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Picture of the month

Axial involvement as a prominent feature in *SMPX*-related distal myopathy

D. Salman[a,*], C. Bolano-Diaz[a], R. Muni-Lofra[a], K. Wong[a,b], M. Elseed[a], E Harris[a,b], J. Diaz-Manera[a], M. Guglieri[a], C. Marini-Bettolo[a], V. Straub[a], G. Tasca[a]

[a] *The John Walton Muscular Dystrophy Research Centre, Translational and Clinical Research Institute, Newcastle University and Newcastle Hospitals NHS Foundation Trust, Central Parkway, Newcastle upon Tyne, NE13BZ, UK*
[b] *Northern Genetics Service, Institute of Genetics Medicine, Newcastle upon Tyne, UK*

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A 78-year-old man with no family history of neuromuscular conditions presented with slowly progressive lower limb weakness with bilateral foot drop started in his late 40 s. After age 70 he developed proximal upper limb weakness with difficulties in raising his arms. On examination, he had severe bilateral weakness of ankle dorsiflexion, impairment in arm abduction (possible up to 80°), and mild bilateral scapular winging. Strength in distal upper limb muscles was preserved. Serum CK level was mildly elevated, and EMG was consistent with a myopathy. No information on a previously performed muscle biopsy was available.

He had been extensively studied with targeted gene panels covering *MYH7, CRYAB, MYOT, LDB3, DES, GNE, TTN,* and *VCP* to exclude the most common myofibrillar and distal myopathies, as well as with genetic testing for Facioscapulohumeral muscular dystrophy types 1 and 2. In light of the patient's Maltese origin, additional testing of the *SMPX* gene was requested and identified a pathogenic missense mutation c.233G>*A* (p.S78N), previously reported in distal myopathy in patients native to Malta [1]. Interestingly, a muscle MRI of the upper body showed significant fatty replacement of cervical and thoracic erector spinae muscles, from the C2 to T9 levels. An involvement of the inferior part of serratus anterior, similarly to what is seen in GNE myopathy [2,3] and likely contributing to scapular winging, was also detected (Fig. 1).

SMPX-related myopathy (MPD7, OMIM#301075) is a rare X-linked disorder described only in ten patients so far as an adult-onset distal myopathy. The description of our patient, showing significant although subclinical paravertebral muscle involvement also reported in one patient of the original cohort, adds to the phenotypic and imaging spectrum of the disease. *SMPX* gene testing should be considered in undiagnosed male patients with distal and axial weakness. In our case, geographic origin was also an important diagnostic clue.

* Corresponding author at: Clinical Research Associate, The John Walton Muscular Dystrophy Research Center Biomedicine West, Institute of Genetic Medicine, Newcastle University.
E-mail address: Doaa.salman@newcastle.ac.uk (D. Salman).

