DISEASE BURDEN OF AROMATIC L-AMINO ACID DECARBOXYLASE (AADC) DEFICIENCY: HEALTHCARE RESOURCE USE (HCRU) OVERALL AND BY MOTOR MILESTONE ACHIEVEMENT

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1. Background and objective

- Aromatic l-amino acid decarboxylase (AADC) deficiency is a rare neurological condition that affects neurotransmitters production and triggers motor, cognitive and autonomic symptoms[1].
- Healthcare resource utilization (HCRU) information for this rare disease is scarce but required for economic evaluations.
- Therefore, the aim of this multi-country study was to generate data on the HCRU of patients with AADC deficiency.

2. Methods

- A case study questionnaire was developed based on data published in literature and clinician input capturing information about individuals with AADC deficiency, disease symptoms and HCRU related to the management of the disease.
- The questionnaires were completed by experts with experience in treating patients with AADC deficiency based on information available in the patients' medical records prior to a telephone interview.

3. Results

- Eleven clinicians involved in the management of patients with AADC deficiency participated in the interviews (6 from France, 4 from Italy and 1 from Spain) and provided case study surveys for 20 patients with AADC deficiency (male: 60%) with a median (IQR) duration of follow-up of 5.0 (2.0 to 7.5) years.
- In total, 11 different medical specialties and more than five types of paramedical support contributed to the management of these patients. Furthermore, more than ten types of medical procedures and nine different laboratory tests were needed in one year. Hospitalizations and A&E visits were frequent. Medical devices were mostly needed among patients without motor function or with head control only (Table 1).
- Patients with AADC deficiency – regardless of their best achieved motor milestone – require a wide range of healthcare specialists, paramedical support, hospitalization, A&E visits, medical procedures, and laboratory tests (Table 1).

Table 1. Annual Frequency of Healthcare Resource Use According to Best Achieved Motor Milestone[a]

Healthcare resource	Walking assisted or unassisted (n = 10)	Sitting unassisted or standing with support (n = 2)	No motor function or full head control only (n = 8)	Overall (n = 20)
Healthcare professionals[b]				
Neurologist Visits, mean (SD)	8 (80) 2.1 (0.4)	2 (100) 2.0 (0)	7 (88) 2.9 (1.1)	17 (85) 2.4 (0.8)
General practitioner Visits, mean (SD)	8 (80) 1.8 (0.8)	0	6 (75) 2.8 (1.3)	14 (70) 2.3 (1.1)
Pediatrician Visits, mean (SD)	4 (40) 4.0 (5.3)	2 (100) 2.0 (0)	3 (38) 4.0 (0)	9 (45) 3.6 (3.4)
Psychiatrist Visits, mean (SD)	6 (60) 10.3 (20.5)	0	2 (25) 2.0 (0)	8 (40) 8.2 (17.7)
Gastroenterologist Visits, mean (SD)	2 (20) 1.5 (0)	0	3 (38) 5.0 (6.1)	5 (25) 3.6 (4.7)
Orthopedic surgeon Visits, mean (SD)	1 (10) 2.0 (–)	0	1 (13) 1.0 (–)	2 (10) 1.5 (0.7)
Ophthalmologist Visits, mean (SD)	1 (10) 1.0 (–)	0	3 (38) 2.0 (1.0)	4 (20) 1.8 (1.0)
Geneticist Visits, mean (SD)	0	1 (50) 1.0 (–)	0	1 (5) 1.0 (–)
Pulmonologist Visits, mean (SD)	0	1 (50) 1.0 (–)	0	1 (5) 1.0 (–)
Endocrinologist (adult or pediatric) Visits, mean (SD)	0	1 (50) 1.0 (–)	0	1 (5) 1.0 (–)
Otolaryngologist Visits, mean (SD)	1 (10) 1.0 (–)	0	0	1 (5) 1.0 (–)
Paramedical support[b]				
Physiotherapist Visits, mean (SD)	5 (50) 53.3 (72.4)	1 (50) 156.0 (–)	6 (75) 113.1 (39.0)	12 (60) 91.7 (62.4)
Speech therapist Visits, mean (SD)	4 (40) 91.0 (49.8)	0	2 (25) 65.2 (55.3)	6 (30) 82.4 (47.7)
Occupational therapist Visits, mean (SD)	1 (10) 52.0 (–)	0	3 (38) 104.7 (88.9)	4 (20) 91.5 (77.2)
Nurse Visits, mean (SD)	2 (20) 1.5 (0)	0	0	2 (10) 1.5 (0)
Dietitian Visits, mean (SD)	1 (10) 4.5 (–)	0	2 (25) 4.0 (0.0)	3 (15) 4.2 (0.3)
Other paramedical support Visits, mean (SD)	5 (50) 2.2 (0.5)	0	3 (38) 18.7 (29.0)	8 (40) 8.4 (17.7)

Table 1 (cont.) Annual Frequency of Healthcare Resource Use According to Best Achieved Motor Milestone[a]

