Improving SMARD1 long-term outcome and quality of life: the role of a multidisciplinary setting

Bonanno C[1] , Sframeli M[2], Vita GL[2], Distefano MG[1] , La Rosa M[1], Barcellona C[1],Profazio C[2], Versaci A[3], Mercurio L[3], Gitto E[4], Romeo C[4], Vita G[1,2], Lunetta C[2], Messina S[1,2]

[1] Department of Clinical and Experimental Medicine, University of Messina, Messina, Italy
[2]NEMO SUD Clinical Centre for Neuromuscular Disorders, Messina, Italy
[3]Department of Emergency - University Hospital of Messina – Messina, Italy
[4] Department of Human Pathology of Adult and Evolutive Age, University Hospital of Messina, Messina, Italy

Introduction

Spinal muscular atrophy with respiratory distress type 1 (SMARD1) is an inherited rare infantile neuromuscular disorder resulting from recessive mutations in the *immunoglobulin mu-binding protein* (IGHMBP2) gene. Initially described as a variant of spinal muscular atrophy (SMA), SMARD1 is now recognized as a specific disease, having its own phenotype[1]. It is characterized by decreased fetal movements, low birth weight, symmetrical distal muscular weakness, muscle atrophy, peripheral sensory neuropathy, autonomic dysfunction, diaphragmatic palsy resulting in mechanical ventilation before to 13 months of age. It is considered a fatal infantile motor neuron disease and most of patients survive until the first year of life [2]. We report the case of an 8-year-old girl affected by SMARD1, who showed a relatively mild phenotype and an atypical long-term outcome.

Case report

♀, 8 years old patient with genetically confirmed SMARD1 diagnosed at the age of 2;

Clinical history :

• Since the age of 4 months, she had distal limb muscle atrophy and weakness.
•Delayed motor milestones.
• Maximal motor ability: Independent standing for a few seconds at the age of 3; walking using a rolling walker a 27 months (Fig.1- a, b) until 42 months old.

Respiratory involvement:

• At 6 months of age she was diagnosed with diaphragmatic palsy without any respiratory distress and up to 38 months of age overnight oximetry remained normal.
▪When she was 4 years old, nocturnal NIV was started and gradually improved until 24h NIV support with nasal mask interface, at the age of 6 years.

Clinical examination :

• Marked muscle weakness and wasting. Absent deep tendon reflexes. Hip dislocation. Hips, knees and ankles contractures and severe scoliosis and thoracolumbar kyphosis.
•Good interaction with the environment.
•Able to speak, hypophonic voice.
•Worsening dysphagia and gastroesophageal reflux in the last year, requiring a diet based on homogeneous consistency foods. Despite high-calorie supplements consumption, the patient was underweight (11 Kg) loosing 500g in a year.

Outcome

To avoid further weight loss and pulmonary complications due to dysphagia , the child underwent gastrostomy and Nissen fundoplication. She had an open surgery performed under general anesthesia without any complication. Two hours after, she was successfully extubated with a prompt pulmonary response, and placed on NIV with facial mask. A physiotherapeutic treatment was immediately initiated allowing the little patient to be placed back on NIV with her usual parameters and nasal mask just 24 hours after the surgery (Fig.2). The first days following the procedure, food administration through the gastrostomy was gradually improved reaching 1125 kcal/die at the discharge (weight gain: 2 Kg). Small tastings *per os* are still possible.

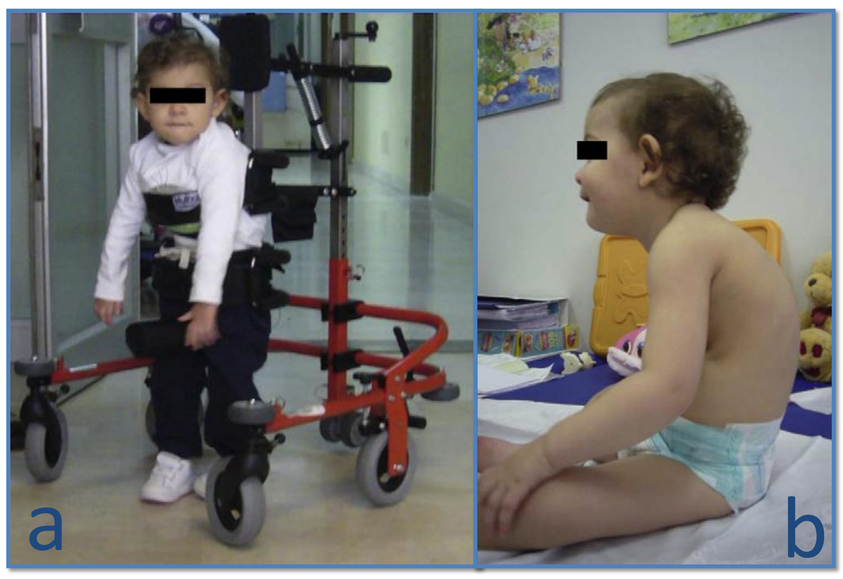

Fig.1- (a) Our little patient using a rolling walker at 27 months and in sitting position showing thoracolumbar kyphosis (b)[5].

Fig.2- F. at the age of 8 years old using NIV with nasal mask 4 days after surgery.
(Courtesy of Calà Scaglitta's family)

Conclusions

Only few reports in literature describe long survival in SMARD1 patients and all of them survived thanks to invasive mechanical ventilation [4]. This case represents a mild phenotype of SMARD1 and shows how a multidisciplinary setting, focusing on intensive and rehabilitative care, may surprisingly improve SMARD1 long-term outcome and quality of life.

References

1.Pierson TM et al. Infantile-onset spinal muscular atrophy with respiratory distress-1 diagnosed in a 20-year-old man. Neuromuscul Disord. 2011; 21: 353–355.
2.Kaindl AM et al. Spinal muscular atrophy with respiratory distress type 1 (SMARD1) J Child Neurol. 2008;23:199–204
3.Pitt M et al. Severe infantile neuropathy with diaphragmatic weakness and its relationship to SMARD1. Brain. 2003 Dec; 126(Pt 12):2682-92.
4. Rudnik-Schoneborn S et al. Long-term observations of patients with infantile spinal muscular atrophy with respiratory distress type I (SMARD1). Neuropediatrics,35(3) (2004), 174– 182.
5.Messina MF et al. Infantile spinal muscular atrophy with respiratory distress type I (SMARD 1): An atypical phenotype and review of the literature. Eur J Paediatr Neurol. 2012 Jan;16(1):90-4