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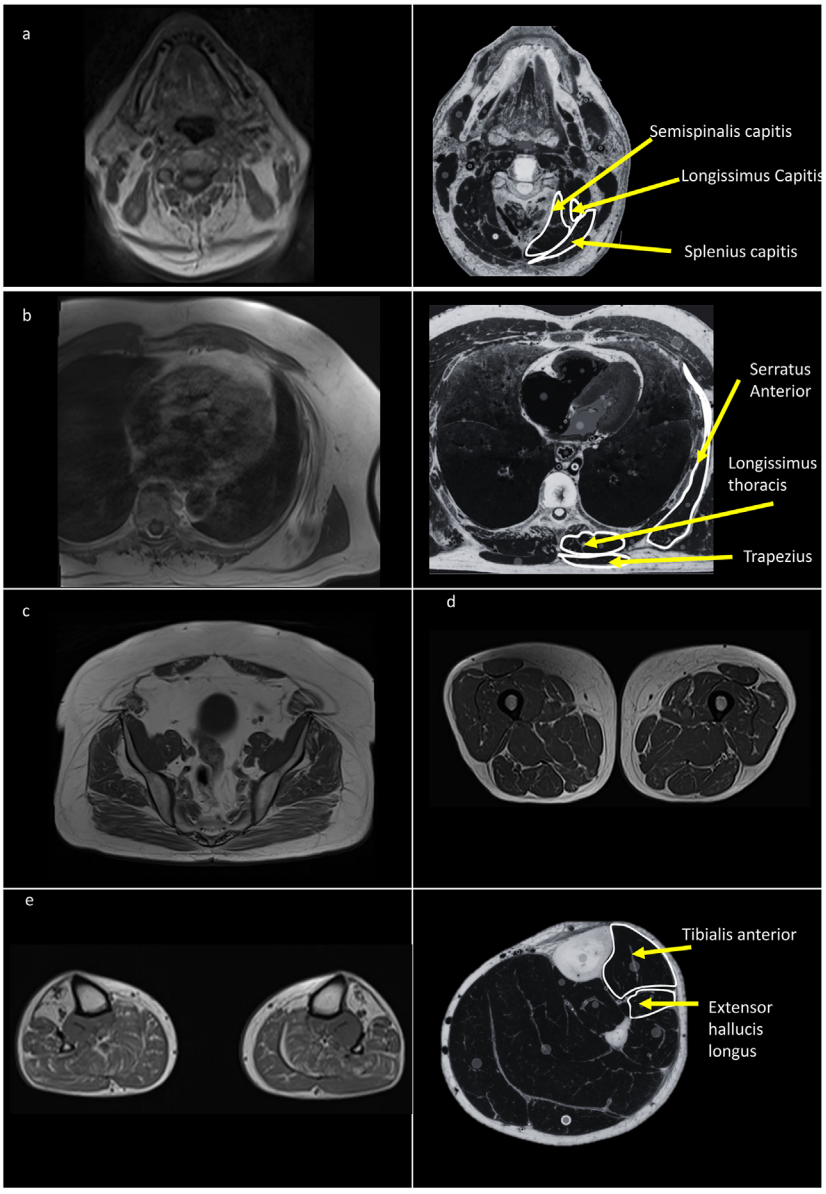

Fig. 1. T1-weighted axial MRI images of the neck (a), trunk (b), pelvis (c), thigh (d), and lower leg (e), at age of 78 years. At the C3 level, cervical paraspinal muscles showed extensive fat replacement (a), mirrored by the selective involvement of the longissimus thoracis alongside with the inferior part of serratus anterior and trapezius at the T6 level (b).
No major changes, clearly distinguishable from those age related, were noticed at pelvis and thigh level, except for an involvement of the gluteus minimus more on the right side (c), while severe fatty replacement of tibialis anterior and extensor hallucis longus with relative sparing of calf muscles were found in the leg e).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

D. Salman: Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **C. Bolano-Diaz:** Writing – original draft, Investigation. **R. Muni-Lofra:** Supervision. **K. Wong:** Investigation, Formal analysis. **M. Elseed:** Supervision. **E Harris:** Writing – review & editing, Supervision. **J. Diaz-Manera:** Supervision. **M. Guglieri:** Supervision. **C. Marini-Bettolo:** Validation, Supervision. **V. Straub:** Writing – review & editing, Visualization, Validation, Supervision. **G. Tasca:** Writing – review & editing, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Conceptualization.

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References

[1] Johari M, Sarparanta J, Vihola A, Jonson PH, Savarese M, Jokela M, et al. Missense mutations in small muscle protein X-linked (SMPX) cause distal myopathy with protein inclusions. Acta Neuropathol 2021;142(2):375–393.
[2] Torchia E, Lucchini M, Bortolani S, Monforte M, Garibaldi M, Mirabella M, et al. Upper body involvement in GNE myopathy assessed by muscle imaging. Neuromuscul Disord 2022;32(5):410–18.
[3] Tasca G, Monforte M, Iannaccone E, Laschena F, Ottaviani P, Leoncini E, et al. Upper girdle imaging in facioscapulohumeral muscular dystrophy. PLoS ONE 2014;9(6):e100292.