found that these unguided interventions resulted in statistically significant, yet modest improvements in multiple clinical outcomes of importance to patients with chronic pain: pain intensity, depression, and pain catastrophising. Although these improvements were only modest, these technologies may be more desirable for patients who lack access to typical healthcare and are in need amidst a pandemic.

An important barrier that patients and clinicians who are interested in eHealth and mHealth applications face is that applications that are studied and presented in the medical literature are not always available to patients.[5] With that in mind, we previously published a list[6] of eHealth and mHealth applications that were reported in our meta-analysis and are available to interested patients and clinicians (Table 1; search date: March 2019; see table 1 of Moman and colleagues[3]). We hope this list will be a good starting place for clinicians interested in learning more and possibly incorporating these applications in their daily practice.

Declarations of interest

The authors declare that they have no conflicts of interest.

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Thresholds of functional capacity using the four-question (modified) Duke Activity Status Index (M-DASI-4Q) as a screening tool: observations from the Measurement of Exercise Tolerance Before Surgery (METS) study

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Keywords: cardiopulmonary exercise testing; cardiovascular risk; Duke Activity Status Index; functional capacity; METS study; preoperative screening; risk assessment

Editor—The international, multicentre Measurement of Exercise Tolerance Before Surgery (METS) study[1] of 1401 patients scheduled for abdominal surgery showed that subjective assessment of functional capacity should not be used for preoperative risk assessment, with only 19.2% (95% confidence interval [CI], 14.2–25.0%) sensitivity for predicting functional capacity defined as peak VO_2 <14 mL kg^{-1} min^{-1}. The Duke Activity Status Index (DASI) had construct validity for predicting functional capacity in surgical patients and improved predictive ability for postoperative myocardial injury. Nevertheless, cardiopulmonary exercise testing (CPET) was superior to the DASI in predicting in-hospital moderate or severe complications. CPET, however, is a resource-intensive test and by its nature a high aerosol-generating procedure with ramifications given the current coronavirus diseases 2019 (COVID-19) pandemic. The DASI

