

Year One Progress Report

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Year & round grant awarded: 2013

Funded by NIAA/BJA: Career development Grant

Start date: Sept 2013

Anticipated end date: Sept 2017

Project title: Exercise in the Older surgical patient

Background

Preoperative exercise was viewed very much as a sure-fire preemptive strike, relevant to a multifaceted approach to the prehabilitation and pre-optimisation of the older surgical patient. The initial accepted outline proposal for the project was considerably improved by attention to the committee's recommendations. As a result, the objectives were targeted towards an understanding of the barriers and facilitators to prehabilitative exercise as an intervention modality, rather than the future optimism for the ability of any exercise program to alter cardiopulmonary reserve *per se* and influence surgical outcomes. The promotion of exercise in any patient population represents a complex medical intervention, in which behavioural and motivational elements provide an intractable component to their future success.

Methods

The initial research phase has attempted to begin to understand the relevance of a preoperative exercise program to older patients before surgery and their understanding, attitudes and beliefs about exercise and fitness before surgery.

We developed a six-week, hospital-based exercise program to serve as a feasibility study to examine views and attitudes to hospital-based prehabilitative exercise. This was developed following significant local and national television and press features around our "fitness for surgery" publication in the *Annals of Surgery* (Snowden *et al* 2013. *Cardiorespiratory Fitness Predicts Mortality and Hospital Length of Stay After Major Elective Surgery in Older People. Annals of Surgery, 257(6), 999–1004*). Qualitative patient interviews were included alongside the exercise program to determine patient acceptability and levels of activity prior to embarking on the exercise program. The study was performed in a group of patients preparing for benign surgical procedures and patients were randomised to exercise and non-exercise groups.

Results

General:

Recruitment to the study was limited to 20% of eligible patients with a mean age of 68 years. The study was prematurely stopped due to failure to recruit sufficient numbers to time leading to a forced loss in physiotherapy (training) input. 80% of the reasons given for non-recruitment were attributed to travel and access issues (55%), commitments to relatives and other hospital commitments and fitness worries. Interestingly, patients in the latter two groups had lower baseline fitness than the non-recruiters who cited travel/access issues as the reason for not engaging with the research.

All patients who completed the exercise program saw improvements in their measured

cardiorespiratory function although the magnitude of improvement was variable. Functional improvements plateaued within 4 weeks of exercise commencement and there was minimal change from 4 to 6 weeks.

Qualitative Results and Conclusions

Our overriding clinical belief that improvement in physical fitness before surgery should be high on the preoperative patient agenda is clearly at odds with older patients views, at least for this benign surgical cohort. Recruitment levels were low, at only 20% of those patients eligible for the study. This emphasises the need to clearly understand the barriers to preoperative exercise initiation and uptake in this group. It was clear that the recruited patients represent a polar opposite to those non-recruited patients in terms of engagement with the exercise therapy research.

Patients that did engage and that underwent exercise therapy indicated an understanding of the relevance of physical fitness before surgery and believed that taking part in a pre-operative exercise programme would indeed reduce their own surgical risk. Attending the gym three times a week over a 6-week period was acceptable, although it was suggested that a shorter intervention might be preferable. The hospital environment was viewed as the most appropriate venue for program delivery. Once committed to the program, the compliance rate was acceptable with the entire group completing 80% of the total number of visits.

Reassuringly, the reported reasons given for not being involved in preoperative exercise, were mainly practical issues related to travel difficulties and other commitments including repeated clinical visits for appointments and therapies (e.g. dialysis) and in some cases issues around providing relief from their carer's role for dependent relatives. Of course these comments may simply hide other important issues related to patient motivation and self-efficacy. The relevance of reduced baseline functional reserve in those patients admitting to non-recruitment due to commitments and fitness worries, in comparison with normal reserve in those citing travel/access issues, support the need to investigate self-efficacy as a component of poor exercise engagement. It was also interesting to report that although an ethical amendment allowed us the permission to interview eligible patients who did not engage with the research, no patient was willing to be interviewed.

Ensuring adherence and recruitment to an exercise program may be far more important to the success or failure of the program than the exercise modality itself. Indeed what we are trying to achieve in an exercise program may be far too prescriptive for surgical patient requirements. Interestingly, in the present study, the Hawthorne effect came into play, in that at least two of the patients randomised to the non-exercise group were motivated to start their own unsupervised exercise programs and with this motivation came significant improvements in cardiorespiratory reserve.

Rather than surgery being a cue to improve preoperative fitness, maybe the mere definition of a fitness level through cardiopulmonary testing, could promote an awareness of preoperative fitness and be the motivational trigger for an initial increase in activity levels in the first instance. Patients will vary in both their requirements and motivation which themselves can be used to tailor the individualized exercise therapy. The date of surgery, given in advance, could be used as the goal for an improvement in physical activity, which may more implicitly (rather than explicitly) give rise to an improvement in cardiorespiratory reserve prior to surgery.

Further Progress:

Given the importance of understanding the barriers and facilitators to exercise and in an attempt to reduce the practical issues of travel time for hospital visits and limited car parking, we have decided to further investigate the attitudes and views of older people (volunteers) through a community-based exercise program. This is utilizing community-based facilities to develop out of hospital exercise therapy for older people. The research has undergone ethical review, has been entered onto the NHS portfolio and to date has recruited 20 older volunteers (aged > 60 years; Sample size requirement n=42). All patients are exercising three times a week for up to 1 hour each time with extensive cardiopulmonary exercise testing and activity level monitoring throughout the program. The exercise therapy incorporates a high-intensity gym based exercise program and a less structured, community based activity program, based on the Live Well program and GP referral scheme.

Integrated into this program are focus groups, led by a Senior psychologist, to further investigate older peoples attitudes to exercise both pre and post-exercise. These are being analysed through a structured, theoretical domains framework (Michie et al). This will allow us to determine specific relevant behavioural domains, which will enable us to design an appropriate prototype behavioural change intervention for exercise therapy. It is envisaged that delivery of this prototype intervention will be tested in a future feasibility study in a selected group of surgical patients.

We are also developing other strands of a prehabilitative approach to the surgical patient including the effects of preoperative carbohydrate/protein loading, respiratory function prehabilitation and the reduction of alcohol intake. This is opening up multiple areas of research collaboration that will be substantiated in the next year of the program.

We are currently working on a manuscript from the initial study to highlight the qualitative aspects of prehabilitative exercise therapy that require further investigation in the older surgical patient and that are being incorporated into the present study.