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Case Report

Incidental Intracranial Meningioma during a Routine Educational Dissection in a Korean Male Cadaver

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Abstract : Meningiomas are frequently asymptomatic and often identified postmortem due to their indolent growth pattern. During an educational dissection, an incidental discovery of a meningioma was made in a male cadaver. The mass was observed in the left middle cranial fossa adjacent to the sella turcica, and subsequent histopathological examination confirmed it as a Grade I meningioma, characterized by typical psammoma body and meningothelial whorl. Anatomists should pay attention to the incidental meningioma because it could be found postmortem without prior notice on body donation and may also serve as an important part of anatomy education in terms of early clinical exposure.

Keywords : Incidental meningioma, Early clinical exposure, Medical education, Dissection

INTRODUCTION

Meningiomas, the most common primary neoplasm of the central nervous system, are tumors originating from the meninges, the membrane that surround the brain and spinal cord. Due to their characteristically slow-growing nature, meningiomas are often asymptomatic or reveal symptoms related to their location [1,2]. The incidence of meningioma demonstrates positive correlation with aging and exhibits a higher prevalence among females, attributed to hormonal influences such as the presence of progesterone receptors on cell membranes [1]. In addition to hormones, there are known risk factors including mutation in the neurofibromatosis type 2 (NF2) gene, ionizing radiation, head injury, and cell phone use [3].

Incidental postmortem diagnoses of malignancies are well-documented in the context of prostate cancer [4]. Contrary to the clinical era, undiagnosed intracranial meningioma has been occasionally reported in cadavers, on autopsy [5,6] or educational dissection [7-9]. In this report, we present a case of intracranial meningioma discovered incidentally in terms of early clinical exposure.

CASE REPORT

In a course of routine educational dissection at College

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of Medicine, Jeju National University in 2023, a case of meningioma was observed incidentally in a 63-year-old Korean male cadaver, whose cause of death was reported as 'asphyxia'.

To access the brain, the calvarium was removed following standard dissection protocols. Upon reflection of scalp, metal plate fixation was noted in the left temporal region (Fig. 1A). After removal of the brain, a well-circumscribed mass was observed adjacent to the cavernous sinus and the sella turcica within the left middle cranial fossa (Fig. 1B and 1C). The mass exhibited an oval, lobulated configuration with well-defined encapsulated dural sac. Given its encapsulation by dural connective tissue, the mass was presumed to be of meningeal origin.

The mass was carefully dissected from the cranial base for further examination (Fig. 2A). The dimensions of the excised tumor were 3.6 × 2.8 × 2.4 cm. For histopathological analysis, the excised mass was processed for paraffin embedding (ASP300S, Leica Biosystems, Wetzlar, Germany). The tissue blocks were cut into 4 μm-thick slices, and were stained with hematoxylin and eosin (H/E) using an autostainer (Tissue-Tek® ready-to-use for Prisma, Sakura Finetek, Tokyo, Japan). The stained images were captured by light microscope (BX53, Olympus, Tokyo, Japan) with an imaging software (cellSens standard version 1.11, Olympus). The tumor was surrounded by dural connective tissue (Fig. 2B) and consisted of syncytial lobules of epithelioid cells and some fascicles of spindled cells. Occasional psammoma bodies (Fig. 2C) and frequent meningothelial whorl formations (Fig. 2D) were also noted. These histologic findings were compatible with the transitional meningioma.

DISCUSSION

The meningiomas are generally indolent neoplasms that rarely metastasize and often remain clinically undetected. As a result, they are frequently discovered incidentally via advanced imaging modalities [3,8]. Nonetheless, unrecognized intracranial meningiomas have recently been documented in anatomical contexts, both in female [8,9] and male cadavers [7]. We encountered an incidental meningioma in the left middle cranial fossa, absent from the body donation records. Based on its anatomical and histopathological features, we diagnosed this mass as a typical Grade I meningioma similar to the recently reported spheno-orbital meningioma [9]. Although meningiomas have a higher incidence in females [1], this case involved a male cadaver. Evidence of prior craniotomy in the left temporal region and impression marks on the inferior brain surface were present. However, in the absence of accessible medical records, the clinical history including surgical interventions and symp-

