may experience fewer symptoms of elevated ICP (1, 6, 7).

Conclusions

Skull base meningoencephaloceles can occur to a number of mechanisms, however spontaneous skull base meningoencephaloceles appear to occur in a specific demographic – that is, middle-aged to older females who are overweight or obese. This association remains strong regardless of the location of the meningoencephalocele (anterior versus lateral skull base). Though the pathophysiology currently is not fully understood, our data confirms that increased BMI and female gender are strong risk factors for meningoencephaloceles in all skull base areas typically associated with CSF leak and meningoencephalocele development.

References


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