

Acute Binocular Diplopia with Ataxia: MRI Diagnosis of Facial Colliculus Syndrome with Selective Abducens Nuclear Involvement

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Abstract: Background: Facial colliculus syndrome (FCS) is an uncommon dorsal pontine syndrome resulting from lesions at the level of the facial colliculus. It classically presents with ipsilateral horizontal gaze palsy and lower motor neuron facial weakness due to involvement of the abducens nucleus and facial nerve fascicle^{1,2}. Selective abducens nuclear involvement without facial palsy is rare.

Case Presentation: A 65-year-old male presented with acute binocular horizontal diplopia and gait imbalance. Neurological examination revealed impaired conjugate horizontal gaze toward the left side without facial weakness. MRI demonstrated a focal diffusion-restricting lesion in the dorsal caudal pons at the level of the facial colliculus. Imaging findings confirmed acute infarction selectively involving the abducens nucleus.

Conclusion: This case highlights an incomplete variant of facial colliculus syndrome. Diffusion-weighted MRI plays a pivotal role in detecting small brainstem infarcts and accurately localizing dorsal pontine lesions.

Keywords: Facial colliculus syndrome; Abducens nucleus; Pontine infarction; Brainstem stroke; Diplopia; MRI.

1. INTRODUCTION

The facial colliculus is an anatomical elevation located in the floor of the fourth ventricle within the dorsal pons. It is formed by the abducens nucleus and the looping fibers of the facial nerve (internal genu)¹. Because of this close anatomical relationship, lesions at this level often produce combined ocular motor and facial deficits.

Classically, facial colliculus syndrome manifests with ipsilateral horizontal gaze palsy and ipsilateral lower motor neuron facial paralysis^{1,3}. The most frequent etiology in elderly individuals is ischemia involving paramedian perforators of the basilar artery^{2,3}.

Selective involvement of the abducens nucleus with sparing of facial nerve fibers is uncommon due to their anatomical proximity. We report a radiologically confirmed case of acute pontine infarction presenting as facial colliculus syndrome without facial palsy.

Case Presentation

A 65-year-old male presented to the emergency department with sudden onset binocular horizontal diplopia of one day duration. Diplopia worsened on leftward gaze and resolved with monocular closure. He also reported unsteadiness while walking.

There was no history of facial deviation, dysarthria, limb weakness, sensory disturbance, or altered consciousness. The patient had known hypertension and type 2 diabetes mellitus.

On neurological examination, the patient was alert and oriented. Ocular examination revealed impaired conjugate horizontal gaze toward the left side, consistent with left abducens nuclear involvement. Facial symmetry was preserved with no evidence of lower motor neuron facial palsy. Motor and sensory examinations were normal. Mild gait ataxia was noted.

Given suspicion of posterior circulation stroke, MRI brain was performed.

Imaging Findings

MRI revealed a focal lesion in the dorsal tegmentum of the caudal pons at the level of the facial colliculus.

- **Axial FLAIR imaging** demonstrated a subtle hyperintense focus in the dorsal paramedian pons (Fig. 1).
- **Diffusion-weighted imaging (DWI)** showed marked hyperintensity in the same region (Fig. 2).
- **Apparent diffusion coefficient (ADC) maps** demonstrated corresponding low signal intensity confirming true diffusion restriction and acute infarction (Fig. 3).
- **Coronal T2/FLAIR sequence** further localized the lesion to the dorsal pontine tegmentum without extension into adjacent facial nerve fascicles (Fig. 4).

No blooming was seen on susceptibility sequences to suggest hemorrhage. Magnetic resonance angiography did not demonstrate significant large-vessel stenosis.

Imaging findings were consistent with a small acute ischemic infarct involving the facial colliculus region, selectively affecting the abducens nucleus.

2. DISCUSSION

The dorsal pontine tegmentum contains several compact neural structures including the abducens nucleus, facial nerve fascicles, medial longitudinal fasciculus, and cerebellar pathways¹. Damage at this location produces predictable neuro-ophthalmologic findings.

The abducens nucleus plays a central role in coordinating horizontal gaze through connections with the contralateral oculomotor nucleus via the medial longitudinal fasciculus^{1,4}. Therefore, nuclear lesions cause horizontal gaze palsy rather than isolated lateral rectus weakness.