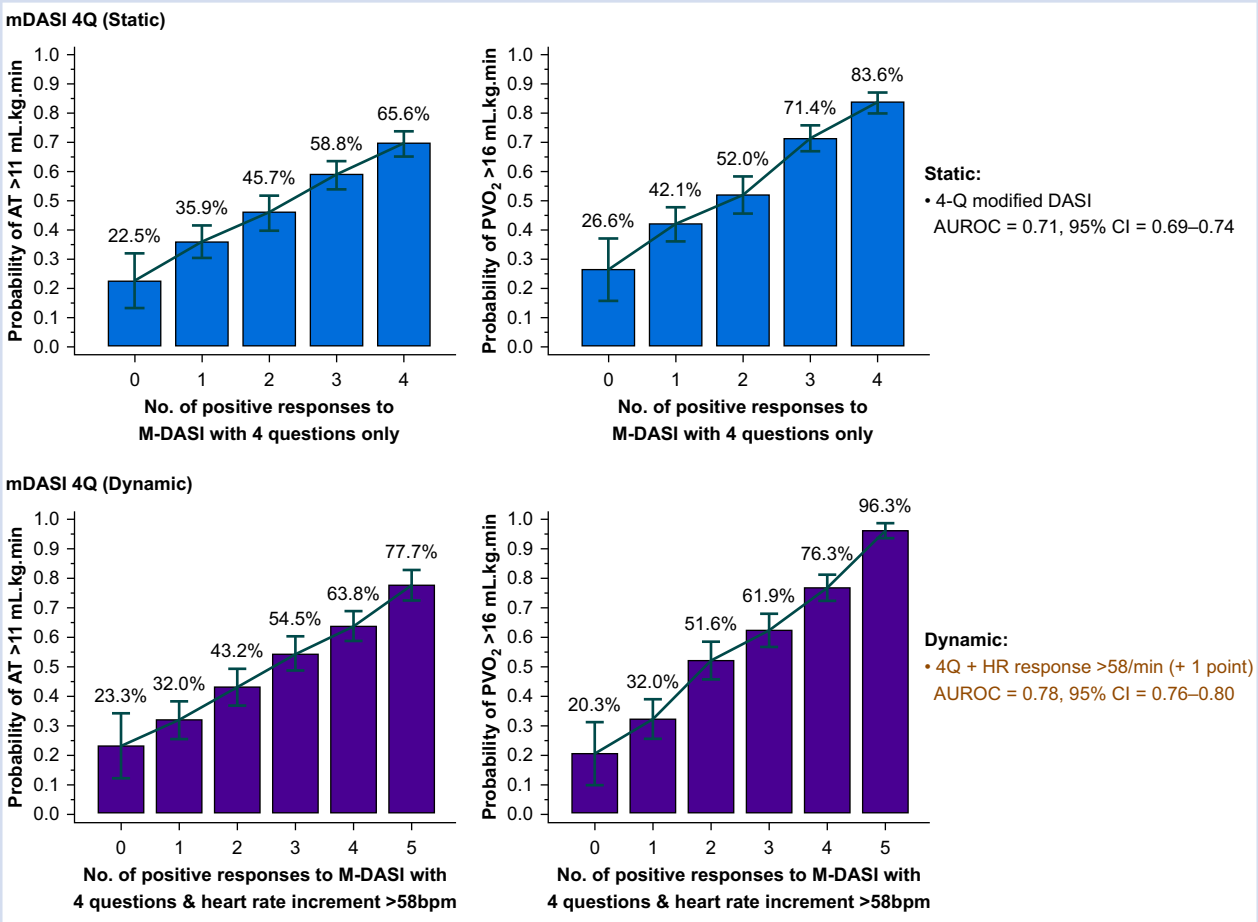

Fig 1. Probabilities (with error bars showing 95% confidence interval) of achieving adequate anaerobic threshold (anaerobic threshold [AT], >11 ml kg^{-1} min^{-1}) and peak oxygen consumption (peak VO_2 >16 ml kg^{-1} min^{-1}) on cardiopulmonary exercise testing in relation to the number of positive responses to the modified Duke Activity Status Index (M-DASI) questions (out of a maximum of four questions) without (static) or with a dynamic heart rate response to exercise (dynamic). AUROC, area under the receiver operating characteristic curve; CI, confidence interval.

and CPET should, however, be seen as complementary screening tools.

In a secondary cross-sectional analysis of the METS dataset, we analysed the prognostic significance of the 12 questions within the DASI and identified that only five of the questions were significant predictors of functional capacity in the METS study cohort.[2] Using an abbreviated version of the DASI survey could potentially serve as a useful screening tool, for example for triaging patients for CPET. One of the five questions within our published M-DASI-5Q is a potentially contentious and sensitive question related to the ability to have sexual relations, and it may be irrelevant to many patients having surgery, for example those with severe illness and older individuals. As such, a four-question version (M-DASI-4Q) that omits the latter question may be more applicable to clinical practice.

In response to publication of the M-DASI, we have been contacted by numerous readers asking for the sensitivity thresholds for the M-DASI-4Q in order to allow clinicians to guide their referral practices for CPET, etc. Here we provide these data (Fig. 1). As an example, if units established a referral threshold as less than three positive responses to the four questions, then patients with a probability of >70% (95% CI, 66.5–75.5%) of having a peak VO_2 >16 ml kg^{-1} min^{-1} would be precluded from needing referral for CPET testing. Adding a dynamic component to the M-DASI-4Q, by assessing the chronotropic response to exercise (which is feasible outside of CPET), would further improve the sensitivity of this triage tool. A chronotropic response (heart rate >58 beats min^{-1}) improves the ability to discriminate patients with peak VO_2 >16 ml kg^{-1} min^{-1} (area under the receiver operating characteristic curve [AUROC]=0.78; 95% CI, 0.76–0.80).[2] In conclusion, adequate exercise capacity is predictable by the M-DASI-4Q, especially when coupled with incremental heart rate response to exercise.

Declarations of interest

The authors declare that they have no conflicts of interest.

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Impact of intraoperative goal-directed fluid therapy in patients undergoing transthoracic oesophagectomy. Comment on *Br J Anaesth* 2020; 125: 953–61

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Editor—We read the article by Mukai and colleagues[1] regarding the impact of intraoperative goal-directed therapy (GDT) on the outcome of patients undergoing oesophagectomy in a recent issue of the *British Journal of Anaesthesia* with much interest. In this large multicentre randomised trial, the use of GDT was associated with a reduction in morbidity, mortality, and length of hospital stay.

Oesophageal cancer is the seventh most common cancer worldwide and the sixth most common cause of cancer death.[2] As described by the authors, despite important improvements in anaesthesiology and surgery, oesophagectomy remains a challenging surgery for all professionals involved, with significant complications occurring in up to 70% of patients.[3] Recent Enhanced Recovery After Surgery Society recommendations on oesophageal surgery suggested focusing on adjustment of perioperative fluid therapy, rather than preferring a restrictive or a liberal fluid regimen.[4]

A recent randomised trial by Bahlmann and colleagues[5] with a smaller sample size showed no clinical advantage related to the use of GDT in a similar clinical setting. The reliability of stroke volume variation (SVV) in thoracic surgery remains a matter of debate, as underlined by the authors in the discussion. Because of significant GDT protocol heterogeneity and to the small sample size of previous studies analysing the role of SVV during thoracic surgery, it is difficult to define the role of this dynamic preload indicator in this specific setting.[6] Another possible confounding element in the study is the pressure of artificial pneumothorax, which is not reported by the authors. Moreover, it is not specified whether it was the same in all the centres involved. As indicated in the discussion, a more reliable, dynamic index may be represented by stroke volume (SV), as stated by Veelo and colleagues.[7] The optimal value of SV can be determined under baseline conditions before starting surgery, and subsequent fluid administration is managed according to changes of this value. Mukai and colleagues[1] present a GDT protocol based on modification of SVV and SV (a bolus of colloid was administered if the SVV was >12% or SVV was 8–12% with a decrease of SV of >10% for more than 2 min). Considering the debate about the use of SV rather than SVV in the context of thoracic surgery, it would be interesting to know if the authors observed whether these values changed in a similar direction during the thoracic portion of a procedure, or if the changes in SVV were not associated with SV changes when an alteration in thoracic pressure was introduced.

In addition, the use of vasoactive drugs in the study is unclear: did the authors use a standardised protocol for dosage (infusional rate/bolus amount) and type (according to cardiac index)? Although the authors present an excellent RCT with a large sample size, more detailed information could help inform design of future trials in oesophageal surgery according to homogenous and shared haemodynamic protocols.

Declarations of interest

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