

Physiotherapy outcome measurements in coronary artery bypass surgery

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Introduction

- Studies investigating the effects of physiotherapy interventions following cardiac surgery have typically focused on rates of pulmonary complication as a primary outcome measure (Pasquina et al. 2003).
- A low and decreasing incidence in complication rates limits its utility as a determinant of the comparative efficacy of differing peri-operative physiotherapy protocols
- Measures of functional status, perceived health, exercise capacity and respiratory function, used collectively, may provide a more complete depiction of post-operative outcome.

Aim

- The current study aimed to investigate the feasibility of a three-fold approach to outcome measurement following coronary artery bypass surgery, incorporating sub-maximal exercise testing, lung function measurement and self-rated health scales.

Methodology

- 82 ambulant, English speaking patients, admitted to hospital for first-time, non-emergency coronary artery bypass surgery over a nine-month period performed, as able, a modified six-minute walk assessment (6MWA), a slow vital capacity manoeuvre (VC), and self-rated health and quality of life/recovery (EQ-5D, SF-36v2 and QoR-40) questionnaires.
- Tests were repeated on the day of discharge, and at four weeks following discharge from hospital.
- Results were analysed statistically using one-way ANOVA with repeated measures. Two sided-tests with a significance level of 5% were used throughout.

	Male (n = 74)	Female (n = 8)
Age (yr)	63.2 ± 9.1	60.5 ± 8.1
BMI (kg.m ⁻²)	28.5 ± 4.2	29.6 ± 3.8
NYHA I	21 (28%)	1 (13%)
NYHA II	26 (35%)	2 (25%)
NYHA III	8 (11%)	3 (38%)
NYHA IV	19 (26%)	2 (25%)
OPCAB 1-2	2 (3%)	2 (25%)
CABG 1-2	13 (18%)	0 (0%)
CABG 3-4	43 (58%)	5 (63%)
CABG > 4	16 (22%)	1 (13%)

Table 1: Study participants. BMI: Body mass index; NYHA: New York Heart Association (Class); OPCAB: Off-pump coronary artery bypass; CABG: Coronary artery bypass graft.



Photograph 1: The modified six-minute walk assessment. Patients were instructed to walk laps of an enclosed, air-conditioned corridor for 6 minutes, covering as much as distance as possible whilst exerting themselves at a perceived exertion of 3 or 4 out of 10 on a modified Borg RPE scale.

