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Cervical Dystonia Caused by Damage to the Dentate-Rubro-Olivary Pathway: A Case Report

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Introduction

- Dystonia can be caused by injury to not only the basal ganglia but also the thalamus, cerebellum, and brainstem.
- We report **a case of cervical dystonia** secondary to hemorrhage in the midbrain, pons, and around the cerebellar peduncle with **hypertrophic olivary degeneration**, resulting from **damage to the dentate-rubro-olivary tract.**

Case

- A 43-year-old male was admitted to the hospital after a motor vehicle accident. The brain **computed tomography** scan was performed, which revealed **1.2cm sized intracranial hemorrhage lesion in the midbrain, pons, and around the cerebellar peduncle (Figure 1(A)).**
- On post-trauma day 35, the **magnetic resonance imaging** showed focal T2 hyperintensity in the anterior medulla, suggestive of **hypertrophic olivary degeneration (Figure 1(B)).**
- He complained of dystonic posturing of his neck, with sustained contractions of the neck muscles even while sleeping, without shaky limbs. During hospitalization, he had dystonic head tremor, diplopia, dysmetria, and ataxia.

Discussion

- **This case** represented one possible mechanism for **cervical dystonia concerned in damage to the dentate-rubro-olivary pathway (also known as the Guillain-Mollaret triangle),** a neural circuit that connects the **dentate nucleus in the cerebellum, the red nucleus in the midbrain, and the inferior olivary nucleus in the medulla oblongata (Figure 2).**
- **This tract involves in regulating the coordination and timing of movements**, and insult to this circuit can lead to a range of movement disorders, including cervical dystonia.
- In addition, **injury to this network can also disrupt the feedback loop between the cerebellum and the cortex**, which is involved in **fine-tuning movements**, corroborating the result to **a loss of control over movements and a tendency towards involuntary movements**.
- **In conclusion,** this case suggested that **cervical dystonia can be caused by the disruption of the dentate-rubro-olivary pathway**, which is an important circuit involved in motor control.

Figure 1(A). The brain computed tomography shows the midbrain and pontine hemorrhage around the cerebellar peduncle.

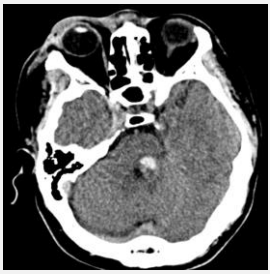

Figure 1(B). The T2-weighted magnetic resonance imaging shows focal T2 hyperintensity in the anterior medulla — hypertrophic olivary degeneration.

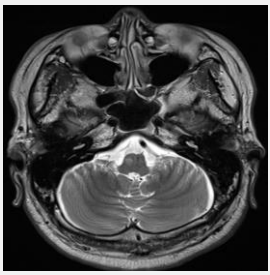

Figure 2. The sagittal magnetic resonance imaging shows disruption of the Guillain-Mollaret triangle.