Cost-effectiveness of a cardiac output-guided haemodynamic therapy algorithm in high-risk patients undergoing major gastrointestinal surgery

Sadique Z(1), Harrison DA(2), Grieve R(1), Rowan KM(2), Pearse RM(3); OPTIMISE study group. Perioper Med (Lond). 2015 Dec 14;4:13. doi: 10.1186/s13741-015-0024-x. eCollection 2015.

BACKGROUND: The use of cardiac output monitoring to guide intra-venous fluid and inotropic therapies may improve peri-operative outcomes, but uncertainty exists regarding clinical effectiveness and robust cost-effectiveness evidence is lacking. The objective of the study was to evaluate the cost-effectiveness of peri-operative cardiac output-guided haemodynamic therapy versus usual care in high-risk patients undergoing major gastrointestinal surgery.

METHODS: The study undertook a cost-effectiveness analysis using data from a multi-centre randomised trial that recruited patients from 17 hospitals in the United Kingdom. The trial compared cardiac output-guided, haemodynamic therapy algorithm for intra-venous fluid and inotrope (dopexamine) infusion during and 6 h following surgery, with usual care. Resource use and outcome data on 734 high-risk trial patients aged over 50 years undergoing major gastrointestinal surgery were used to report cost-effectiveness at 6 months and to project lifetime cost-effectiveness. The cost-effectiveness analysis used information on health-related quality of life (QoL) at randomisation, 30 days, and 6 months combined with information on vital status to report quality-adjusted life years (QALYs). Each QALY was valued using the National Institute for Health and Care Excellence (NICE) recommended threshold of willingness to pay (£20,000 per QALY) in conjunction with the costs of each group to report the incremental net monetary benefits (INB) of the treatment algorithm versus usual care.

RESULTS: The mean [SD] quality of life at 30 days and 6 months was similar between the treatment groups (at 6 months, intervention group 0.73 [0.28] versus

usual care group 0.71 [0.30]; mean gain 0.03 [95 % confidence interval (CI) -0.01 to 0.08]). At 6 months, survival, mean QALYs and mean healthcare costs (intervention group £8574 versus usual care group £8974) were also similar. At the cost-effectiveness threshold of £20,000 per QALY gained, the incremental net benefit of haemodynamic therapy over the patients' lifetime was positive (£4168 [95 % CI -£3063 to £11,398]). This corresponds to an 87 % probability that this intervention is cost-effective.

CONCLUSIONS: Cardiac output-guided haemodynamic therapy algorithm was associated with an average cost reduction and improvement in QALY and is likely to be cost-effective. Further research is needed to confirm the clinical and cost-effectiveness of this treatment.