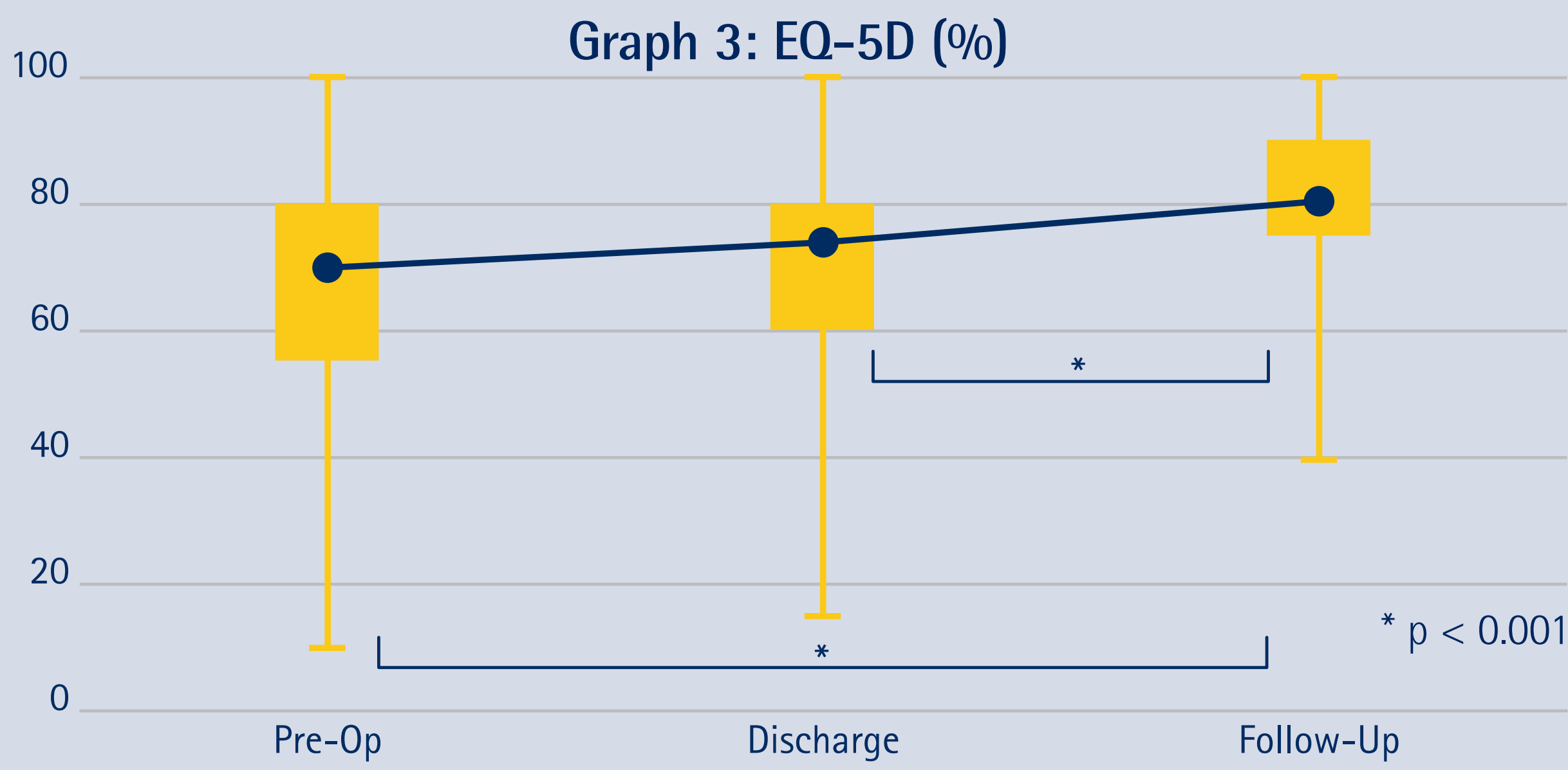
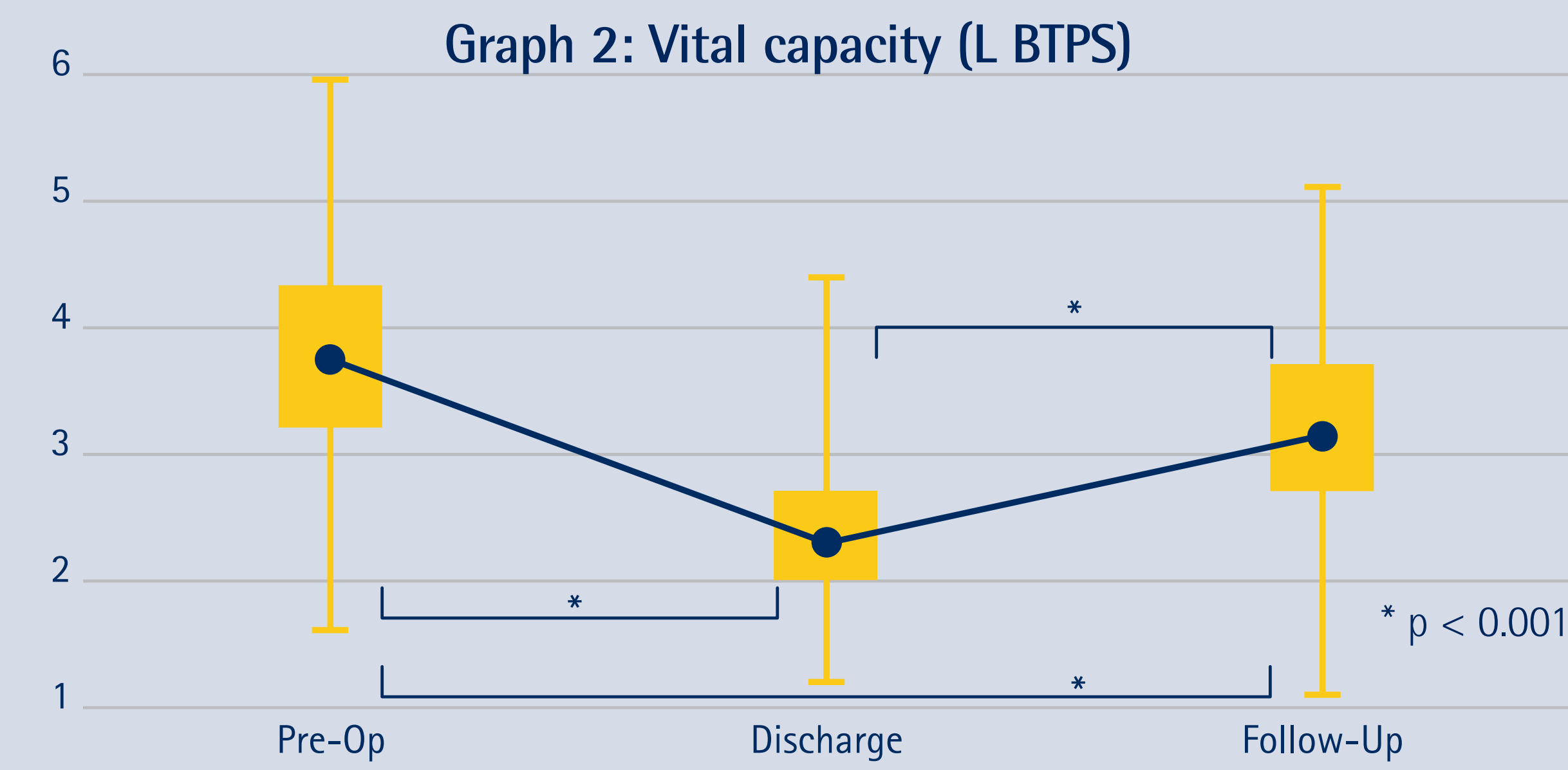
