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Teaching NeuroImage: Olfactory Stem Cell Injection Inducing Actively Secreting Respiratory Epithelium in a Cervical Syrinx

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A 46-year-old man suffered a complete C6 spinal cord injury with minimal recovery. Two years later, he underwent olfactory stem cell injection into the cervical post-traumatic syrinx but developed progressive weakness. A C5 syringo-subarachnoid shunt was placed, but his strength declined further, so he underwent syrinx evacuation. Upon dural opening, white gelatinous material exuded under pressure (Figure 1). Pockets of similar material were evacuated. Pathology identified respiratory epithelium and seromucinous glands within fibrous stroma (Figure 2). Within four months, he re-gained deltoid and bicep function.

Olfactory stem cells have been proposed as an experimental treatment for functional improvement following traumatic spinal cord injury; intrathecal administration improved function in one patient.[1] Although mesenchymal stromal cell injection in syrinx has shown promise in reducing syrinx size and improving function, careful monitoring is needed for potential side effects.[2]

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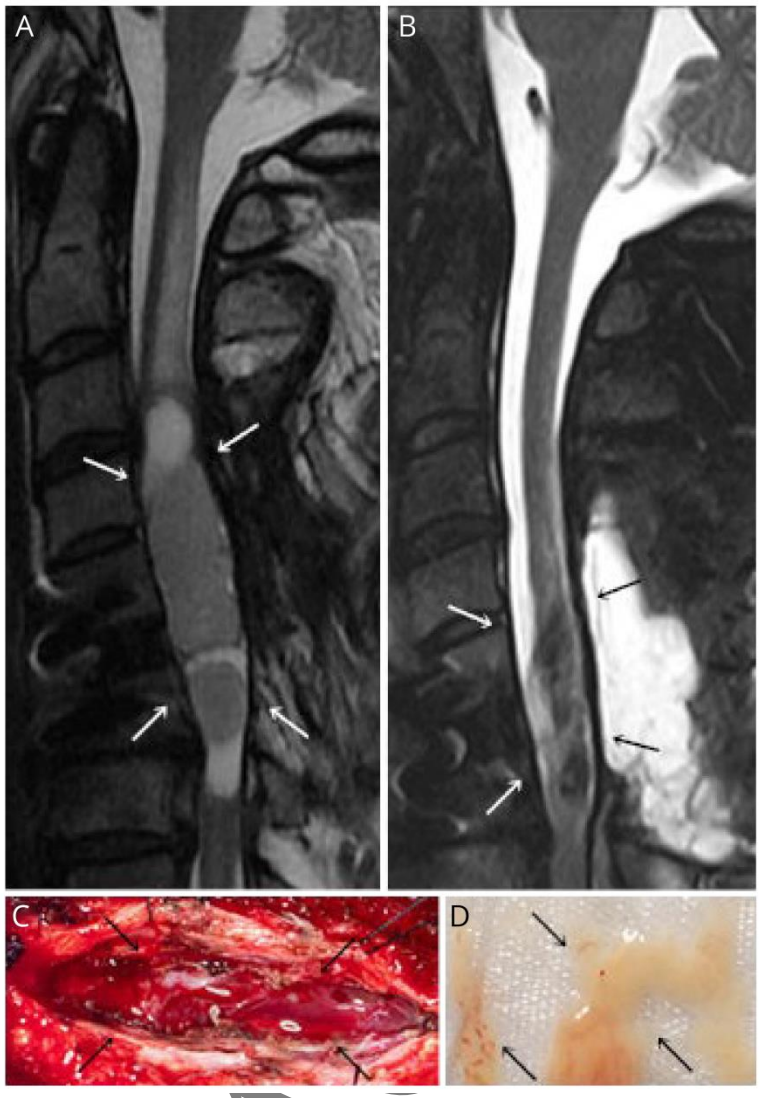
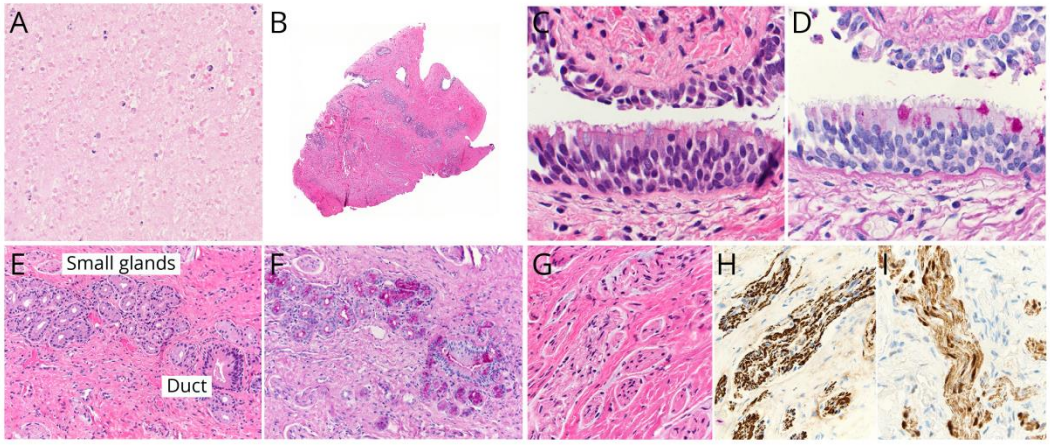
1. Zamani H, Soufizomorrod M, Oraee-Yazdani S, Naviafar D, et al. Safety and feasibility of autologous olfactory ensheathing cell and bone marrow mesenchymal stem cell co-transplantation in chronic human spinal cord injury: A clinical trial. Spinal Cord 2022;60:63-70.
2. Vaquero J, Hassan R, Fernández C, et al. Cell therapy as a new approach to the treatment of posttraumatic syringomyelia. World Neurosurgery 2017;107:1047-e5.

Figure 1. MRI and Intraoperative Photographs



(A) Preoperative and (B) postoperative sagittal MRI with arrows highlighting complex syrinx. Intraoperative photograph of (C) syrinx cavity and (D) mucinous syrinx material.

Figure 2. Pathology of the Lesion



(A) Amorphous nasal secretion x200; (B) cyst wall highlighting ciliated respiratory mucosa in upper left box, small seromucinous gland in upper right box, small nerve twigs in lower right box; (C) H&E x400, (D) PAS of ciliated respiratory mucosa with goblet cells x400; (E) H&E x200, (F) PAS showing small seromucinous gland, duct x200; (G) S100 showing small nerve twigs in dense fibrous tissue with axons, Schwann cells x400; (H) neurofilament x400; (I) S100 showing Schwann cells x400.

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