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

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Study concept or design; Analysis or interpretation of data Caterina Giannini: Drafting/revision of the manuscript for content, including medical writing for content; Analysis or interpretation of data William Oliver Tobin: Drafting/revision of the manuscript for content, including medical writing for content; Study concept or design; Analysis or interpretation of data **Figure Count:** 2 **Table Count:** 0 **Search Terms:** [135] All Infections, [255] Spinal cord trauma; see Trauma/spinal cord trauma (S), [256] Spinal cord infection, [266] Spinal cord trauma **Acknowledgment: Study Funding:** The authors report no targeted funding **Disclosure:** The authors report no relevant disclosures. **Preprint DOI: Received Date:** 2022-08-05 **Accepted Date:**

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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. 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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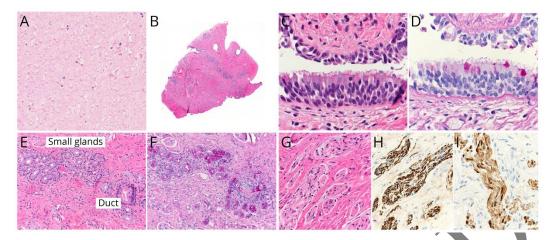
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Figure 1. MRI and Intraoperative Photographs



(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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