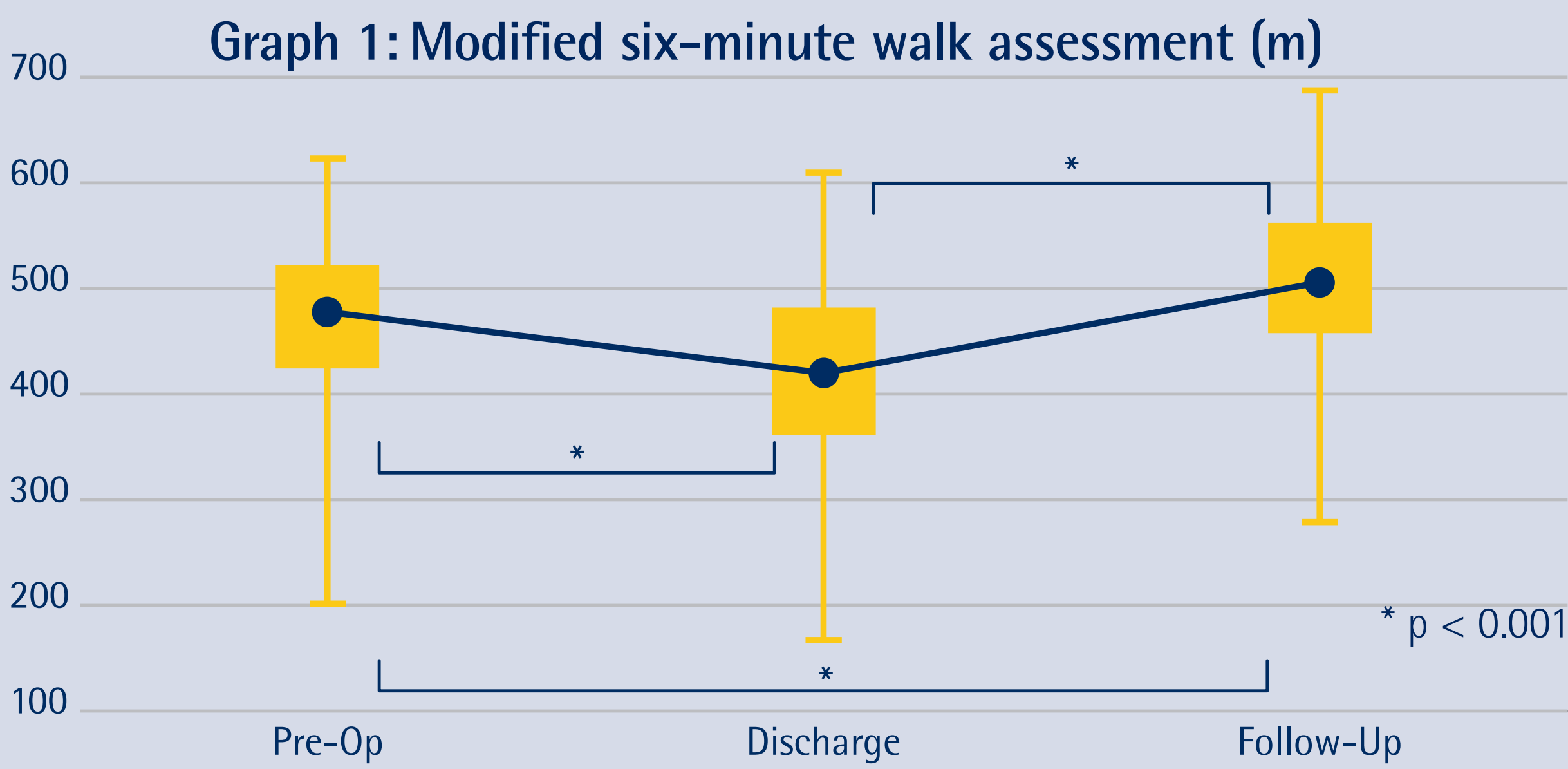
Results

