CASE REPORT

DOI: 10.5336/caserep.2018-63478

Neurofibromatosis Type-1 with Unidentified Bright Objects in Advancing Age

Buse Rahime HASIRCI BAYIR[a],
Gizem GÜRSOY[b],
Mehmet GENCER[a],
Şirin YAŞAR PEKCAN[c],
Hülya TİRELİ[a]

[a]Clinic of Neurology, Haydarpaşa Numune Training and Research Hospital, İstanbul, TURKEY
[b]Clinic of Neurology, Şemdinli State Hospital, Hakkari, TURKEY
[c]Clinic of Dermatology, Haydarpaşa Numune Training and Research Hospital, İstanbul, TURKEY

Received: 26.10.2018
Received in revised form: 24.01.2019
Accepted: 04.02.2019
Available online: 20.02.2019

Correspondence:
Gizem GÜRSOY
Şemdinli State Hospital, Clinic of Neurology, Hakkari, TURKEY
dr_gzm@hotmail.com

ABSTRACT Neurofibromatosis type 1 (NF1) is the most common autosomal dominant neurocutaneous syndrome. Unidentified bright objects (UBOs) are the most common neuroimaging feature of NF1 and usually expected to disappear in adulthood. In our case, we wanted to draw attention to the fact that some of the UBOs can continue in adulthood without any clinic signs.

Keywords: Neurofibromatosis type 1; unidentified bright objects; advancing age; cognitive dysfunction

Neurofibromatosis type 1 (NF1) is the most common autosomal dominant neurocutaneous syndrome and affecting approximately 1 in 2700 newborns.[1] NF1 has high variability of expression, for that reason different clinical manifestations are seen on patients with the same NF1 gene mutation. Unidentified bright objects (UBOs) which is the most common neuroimaging feature of NF1, especially in childhood.[2] Generally, UBOs are transient and disappear into adulthood but some of them persist.[3] We discuss the neuroimaging findings of 52-year-old man with NF1 who demonstrated UBOs on the right side of the hemispheric white and gray matter.

CASE REPORT

52-year-old right handed man referred for the complaint of dizziness to Haydarpaşa Numune Training and Research Hospital Neurology Service. He did not have NF1 diagnosis before. However, he represented clinical fetaures convenient with NF1 such as axillary and inguinal freckling, café au lait spots, Lisch nodules, neurofibromas. In family history, his mother, who had died, had neurofibromas and other clinical findings not known. As a result of evaluations, NF1 was detected in his two sisters and daughter who were not diagnosed before. In neurological examination, he had a complaint of dizziness which increased with movement, but the complaint was existed at rest. Cognitive functions, cerebellar tests and the rest of examination was normal, he had no ataxia or gait abnormalities.

Magnetic resonance imaging (MRI) demonstrated hyperintense foci, termed UBOs or focal areas of signal intensity (FASI) on T2 weighted Figure 1, and fluid attenuated inversion recovery (FLAIR) MRI scans (Figure 2). They were isointense on T1 Figure 3, and without contrast enhancement (Figure 4). UBOs were found in cortico-subcortical region of fronto-parietal white matter. A consent form was obtained from the participant.

DISCUSSION

NF1 is related with somewhat neuroimaging findings such as white and gray matter volumetric changes.[4] UBOs are the most common neuroimaging feature in NF1 patients which frequently presented in thalamus, internal capsule, basal ganglia, brain stem, cerebellum and subcortical hemispheric white matter.[2,5] These lesions indicate high signal on T2 and FLAIR sequences, isointense to hyperintense on T1, no contrast enhancement and no mass effect.[3] UBOs are defined by vacuolar/spongiotic changes of myelin without inflammation and no marked demyelinization in the around tissue.[6] UBOs noted benign and generally transient which happened in patients with 4-12 aged.[3] Expecting to regress in adulthood and not associated

