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Cognitive monitoring in planned arthroplasty surgery study

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A decline in cognitive function is common[1] and sometimes permanent after a major surgery in the elderly. It is uncertain what causes the change, whether a similar decline might occur without surgery, and who is at risk. The current literature lacks an accurate picture of preoperative cognitive trajectories and trajectory in older people who do not have surgery.[2,3] Our aim was to assess the feasibility of serial remote monitoring of cognition with an online tool (CogTrack Wesnes Cognition Ltd, London) in elderly patients undergoing planned arthroplasty surgery and matched non-surgical controls. Our primary care and anaesthetic trainee research networks will work in collaboration with patients, industry, and cognition experts.

Feasibility study testing of a prospective observational methodology at two secondary care sites and two primary care sites. Serial cognitive testing will be performed with CogTrack on 150 surgical patients and 150 matched non-surgical controls over an 11-week window incorporating the surgical episode. The primary outcome measure is feasibility. The secondary outcome measures include CogTrack scores and prevalence of factors, which may impact on cognition. The patients were involved in refining outcome measures and will contribute throughout.

Feasibility data, including number of patients approached, recruited, declining, and withdrawing, will be collected, and information about IT accessibility and completion rates of assessments. Summary statistics will be conducted on Cog-Track data for cases and control groups, and plots constructed to demonstrate trajectory of scores over the 11-week study period. Mixed-model srepeated measures analysis will be performed to assess the effects of exposure to arthroplasty and adjust for candidate covariates.

Our aim, in a future multicentre study, is to track the cognitive trajectories of a large number of operated cases and matched controls over a long time period. Arthroplasty surgery is performed very commonly, and on an increasingly ageing population, aiming to improve functional capacity. Conversely, permanently altered cognition could impact on patients' quality of life. Clinical research underpins shared decision-making with patients.

References

1. Moller JT, Cluitmans P, Rasmussen LS, et al. *Lancet* 1998; **351**: 857—61
2. Evered LA. *Anesth Analg* 2017; **124**: 1036—8
3. Scott JE, Mathias JL, Kneebone AC. *J Arthroplasty* 2014; **29**: 261—7.e1

Association between frailty as assessed by the electronic frailty index and adverse postoperative outcomes

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Frailty is associated with adverse perioperative outcome.[1,2] ResearchOne (R1; a large primary care data set) has been used to develop an electronic frailty index (eFI) based on the accumulation of clinical and functional deficits.[2] We report on the association between the eFI and mortality, length of survival, and increase in eFI over 12 months post-surgery (ΔeFI).

We studied a data extract from R1 containing codes for 860 649 operations performed between January 2011 and December 2016. Mortality (1, 3, and 6 months), length of survival, and 12-month increase in eFI were the outcome measures. Age, gender, use of antihypertensive, eFI at surgery, count of both systolic and diastolic blood pressure 12 months before surgery, deprivation ranks, counts of GP visits 12 months before surgery, and latent variables for missing data were the assumed independent variables. We predicted outcomes using a general linear model with elastic net

regularisation and iterative fitting along a regularisation path. Confidence intervals were derived via bootstrap sampling (n=100). Missing blood-pressure data were imputed based on population-level statistics in 39.0% of cases.[3]

The eFI at surgery was identified as being associated with change in eFI after surgery and survival (95% confidence interval standardised β coefficients of 0.73−0.86 and 0.88−0.89, respectively). Other factors associated with survival and increased postoperative frailty included age, use of antihypertensive medications, and sex.

The association between adverse postoperative outcome and eFI has not been demonstrated previously, and suggests that the eFI warrants further investigation for preoperative risk assessment.

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References

1. Oakland K, Nadler R, Cresswell L, et al. *Ann R Coll Surg Engl* 2016; **98**: 80−5
2. Clegg A, Bates C, Young J, et al. *Age Ageing* 2016; **45**: 353−60
3. Wright JD, Hughes JP, Ostchega Y, et al. *Natl Health Stat Rep* 2011; **35**: 1−22

Effects of major hepato-pancreatico-biliary surgery and general anaesthesia on skeletal-muscle mitochondrial respiration: a pilot study

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In this pilot study, we sought to characterise changes in mitochondrial function during major hepato-pancreatico-biliary surgery under general anaesthesia (GA), and to determine if such changes are associated with preoperative measures of fitness.

Patients underwent cardiopulmonary exercise testing before surgery to obtain anaerobic threshold (AT) and peak oxygen uptake (VO$_2$ peak). Skeletal-muscle biopsies were taken from the *vastus lateralis* under GA. High-resolution respirometry (O2k; Oroboros, Austria) of permeabilised muscle fibres was performed using a substrate−uncoupler−inhibitor titration protocol.[1,2]

Fourteen patients were recruited to the study. We observed a significant increase in mitochondrial oxygen consumption post-surgery in fatty acid oxidation and Complex I mediated states. We also found a significant reduction in mitochondrial coupling efficiency, electron transfer coupling efficiency (−0.03; P<0.04), and oxidative phosphorylation coupling efficiency (−0.03; P<0.02) after surgery compared with before surgery. Patients with an AT less than 11 ml kg^{-1} min^{-1} had a significantly lower mitochondrial coupling efficiency pre-surgery than those with an AT greater than 11 ml kg^{-1} min^{-1}. There was also a correlation observed between mitochondrial coupling efficiency with VO$_2$ peak (r=0.601; P<0.05). The relationships between AT, VO$_2$ peak, and coupling efficiencies were no longer evident after surgery.

Our early findings show that the process of major hepato-pancreatico-biliary surgery under GA leads to an increase in mitochondrial oxygen consumption and reductions in mitochondrial coupling efficiencies.

Also, cycle ergometry findings correlated well with cell ergometry.

References

1. Pesta D, Gnaiger E. *Methods Mol Biol* 2012
2. Horscroft JA, Kotwica AO, Laner V, et al. *Proc Natl Acad Sci U S A* 2017; **114**: 6382−7

Case series report on iatrogenic subglottic tracheal stenosis

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Tracheal intubation and tracheostomy are routinely performed in anaesthesia and critical care settings; however, such procedures could result in subglottic tracheal stenosis.[1] In certain patients, predisposition to wound over-repairing, fibrosis, and hypertrophic scar formation could significantly increase their susceptibility to tracheal stenosis after tracheal injury. Here, we report the incidence of tracheal stenosis after intubation or tracheostomy.

Sixty-three patients (38 male/25 female; 21−69 yr old) had been either intubated for surgery or tracheotomised in the ICU. Their airways affected with iatrogenic subglottic tracheal stenosis were treated in People's Hospital of Zhengzhou University from 2012 to 2017. Patients' Myer and Cotton grading of tracheal stenosis,[2] time to onset of airway stenosis, and overall prognosis were collected retrospectively.

Table 1 Myer and Cotton classification of subglottic tracheal stenosis

Group	Intubation					Tracheostomy				
	n	I (%)	II (%)	II (%)	IV (%)	n	I (%)	II (%)	III (%)	IV (%)
Hypertrophic scarring	5	0 (0)	1 (20)	3 (60)	1 (20)	11	0 (0)	3 (27.2)	5 (45.6)	3 (27.2)
Non-hypertrophic scarring	18	3 (16.7)	9 (50)	4 (22.2)	2 (11.1)	29	4 (13.8)	14 (48.3)	7 (24.1)	4 (13.8)