- Completion rates for the three primary assessment procedures, the 6MWA, VC and EQ-5D questionnaire, are shown in table 2.
- 14 patients did not perform a pre-operative 6MWA due to recent myocardial infarction. 7 patients did not commence or complete the pre-operative 6MWA due to ischaemic chest pain. 1 test was not performed due to specific surgical request. All surviving patients performed all discharge tests. 3 additional patients were lost to 4 week follow-up.

	Pre-Operative (day -1.0 ± 0.0)	Day of Discharge (day 6.9 ± 1.9)	Follow-Up (day 39.0 ± 4.1)
6MWA	60/82 (73%)	81/82 (99%)	78/82 (95%)
VC	82/82 (100%)	81/82 (99%)	78/82 (95%)
EQ-5D	82/82 (100%)	81/82 (99%)	78/82 (95%)

Table 2: Completion rates of peri-operative assessment procedures.

- Scores for the 3 primary outcome measures, 6MWA distance, VC and EQ-5D self-rated health score are shown in graphs 1-3.



Conclusions

- Measures of sub-maximal exercise capacity, lung function and self-rated health/quality of recovery are feasible for the majority of patients prior to and after coronary artery bypass surgery.
- These measures are safe and indicate demonstrable changes across the surgical experience.
- A three-fold approach to physiotherapy outcome measurement may allow for comparison of the efficacy of differing peri-operative management programs.

Reference

Pasquina, P., M. R. Tramer and B. Walder (2003). "Prophylactic respiratory physiotherapy after cardiac surgery: systematic review." *BMJ* 327 (7428): 1379.

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