Arnold-Chiari Type I Manifesting as Bipolar Disorder

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Arnold-Chiari malformation is a group of congenital disorders with 4 subtypes differentiated by severity and clinical features. Arnold-Chiari malformation type I (ACM-I) is the most common and is defined by the cerebellar tonsil herniating caudally into the foramen magnum. ACM-I usually features various symptoms that are manifest by resulting cranial neuropathies, increased intracranial pressure, and cerebellar dysfunction in the earlier years of life.[1] However, asymptomatic cases have also been reported to become symptomatic years later.[2] Several cases of psychiatric illness in association with ACM-I are reported in the literature.[3–8] We present, to our knowledge, the first case report of bipolar disorder in association with Arnold-Chiari malformation.

Case Report

Mr A was a 32-year-old man with no significant medical history who was initially admitted to our psychiatric unit after the court found him to be unfit to stand trial for misdemeanor trespassing secondary to his manic symptoms. He presented with elated mood, rapid pressured speech, and grandiose delusions. Mr A claimed he had earned a bachelor's degree in chemical engineering and had worked at an executive level for 2 major oil companies. Mr A also stated that he left both of these jobs because of their "direct connection with Osama Bin Laden" and had been moving to different states out of fear that the CIA was continually monitoring his whereabouts via a computer chip in his brain.

Mr A's psychiatric history revealed 1 prior psychiatric admission more than 10 years ago for mania. He reported no psychoactive substance or alcohol abuse. At admission to the psychiatric unit, a complete medical workup was performed, and all laboratory results were within normal limits, which included a negative urine toxicology screen. His brain computed tomography scan showed cerebellar tonsils herniating 0.5 cm below the foramen magnum, which was consistent with ACM.[9] There were no clinically significant physical signs or symptoms. While in the psychiatric unit, the patient refused to take any psychotropic medication. His psychiatrist brought this refusal to court to obtain medication over objection. The judge, however, found Mr A to not be a danger to himself or others and ordered him discharged with no medications.

Five days after discharge, he presented to the walk-in clinic with the same psychiatric symptoms and continued to refuse medication treatment. He also refused to provide any contact information for fear of leaving trails for the CIA. He refused further care.

Discussion

Previous case reports that associate ACM-I with other psychiatric disorders suggest that ACM damages the structural integrity of the cranial system associated with controlling our mood and thought process. Chisholm et al[4] suggested that psychiatric symptoms may be a result of ACM-I acting as a catalyst for those already susceptible. ACM-I has also been proposed to be related to anxiety by burdening the brain stem, which holds the centers that control the noradrenergic and serotonergic systems at the locus ceruleus and median raphae, respectively. Low activity of both norepinephrine and serotonin have also been consistently linked to bipolar disorder.[10] In our case report, the finding of ACM-I is consistent with the hypothesis of abnormal functioning of brain circuits that involve serotonin and norepinephrine promoting the psychiatric manifestations. The onset of Mr A's manic symptoms and the incidental findings of ACM-I suggest a parallel correlation.

ACM-I is an elusive diagnosis because patients often remain physically asymptomatic until discovered incidentally. Our case report highlights the importance of considering neurologic causes manifesting as psychiatric symptoms.

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