Healthcare resource	Walking assisted or unassisted (n = 10)	Sitting unassisted or standing with support (n = 2)	No motor function or full head control only (n = 8)	Overall (n = 20)
Hospital stays/A&E visits				
Hospitalization (>1 day) Visits, mean (SD)	5 (50) 1.8 (0.5)	2 (100) 3.0 (1.4)	7 (88) 2.1 (1.4)	14 (70) 2.1 (1.1)
A&E visits without hospitalization Visits, mean (SD)	0	1 (50) 2.0 (–)	5 (63) 2.0 (0.7)	6 (30) 2.0 (0.6)
Medical devices				
Manual wheelchair Visits, mean (SD)	0	0	1 (13) 0.5 (–)	1 (5) 0.5 (–)
Verticalizers Visits, mean (SD)	0	0	4 (50) 0.5 (0.1)	4 (20) 0.5 (0.1)
Electric wheelchair Visits, mean (SD)	0	0	2 (25) 0.5 (0)	2 (10) 0.5 (0)
Upper limb splints Visits, mean (SD)	0	1 (50) 1.0 (–)	0	1 (5) 1.0 (–)
Cough assist Visits, mean (SD)	0	0	1 (13) 0.3 (–)	1 (5) 0.3 (–)
Other medical device Visits, mean (SD)	1 (10) 1.0 (-)	0	4 (50) 2.8 (1.3)	5 (25) 2.4 (1.3)
Medical procedures				
Electrocardiography Visits, mean (SD)	7 (70) 1.9 (0.4)	1 (50) 2.0 (–)	3 (38) 2.0 (0)	11 (55) 1.9 (0.3)
Magnetic resonance imaging Visits, mean (SD)	4 (40) 0.4 (0.2)	2 (100) 2.0 (0)	3 (38) 0.9 (0.9)	9 (45) 0.9 (0.8)
Electroencephalography Visits, mean (SD)	1 (10) 1.0 (–)	2 (100) 2.0 (0)	2 (25) 3.0 (1.4)	5 (25) 2.2 (1.1)
Spine X-ray Visits, mean (SD)	2 (20) 0.8 (0.4)	0	2 (25) 1.0 (0)	4 (20) 0.9 (0.3)
Hip X-ray Visits, mean (SD)	0	0	2 (25) 1.0 (0)	2 (10) 1.0 (0)
Pelvis X-ray Visits, mean (SD)	0	0	2 (25) 1.0 (0)	2 (10) 1.0 (0)
Lumbar puncture Visits, mean (SD)	1 (10) 0.3 (–)	1 (50) 2.0 (–)	0	2 (10) 1.2 (1.2)
Barium swallow test Visits, mean (SD)	0	1 (50) 0.5 (–)	1 (13) 1.5 (–)	2 (10) 1.0 (0.7)
Bruininks–Oseretsky test of motor proficiency Visits, mean (SD)	0	2 (100) 1.5 (0.7)	0	2 (10) 1.5 (0.7)
Polysomnography Visits, mean (SD)	1 (10) 1.0 (-)	0	0	1 (5) 1.0 (-)
Other medical procedure Visits, mean (SD)	3 (30) 1.7 (0.6)	0	0	3 (15) 1.7 (0.6)
Laboratory tests				
Blood test Visits, mean (SD)	6 (60) 1.7 (0.5)	2 (100) 1.5 (0.7)	4 (50) 1.8 (0.5)	12 (60) 1.7 (0.5)
Prolactin level Visits, mean (SD)	7 (70) 1.6 (0.5)	1 (50) 1.0 (–)	4 (50) 2.0 (0)	12 (60) 1.7 (0.5)
Urine test Visits, mean (SD)	6 (60) 1.7 (0.5)	2 (100) 1.5 (0.7)	3 (38) 2.0 (0)	11 (55) 1.7 (0.5)
Plasma iron level Visits, mean (SD)	6 (60) 1.7 (0.5)	1 (50) 1.0 (–)	4 (50) 1.8 (0.5)	11 (55) 1.6 (0.5)
Coagulation test Visits, mean (SD)	5 (50) 1.8 (0.5)	0	3 (38) 2.0 (0)	8 (40) 1.9 (0.4)
Urine vanillactic acid level Visits, mean (SD)	0	2 (100) 1.0 (0)	1 (13) 1.0 (–)	3 (15) 1.0 (0)
Glycaemia Visits, mean (SD)	0	0	1 (13) 1.0 (–)	1 (5) 1.0 (–)
Folic acid level in cerebrospinal fluid Visits, mean (SD)	1 (10) 0.3 (–)	0	0	1 (5) 0.3 (–)
Plasma AADC level Visits, mean (SD)	1 (10) 0.3 (–)	0	0	1 (5) 0.3 (–)

Notes: Data are n (%) unless otherwise indicated. [a]Not all patients provided data for the frequency of healthcare use. [b]Results are not mutually exclusive.

Abbreviations: AADC, aromatic L-amino acid decarboxylase; A&E, accident and emergency; SD, standard deviation.

4. CONCLUSION

- These data show the high medical care and extensive use of HCRU are required to manage AADC deficiency.
- The results of this study may be useful to inform cost-effectiveness analysis for estimating the costs and benefits of treatments for AADC deficiency.

References

1. Wassenberg T, et al. Orphanet J Rare Dis. 2017 Jan 18;12(1):12..