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P267 -Acute Effects of Haemodialysis on Skeletal Muscle Perfusion, Metabolism and Function: A Systematic Review

Ms Shatha Al Mushayt[1], Mrs. Samia Hussain
[1]*University Of Nottingham, Derby, United Kingdom,* [2]*Derby Hospitals NHS Foundation Trust, ,*

Introduction: The underlying mechanisms of skeletal muscle wasting in people receiving haemodialysis are complex. Hence, we performed a systematic review to summarise currently available evidence on the acute effects of the process of haemodialysis itself on skeletal muscle perfusion, metabolism and function.

Methods: A protocol was developed and published on the PROSPERO (CRD42018103682). A systematic search was carried out in the following databases: MEDLINE, PubMed, Cochrane, EMBASE, Scopus, and Web of Science. Citation, reference list and grey literature searches were also performed. Selection of studies was performed according to predefined eligibility criteria in two stages: Title, Abstract Review and Full-Text Review. Critical appraisal and risk of bias were assessed. Study selection and appraisal were performed by two reviewers with disagreements resolved by a third reviewer. A data extraction form tailored to the review question was designed.
Results: 1118 articles were screened, 65 full-text articles were retrieved for detailed review, and 12 were eligible for inclusion. Three additional articles were identified through reference list searches.
Perfusion studies: Skeletal muscle perfusion during dialysis was examined in two prospective studies. Both used near-infrared spectroscopy to measure blood flow and tissue oxygen saturation. One study reported improvements in skeletal muscle microcirculation and muscle oxygen consumption mVO2 over the HD session; in the other study an increase mVO2 was reported only in a subgroup with diabetes.
Metabolism studies: Acute effects of dialysis on skeletal muscle metabolism was examined in nine prospective studies, some which included tracer studies and muscle biopsy. A number of acute metabolic changes were reported (e.g. Caspase-3 activity, Polyubiquitin, BCKAD and Interleukin-6 protein increased after HD) as was a net negative protein balance over the dialysis session. Muscle ATP and ADP concentration did not change significantly during dialysis.
Physical Function: This was examined in four studies. One study assessing muscle strength before and after dialysis reported diverse results across the study group (some improved, some decreased and some were unchanged). A second study used EMG on the hand and leg muscles, with changes reported only for the hand muscle. Sit-To-Stand and Sit-To-Walk tests were assessed in two studies. One study reported a small (6%), yet significant, improvement in the number of stands following HD, whereas the other study reported a slower stand post-HD. Muscle mass was examined using ultrasonography and no significant difference after HD was noted.
Due to the nature of the studies all had small sample sizes; additionally, there were high risks of selection, measurement and confounding biases. Adequacy of study reporting was also variable.

Conclusion: Overall, gaps remain in our understanding of the acute effects of HD on skeletal muscle. This is particularly true for changes in perfusion and physical functioning, whilst there does appear to be an acute effect of dialysis on skeletal muscle metabolism, with increased inflammatory signalling and catabolism.