In classical facial colliculus syndrome, both abducens nucleus and facial nerve fibers are involved, resulting in horizontal gaze palsy and ipsilateral peripheral facial paralysis^{1,3}. In our patient, absence of facial palsy suggests that the infarct was small and anatomically restricted, sparing the facial nerve fascicle.

Small-vessel ischemia affecting paramedian perforators of the basilar artery is the most likely mechanism in elderly patients with vascular risk factors^{2,5}. Diffusion-weighted imaging is highly sensitive in detecting early brainstem infarction and is essential for accurate anatomical localization².

Differential considerations for dorsal pontine lesions include demyelinating plaques, inflammatory conditions, intrinsic tumors, and vascular malformations. However, acute clinical presentation and diffusion restriction strongly support ischemic etiology.

Recognition of incomplete variants of facial colliculus syndrome is important, particularly when facial weakness is absent, as diagnosis relies heavily on radiological correlation.

3. CONCLUSION

This case illustrates a rare incomplete presentation of facial colliculus syndrome with isolated abducens nuclear involvement without facial palsy. MRI with diffusion-weighted imaging is crucial for early detection and precise localization of small pontine infarcts. Awareness of such atypical variants improves diagnostic accuracy and guides timely management.

Figure Legends

Figure 1: Axial FLAIR image demonstrating subtle hyperintensity in the dorsal paramedian caudal pons at the level of the facial colliculus.

Figure 2: Axial diffusion-weighted image showing focal hyperintensity consistent with acute infarction.

Figure 3: Corresponding ADC map demonstrating low signal intensity confirming restricted diffusion.

Figure 4: Coronal T2/FLAIR image localizing the lesion to the dorsal pontine tegmentum without facial nerve fascicular involvement.