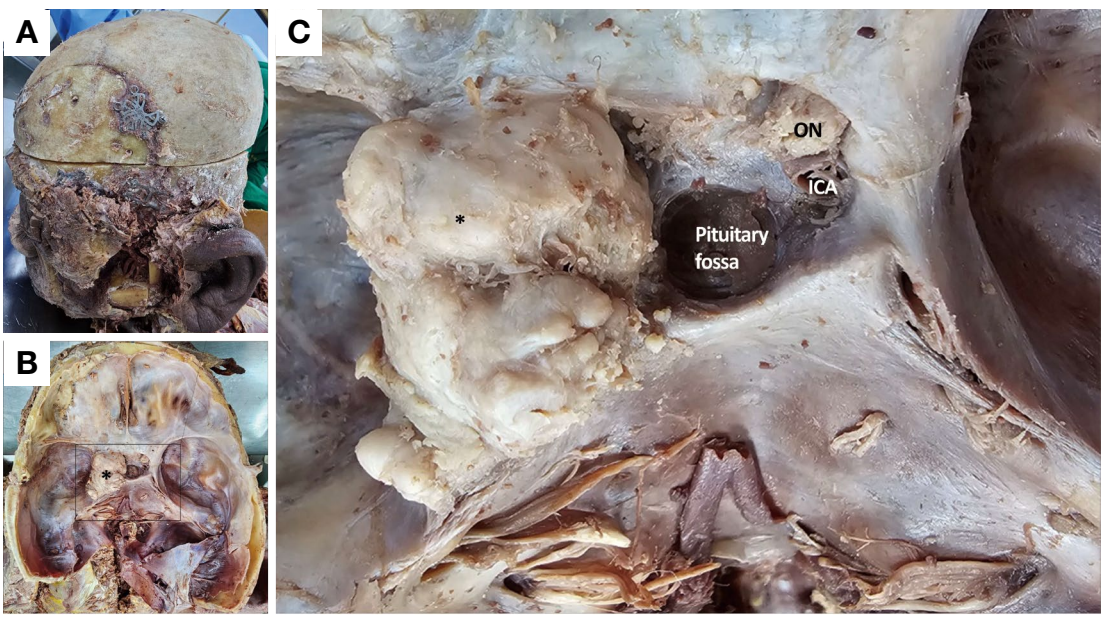

Fig. 1. Photographs of the gross anatomy of this case, the incidental meningioma. A. Metal plate fixation on left temporal region. B. Superior view of cranial base. C. Enlarged view of the area where the tumor was. Asterisk, incidental mass; ON, optic nerve; ICA, internal carotid artery.

