The anterior cribriform plate foramina: from anatomy to surgery

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Background: Despite the development of anterior skull base surgery, the anatomy of the nasal bone and anterior cribriform plate remains unclear. A recent study confirmed 2 distinct foramina in the anterior part of the cribriform plate: the ethmoidal slit (ES) and the cribroethmoidal foramen (CF). The aim of this study was to specify their content, their anatomic relationship to the frontal sinus and skull base, and their potential value in skull base surgery.

Methods: Dissections were performed on 36 cadaver heads. Macro- and microscopic examinations were carried out. Microcomputed tomography scans contrasted with osmium were performed to identify vessels and nerves. Histology with neural, meningeal, or luteinizing hormone-releasing hormone immunomarkers was performed on the content of the foramina. Finally, endonasal surgical dissections were carried out.

Results: The ES and the CF were observed in all cases. They measured a mean of 4.2 and 1.6 mm, respectively. The ES contained dura mater, arachnoid tissues, lymphatics, and the terminal nerve. The CF contained the anterior ethmoidal nerve and artery. This foramen continued forward with the cribroethmoidal groove, which measured a mean of 2.5 mm. This groove was under the frontal sinus and in front of the skull base. We also described a "cribroethmoidal canal" and a "nasal bone foramen." Clinical applications are discussed.

Conclusion: The clinical applications of this new anatomic description concern both the cribriform plate and frontal sinus surgeries. Identifying the terminal nerve passing through the ES is a step forward in understanding pheromone recognition in humans.

Keywords: cribriform plate, anatomy, surgery