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Chronic Lymphocytic Leukemia Infiltrating in the Brain

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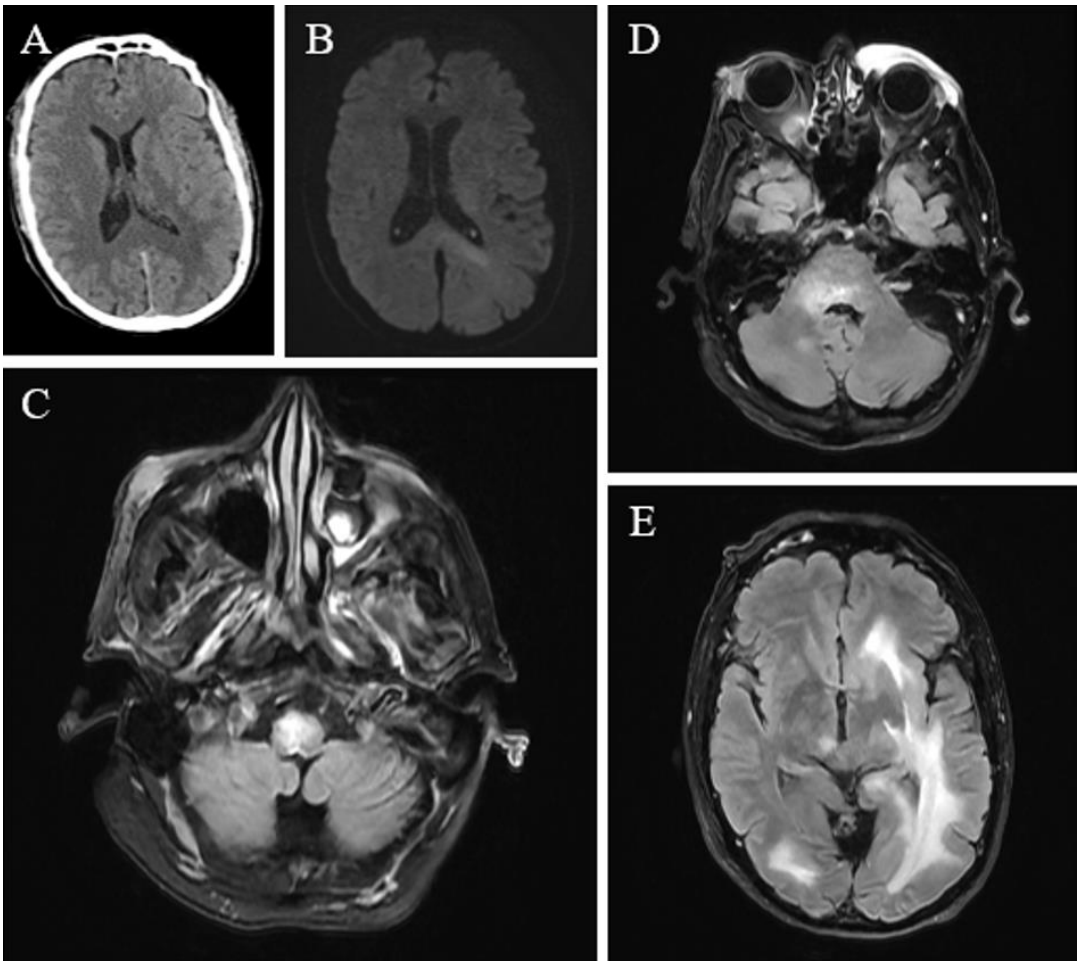

Figure 1A: Non-contrast head CT scan without significant abnormality. B) Diffusion-weighted MRI with increased signal in the splenium of the corpus callosum on the left without diffusion restriction on apparent diffusion coefficient map. C-E) FLAIR sequences demonstrating patchy T2 hyperintensities in the white matter and brainstem. There was no associated contrast enhancement.

Clinical Image

A 72 year-old man presented to the emergency department with two weeks of poor oral intake and progressive confusion. Two years prior, he was found to have a lymphocytosis and was diagnosed with chronic lymphocytic leukemia (CLL). Fluorescence in situ hybridization of CLL cells showed trisomy 12 in 32% of nuclei without TP53 or IGHV mutations. CT scan of the head was normal (Figure 1A) and CT angiogram of the head/neck showed patent vasculature. Transthoracic echocardiogram showed left ventricular enlargement and apical ballooning, concerning for stress-induced cardiomyopathy.

Brain MRI showed patchy T2 hyperintense signal involving the bilateral cerebral hemispheres, brainstem, and right cerebellum (Figure 1B-E). Lumbar puncture revealed 31 total nucleated cells (89% lymphocytes), protein of 75 mg/dL, and glucose of 75 mg/dL (serum glucose 148 mg/dL). Cerebrospinal fluid (CSF) flow cytometry was positive for malignant CD5+ B cells, consistent with CLL. CSF infectious studies resulted positive for human herpesvirus 6 and Ebstein-Barr virus polymerase chain reaction. Brain pathology obtained through needle biopsy confirmed perivascular CLL infiltrates of dimly CD20+ B cells with weak coexpression of PAX5, CD5, and CD23. There was no pathologic evidence of high-grade transformation or infection. Despite treatment with Bruton tyrosine kinase inhibitor, zanubrutinib, and initial radiographic response, he worsened, and care was withdrawn.

Symptomatic CNS involvement by CLL is extremely rare but portends a poor prognosis (survival in months) when abnormalities are extensive. Clearance of CSF from CLL after treatment and limited leptomeningeal involvement may be associated with better overall survival.