

The Neuropathology of CTE

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Case-Based Questions (please see page 3 for answers)

1.	Which of the following is a diagnostic feature of CTE
a.	P-tau immunopositive thorn-shaped astrocytes in the subpial region at the depth of a cortical sulcus
b.	Perivascular p-tau immunopositive astrocytes in the cortical gray matter at the depth of a sulcus
c.	Perivascular p-tau immunopositive astrocytes in the cortical white matter at the depth of a sulcus
d.	Perivascular p-tau immunopositive neurons and neurites in the cortical gray matter at the depth of a sulcus
e.	P-tau immunopositive neurons and neurites in the cortical gray matter at the depth of a sulcus

2.	In the absence of a pathognomonic lesion, which of the following is sufficient to diagnose CTE?
a.	NFTs in the mammillary bodies
b.	Moderate densities of NFTs in CA4 and CA2 of the hippocampus
c.	A perivascular lesion consisting of ptau aggregates in neurons and neurites in the amygdala
d.	P-tau immunopositive thorn-shaped astrocytes in the subpial region of the dorsolateral frontal cortex
e.	NFTs in the dentate nucleus of the cerebellum

3.	Which of the following describes the ptau neuritic and glial morphology in CTE?
a.	threadlike neurites and tufted astrocytes
b.	dotlike neurites and oligodendroglial coiled bodies
c.	dotlike neurites, thorn-shaped, granular fuzzy and unclassifiable astrocytes
d.	dotlike neurites, thorn-shaped and tufted astrocytes
e.	threadlike neurites and astrocytic plaques

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Question 1: Correct answer and rationale: D. The second consensus panel clarified that the pathognomonic lesion of must include ptau aggregates in neurons, with or without astrocytes, in the cortical gray matter at the depth of a sulcus (reference 10)

Question 2: Correct answer and rationale: C. Although not included in the consensus conference cases, there are many examples of mild CTE with perivascular CTE lesions in the banks of the cortical gyri, hippocampal CA fields, entorhinal cortex or amygdala. In other words, not all perivascular lesions in CTE are found at the depths of the cerebral cortex and should still be considered diagnostic for CTE (manuscript in preparation).

Question 3: Correct answer and rationale: C. The ptau neurites in CTE are predominantly dotlike and may be clustered around vessels. This is a prominent feature in early and mild CTE. Astrocytic ptau in CTE includes thorn-shaped astrocytes in the subpial region and granular fuzzy astrocytes in the cortical gray matter. Granular fuzzy astrocytes accumulate with age in CTE and are found most often in brain donors who die after the age of 60.(reference 9)