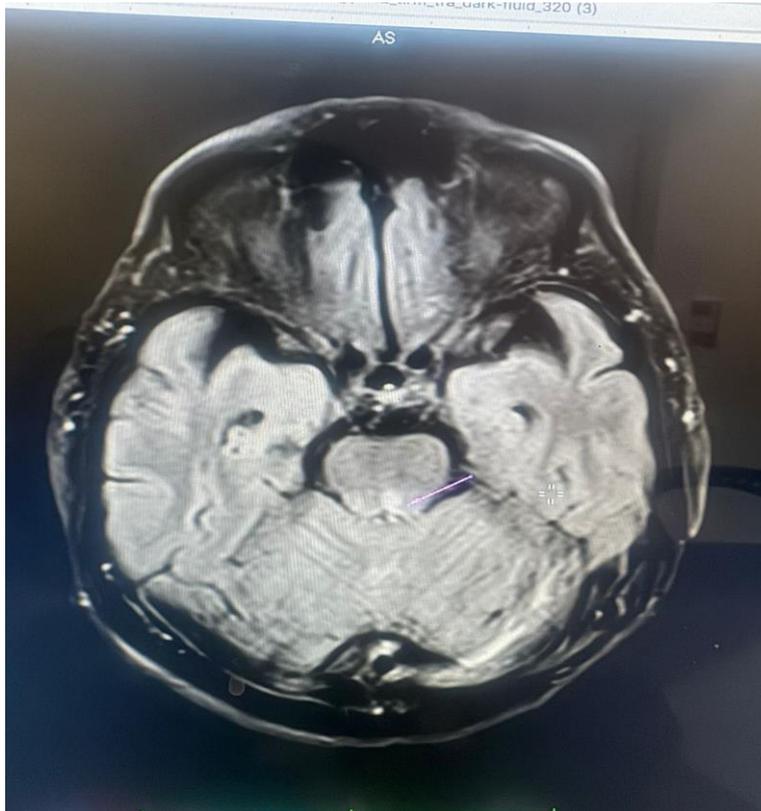


Figure 1

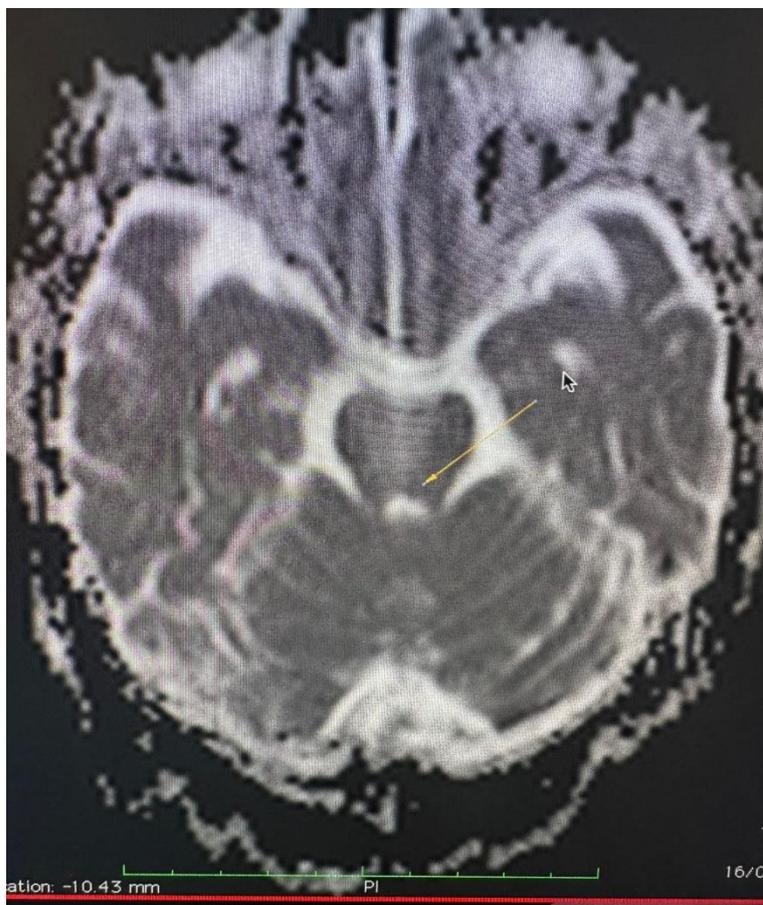


Figure 2



Figure 3

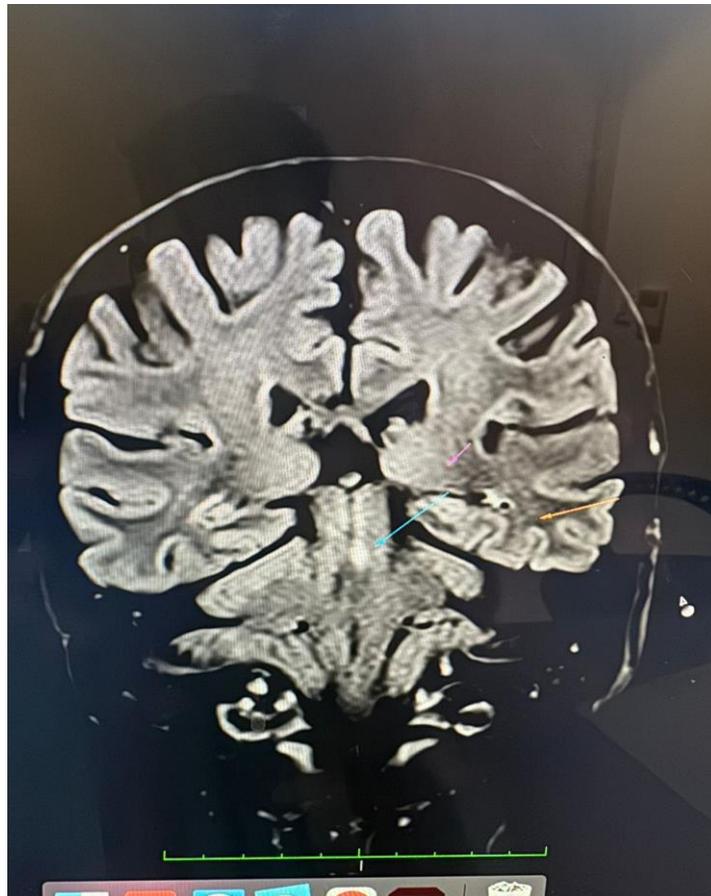


Figure 4

Declarations:

Ethics approval: Not applicable.

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