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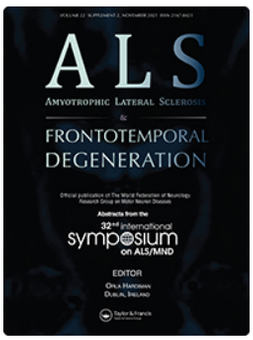

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combination to predict FVC by evaluating the correlations of different combinations of ABG parameters (carbon dioxide, pCO_2; carbonate, HCO_3^-) and respiratory symptoms (dyspnea and orthopnea were present if ALSFRS-r items 10 and 11 were <4, respectively) with FVC. Patients were grouped into 3 groups according to ABG values (group 1: normal ABG; group 2: either pCO_2 or HCO_3^- increased; group 3: both pCO_2 and HCO_3^- increased), to compare clinical features between patients with and without respiratory symptoms. For a proper comparison, general impairment was evaluated by ALSFRS-r score without the respiratory domain (ALSFRS-r36) and thus, disease progression rate as ΔALSFRS36.

Results: The best combination to predict FVC was: pCO_2 + HCO_3^- + ALSFRS-r item 10 ($R = 0.430$, $p < 0.001$). In all groups patients with dyspnea showed a more severe general impairment, a higher disease progression rate and lower FVC values. Patients with normal ABG complaining of dyspnea had a reduced survival in comparison with patients without dyspnea (0.91 years, IQR 0.46–1.91 vs 1.46 years, IQR 0.89–2.29, $p = 0.002$). Cognitive dysfunction did not influence the complaining of dyspnea (OR 1.009, 95% CI 0.837–1.215, $p = 0.927$). Among all groups patients with normal ABG and dyspnea showed the highest progression rate (fast progressors; ΔALSFRS36 = 0.86, IQR 0.44–1.25); on the other side, patients not complaining of dyspnea despite having a respiratory failure at ABG had the lowest progression rate (slow progressors; ΔALSFRS36 = 0.38, IQR 0.26–0.52).

Discussion: The ability of ABG to predict FVC increases by adding the clinical evaluation of dyspnea. At equal ABG values, the complaining of dyspnea is associated with lower FVC values. The presence of dyspnea differs according to disease phenotypes, being more frequently experienced by patients with a worse motor impairment and a faster disease progression. A close respiratory monitoring should be set up for fast progressors complaining of dyspnea to look for an initial diaphragm weakness and for slow progressors even without dyspnea because they could show a respiratory failure at ABG.

Conclusions: Combining ABG with clinical evaluation of dyspnea improves the ability to assess early respiratory dysfunction in ALS, especially in patients with bulbar or cognitive impairment.

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CMS-55 Development of the OptiCALS nutritional support intervention for people with amyotrophic lateral sclerosis

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Background: Weight loss is common in people with Amyotrophic Lateral Sclerosis (pwALS) and is a predictor of poor outcomes (1). There is encouraging evidence that increasing calorie intake may affect disease progression (2). Significant variability has been identified in the provision of nutritional management of pwALS across the UK (3). There is a need for evidence-based nutrition support interventions to improve the outcomes of pwALS.

Objective: To develop a complex nutrition support intervention to support pwALS to increase their calorie intake.

Methods and Results: A Portal Development Group (PDG), including academics, healthcare professionals (HCPs), web-developers and public involvement representation were tasked with developing an online portal to provide a personalised experience to pwALS including presenting individualised feedback on calorie intake and weight, and information on nutrition support strategies.

The online nutritional analysis software, myfood24, was integrated into the portal, allowing an individuals' calorie intake to be presented in real time. Intervention content was based on systematic reviews and interviews with pwALS, carers and HCPs identifying the key enablers and barriers to increasing calorie intake in pwALS, using the COM-B model as an overarching theoretical framework. These were then targeted by specific behaviour change techniques in the intervention. The intervention was developed through a series of 'think aloud' interviews with pwALS, carers and HCPs, across six iterations. The PDG made changes to the intervention between each iteration, in response to the feedback received. The online portal was further developed with three rounds of user testing, involving pwALS and their carers engaging with the portal for one month following being trained by HCPs. All participants and HCPs taking part in the user testing were interviewed, with their feedback being used to further refine the portal and training. The final portal, named OptiCALS, is now being evaluated in a multi-centre randomised controlled trial.

Discussion: The development of an online complex nutritional intervention requires significant time and resources. An iterative process of 'develop-test-listen-refine-repeat' involving effective communication with key stakeholders at all stages, is essential in helping to establish an intervention's acceptability and feasibility.

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