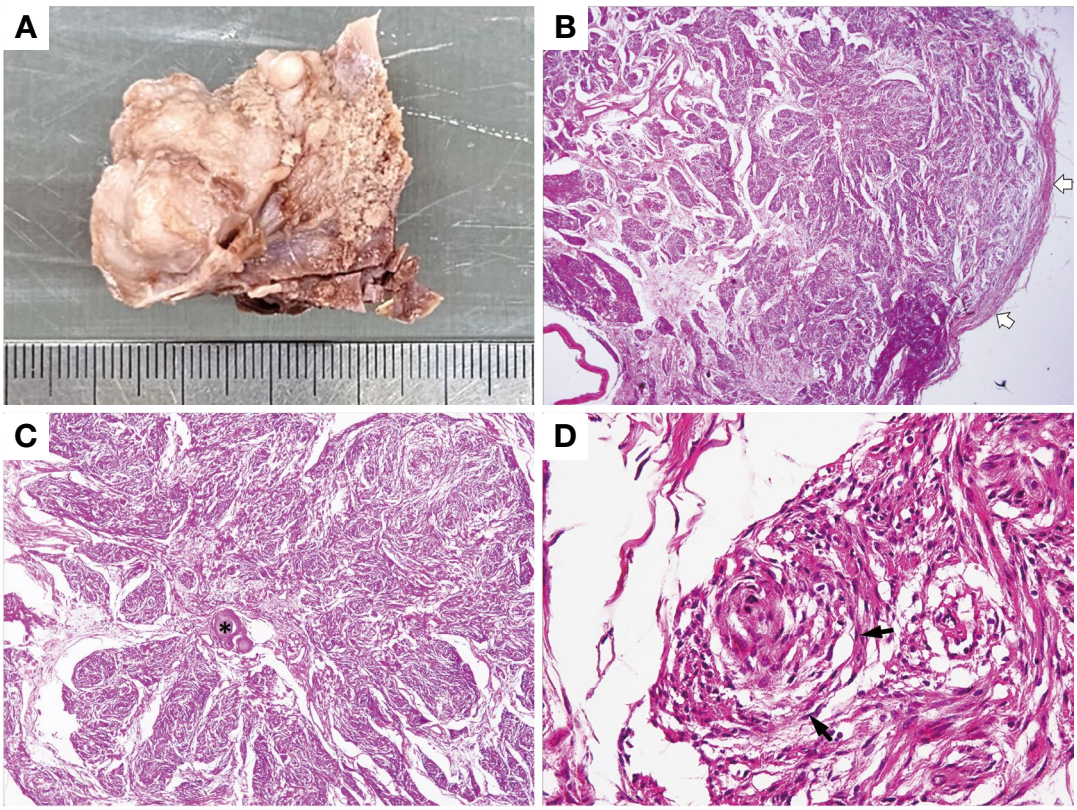

Fig. 2. Photographs of the meningioma and its histopathological analysis. A. General appearance of the resected tumor mass. B. The tumor surrounded by dural connective tissue (open arrows; magnification ×10). C. Lobules and sheets of tumor cells with occasional psammoma bodies (asterisks; magnification ×40). D. Characteristic meningothelial whorls (arrows; magnification ×400).

toms could not be elucidated.

While NF2 gene mutations are recognized as a principal genetic risk factor for meningioma development [3], the spatial phenotype may indicate the involvement of alternative mechanisms [10]. The meninges over the middle cranial fossa are typically derived from mesoderm, whereas those in other regions originated from neural crest. The pathogenic variants were identified in this cranial base, middle cranial fossa including the sella turcica, such as phosphatidylinositol 3-kinase (PI3K), tumor necrosis factor receptor-associated factor 7 (TRAF7), and Krüppel-like factor 4 (KLF4). However, the pathogenic variants were not identified in this case.

Recent medical education increasingly integrates basic and clinical medicine, and thus, early clinical exposure is viewed positively from the students' perspective [11]. Early clinical exposure can lead to better knowledge retention because it integrates basic and clinical medicine and develops self-directed learning skills [12]. As anatomy serves as a gateway to the medical curriculum, integrated teaching approaches may better prepare student for subsequent clinical education [13]. The integration of gross anatomy education was tried with pathology [14,15] and surgery [16], which showed improved understanding of the clinical application of gross anatomy. Unlike preserved cadavers, pathological cadavers reveal authentic morphological changes such as tumor masses, vascular malformations, and degenerative alterations. Engagement with pathological cadavers bridges the gap between preclinical education and clinical practice [17]. Although students often perceive the cadaver more as a "silent teacher" than as a "first patient" [18], early clinical exposure has been shown to enhance premedical students' motivation to become a good doctor [19]. In this context, an incidental meningioma, though relatively common in clinical setting, may serve as a "first patient" that enriches the educational value of gross anatomy. Ultimately, the use of pathological cadavers transforms anatomy education from a static, structure-based discipline into a dynamic and

clinically integrated experience, equipping future physicians with a more holistic understanding of the human body [17].

In conclusion, we found an incidental intracranial meningioma, which was classified as Grade I, in a male cadaver. Although such findings are relatively common in clinical practice, incidental meningioma or similar incidental pathological discoveries encountered during anatomical dissection should be regarded as "first patient" experiences for undergraduate students. This case highlights the potential for early clinical exposure, in collaboration with pathology, to enhance the educational impact of anatomical learning.

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