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INTRODUCTION AND AIM

Acute Demyelinating Encephalomyelitis (ADEM) is a rare inflammatory disease of the CNS, characterized by altered consciousness and sometimes focal neurological signs. While ADEM is well-studied in children there is limited research in adults. Recently, a new subgroup of patients with antibodies against proteolipid protein 1 (PLP1) has been identified, some of whom meet ADEM criteria, but the prevalence of these antibodies in ADEM is still unknown. In the present study, we aim to define the serological profile of ADEM patients and identify its distinctive features in children and adults.

MATERIAL AND METHODS

We retrospectively screened 41 cases of ADEM: 23 pediatric (56%) and 18 adults (44%). We collected clinical information via clinical records. In patients with available samples, we performed a serological screening including MOG-IgG, AQP4-IgG, GFAP-IgG, PLP1-IgG cell based assay (CBA) and tissue-based assay (TBA) on rat brain slices.

RESULTS

The median age at onset was 23,65 years (0,13-76,27), and 23 patients (56.1) were classified as pediatric onsets. Adults had autoimmune comorbidities more commonly than pediatric patients ($p=0,037$). Pediatric patients presented more frequently with **optic neuritis** either mono or bilateral ($p=0,047$), while adults with **myelitis** ($p=0,029$), cranial **neuropathy** ($p=0,019$), **peripheral nerve involvement** ($p=0,003$), and **sensory and sphincteric** symptoms ($p<0,001$ for both) [Fig. 2A].

MOG-IgG were found in 17/36 patients tested (47.2%), and **PLP1-IgG** in 5/27 (18.5%). Both autoantibodies were tested on **CBA**. MOG-IgG were more common in pediatric patients (15/23 vs 2/18, $p=0,013$) whereas PLP1-IgG slightly more common in adults, albeit not significantly (2/20 vs 3/7, $p=0,219$) [Fig. 1A]. 22 patients (53,6%) were tested on **TBA**. 4 assays resulted positive (18.2%), 3 in adult cohort and 1 in pediatric cohort. 2/4 TBA showed white matter staining, the other two showed different patterns. Not significant differences were found in TBA assessment between the two cohorts. [Fig. 1B].

As for **treatment** all adults received IV steroids in the acute phase, for pediatric patients OCS only was preferred ($p=0,01$). At least 3 months OCS in adults was performed for maintenance more often ($p=0,044$).

Relapses were observed in 15/35 patients (11 adults vs 4 pediatrics) with a median number of relapses of 1 (0-9) in adults vs 0 (0-1) in children ($p=0,014$) after a median follow-up of 9.93 months (0,04-345,6) [Fig. 2B].

In both cohorts, **EDSS and mRS** outcomes improved at discharge (Adults: EDSS $p=0,034$, mRS $p=0,001$ vs Pediatric EDSS $p=0,027$, mRS $p<0,001$). Pediatrics had an additional improvement at last follow-up compared to discharge not shown in adults (Adults: EDSS $p=1,0$, mRS $p=0,856$ vs Pediatric EDSS $p=0,034$, mRS $p=0,003$) [Fig. 2C].

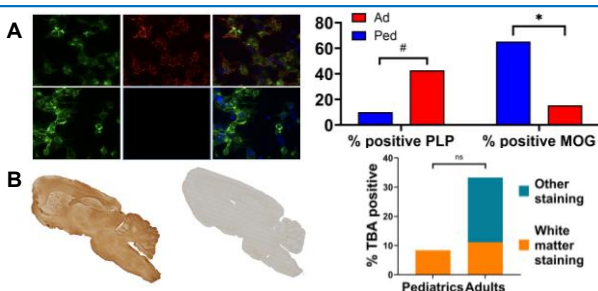


Figure 1. Laboratory testing. (A) Example of PLP1-CBA and comparison of positive patients of PLP1 and MOG-IgG between adults and pediatric ADEM; (B) Example of white matter staining on TBA and comparison of positive patients on TBA between adults and pediatric ADEM.

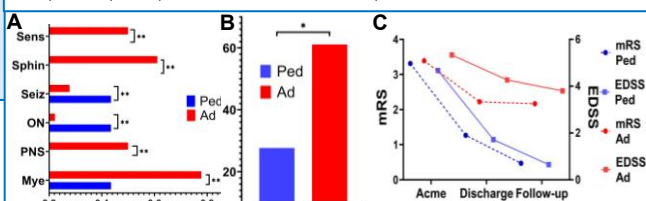


Figure 2. Clinical characteristics of the cohort. (A) Clinical symptoms at onset comparison in both cohorts; (B) relapses registered comparison in both cohorts; (C) Clinical outcomes at onset, discharge and at last visit follow-up.

CONCLUSIONS

Adult-onset ADEM exhibited distinct features compared to pediatric cases, including a worse prognosis and lower frequency of MOG-IgG. PLP1 antibodies can be found in a group of patients fulfilling ADEM criteria. Notably, the presence of white matter staining in a subgroup of these patients is suggestive of still uncharacterized antibodies.