Teaching Video NeuroImages: Spontaneous Upbeat-Torsional Nystagmus From Medial Medullary Infarction

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A 71-year-old man presented with acute dizziness and right-sided paresthesia. Examination revealed spontaneous torsional nystagmus (top pole of eyes beating to the left) with a milder upbeat component (Video 1), right-sided weakness, and right hemisensory loss. MRI brain showed an acute left medial medullary infarct (Figure 1). Spontaneous upbeat-torsional nystagmus typically results from selective damage to the vertical semicircular canals pathways in the medullary medial longitudinal fasciculus (MLF), often resulting in an ipsilesional-beating torsional nystagmus. It is important to note that extra-MLF lesions in the brachium conjunctivum and ventral tegmental tract can also produce similar findings (Figure 1). While upbeat-torsional nystagmus is more commonly observed in posterior canal benign paroxysmal positional vertigo, it is elicited by the Dix-Hallpike maneuver and is not continuous or spontaneous.

**Appendix 1 Authors**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
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References


Figure legend

Figure Title: Central localizations of spontaneous upbeat-torsional nystagmus

Figure 1 Diffusion-weighted imaging (DWI) revealing restricted diffusion in the left anterior medulla and paramedian left medulla (A) with apparent diffusion coefficient (ADC) correlation (B) suggesting an acute infarct. Pathway imaging (C) adapted from vertical semicircular canal pathways by Gold, D.\(^2\) MLF and extra-MLF central localizations of spontaneous upbeat-torsional nystagmus. Patient’s ischemic stroke represented by lightning bolt in the MLF pathway. BC – brachium conjunctivum; VTT – ventral tegmental tract; MLF – medial longitudinal fasciculus; SVN – superior vestibular nucleus; LVN – lateral vestibular nucleus; MVN – medial vestibular nucleus; IV – fourth nerve nucleus; III – third nerve nucleus; INC – interstitial nucleus of Cajal.
**Video legend**

*Video 1* showing spontaneous torsional nystagmus (top pole of eyes beating to the left) with a mild upbeat component, and unidirectional torsional nystagmus with top poles beating to the left in both left and right eccentric gaze.
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