Reviewer's report

Title: Preoperative muscle weakness as defined by handgrip strength and postoperative outcomes: a systematic review.

Version: 2 Date: 26 November 2011

Reviewer: Richard Bohannon

Reviewer's report:

The authors, by and large, have done a good job incorporating the reviewers' comments. Nevertheless, I have additional recommendations that I consider essential or compulsory:

1) I previously referred to the authors noncomprehensive search. Specifically, they neither searched all of the relevant databases nor consulted an expert. While these shortcomings are not fatal, they should be acknowledged in the Discussion.

2) The Background continues to meander. My attempt at an improvement follows:

A substantial minority of patients sustain postoperative complications[1] and accelerated, post-hospital discharge mortality.[2] In surgical procedures known to have a mortality of greater than 5% in the UK, 80% of deaths occur among elderly patients (mean age 75 years) and or during emergency procedures, even though they account less than 15% of total procedures.[3] Physician- and patient-friendly, practical and inexpensive measurements are required to objectively risk-stratify and guide perioperative management for this cohort of patients. Measurements of exercise capacity and muscle strength are associated with increased all-cause and cardiovascular mortality in the general population.[4-7] However, the comprehensive assessment of cardiovascular reserve – most objectively using cardiopulmonary exercise testing[8] – is challenging for immobile patients, time-consuming, and costly to extend as a general screening tool to the wider, at-risk surgical population. By contrast handgrip strength is an inexpensive, objective bedside test which has established population norms[9-13] and has been extensively tested in a range of chronic general medical conditions.[14] It may reflect, in part, the association of impaired muscle strength with malnutrition[15] and cardiopulmonary or metabolic diseases.[4-7]

Hand grip strength is assessed by instructing the patient to keep their shoulders adducted and neutrally rotated, the arm in a vertical position, the wrist in a neutral position and to squeeze the grip with maximal strength. The highest result in a seated or semi-seated position may be used.[16, 17]Whether a robust relationship between preoperative handgrip strength and postoperative outcomes exists is unclear, since variable, and frequently retrospective, definitions of
postoperative morbidity have been employed as outcome.....

3) I suggest the first sentence of the Abstract be rewritten as follows:
Reduced muscle strength- commonly characterized by decreased handgrip strength compared to population norms- is associated with numerous untoward outcomes.

4) "Its" in the Conclusions of the Abstract does not need an apostrophe. It should be "its."

5) In what is now the second paragraph of the Background The authors describe the procedure for measuring handgrip strength. The procedure is consistent with that recommended by the ASHT, but researchers remain inconsistent in the manner in which they measure handgrip strength. I doubt that all the studies cited by the authors use the procedure described by the authors.

6) It's good that the authors added information on when handgrip strength was measured in the studies they cite. However, doing so as they do in the text is tedious. I suggest the presentation of details in a table and a summary in the text.

7) References 16 and 35 and references 9 and 38 are duplicative.

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I have no major competing interests. I consult with a company that manufactures a hand-grip dynamometer. However, neither the company nor I are likely to benefit from the publication of this article.