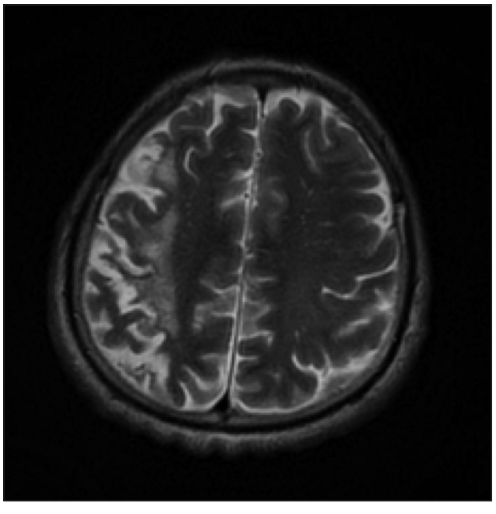

FIGURE 1: Axial non-contrast T2-weighted MRI reveals unidentified bright objects (UBOs) in cortico-subcortical region of fronto-parietal white matter.

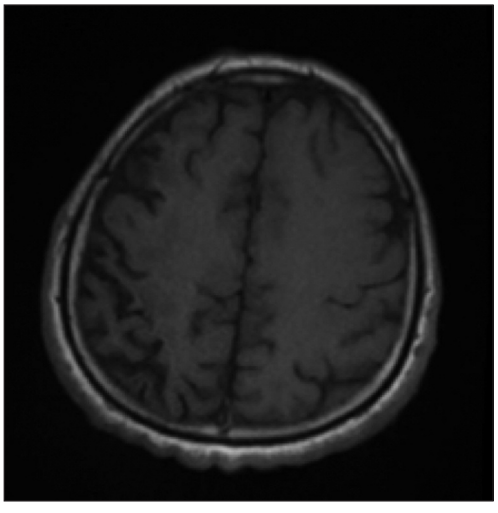

FIGURE 3: Unidentified bright objects (UBOs) were seen isointense on axial non-contrast T1-weighted MRI.

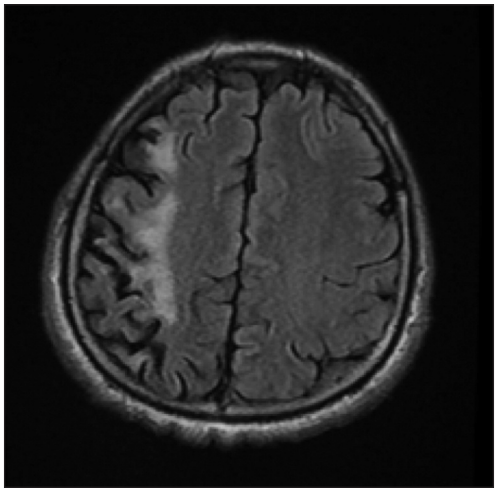

FIGURE 2: Fluid attenuated inversion recovery (FLAIR) MRI scan shows hyperintense foci in cortico-subcortical region of fronto-parietal white matter.

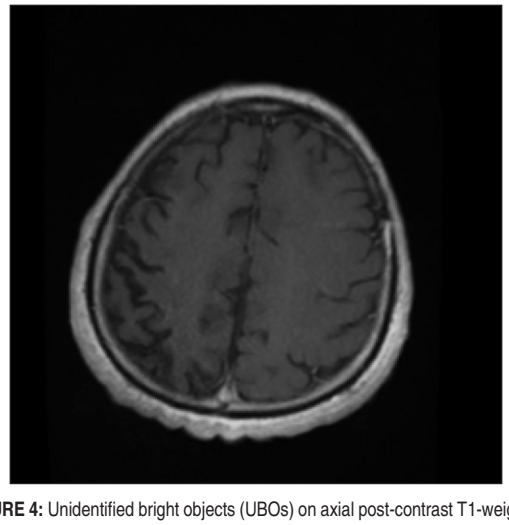

FIGURE 4: Unidentified bright objects (UBOs) on axial post-contrast T1-weighted MRI demonstrated no contrast enhancement.

with focal neurological deficits, some persist and their presence, number and location correlated with cognitive dysfunction in recent studies.[7] Barbier et al. reported that in 50% to 100% of the NF1 patients, MRI shows hyperintensities on T2-weighted sequences which are associated with learning disabilities.[8] In the study of Cabellero et al., 31 patients with the NF1 were evaluated, 10% of patients had mild intellectual disability and UBOs were found in most of this subgroup.[9] In our case UBOs were found in cortico-subcortical region of fronto-parietal white matter. Despite being seen in advanced age, they did not cause cognitive dysfunction. Mini Mental State Examination (MMSE) score was 30.

Optic nerve gliomas, sphenoid wing dysplasia, parenchymal gliomas, dural ectasia of the optic nerve sheath and spinal canal are the common manifestations central nervous system manifestations which were not seen in our patient.

Our case highlights the importance of presence, number and location of UBOs in advancing age without cognitive dysfunction. Long term prospective studies can express the reasons of regression of UBOs as age progresses and their relation with cognitive functions.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Buse Rahime Hasırcı Bayır;* ***Design:*** *Gizem Gürsoy;* ***Control/Supervision:*** *Mehmet Gencer;* ***Data Collection and/or Processing:*** *Şirin Yaşar Pekcan;* ***Analysis and/or Interpretation:*** *Hülya Tireli;* ***Literature Review:*** *Buse Rahime Hasırcı Bayır,* ***Writing the Article:*** *Buse Rahime Hasırcı Bayır;* ***Critical Review:*** *Hülya Tireli;* ***References and Fundings:*** *Gizem Gürsoy;* ***Materials:*** *Gizem Gürsoy.*

REFERENCES

1. Evans DG, Howard E, Giblin C, Clancy T, Spencer H, Huson SM, et al. Birth incidence and prevalence of tumor-prone syndromes: estimates from a UK family genetic register service. Am J Med Gene A. 2010;152(2):327-32. [Crossref] [PubMed]
2. Gonen O, Wang ZJ, Viswanathan AK, Molloy PT, Zimmerman RA. Three-dimensional multivoxel proton MR spectroscopy of the brain in children with neurofibromatosis type 1. AJNR Am J Neuroradiol. 1999;20(7):1333-41.
3. Hegde AN, Mohan S, Lath N, Lim CC. Differential diagnosis for bilateral abnormalities of the basal ganglia and thalamus. Radiographics. 2011;31(1):5-30. [Crossref] [PubMed]
4. Greenwood RS, Tupler LA, Whitt JK, Buu A, Dombeck CB, Harp AG, et al. Brain morphometry, T2-weighted hyperintensities, and IQ in children with neurofibromatosis type 1. Arch Neurol. 2005;62(12):1904-8. [Crossref] [PubMed]
5. Billiet T, Mädler B, D'Arco F, Peeters R, Deprez S, Plasschaert E, et al. Characterizing the microstructural basis of "unidentified bright objects" in neurofibromatosis type 1: a combined in vivo multicomponent T2 relaxation and multi-shell diffusion MRI analysis. Neuroimage Clin. 2014;4:649-58. [Crossref] [PubMed] [PMC]
6. DiPaolo DP, Zimmerman RA, Rorke LB, Zackai EH, Bilaniuk LT, Yachnis AT. Neurofibromatosis type 1: pathologic substrate of high-signal-intensity foci in the brain. Radiology. 1995;195(3):721-4. [Crossref] [PubMed]
7. Piscitelli O, Digilio MC, Capolino R, Longo D, Di Ciommo V. Neurofibromatosis type 1 and cerebellar T2-hyperintensities: the relationship to cognitive functioning. Dev Med Child Neurol. 2012;54(1):49-51. [Crossref] [PubMed]
8. Barbier C, Chabernaud C, Barantin L, Bertrand P, Sembely C, Sirinelli D, et al. Proton MR spectroscopic imaging of basal ganglia and thalamus in neurofibromatosis type 1: correlation with T2 hyperintensities. Neuroradiology. 2011;53(2):141-8. [Crossref] [PubMed]
9. Jiménez Caballero PE, López Espuela F, Portilla Cuenca JC, Romero Sevilla RM, Fermín Marrero JA, Casado Naranjo I. Clinical and neuroradiological signs in adults with type 1 neurofibromatosis. Neurologia. 2013;28(6):361-5. [Crossref] [PubMed]