What is the value of routinely testing full blood count, electrolytes and urea, and pulmonary function tests before elective surgery in patients with no apparent clinical indication and in subgroups of patients with common comorbidities: a systematic review of the clinical and cost-effective literature

CRD summary
The authors concluded that there was insufficient evidence to support the use of routine tests, for low-risk patients, before elective minor or intermediate surgery. This was generally a well-conducted review, and the authors’ conclusions reflect the poor evidence and are likely to be reliable.

Authors' objectives
To assess the clinical and cost-effectiveness of routine tests, before surgery, for adult patients undergoing elective minor or intermediate surgical procedures.

Searching
Nine databases, including MEDLINE, DARE, and Cochrane Central Register of Controlled Trials (CENTRAL), were searched for articles from 1980 to June 2009. No language restrictions were applied, and the search terms were reported. Eight additional sources were searched, for grey or unpublished literature, or for further information on adverse effects.

Study selection
Eligible for inclusion were studies assessing the clinical or cost-effectiveness of routine testing for full blood count, electrolytes and renal and pulmonary function, in adults, before elective minor or intermediate surgery. Eligible patients had to be classified as American Society of Anesthesiologists (ASA) grades 1 or 2. Eligible studies had to compare routine testing versus no routine testing. The outcomes of interest were abnormal test results; changes in management following abnormal test results, in patients whose clinical examinations before surgery were normal; adverse events; and all-cause mortality. The length of hospital stay was also assessed.

The included studies were conducted between 1987 and 2007 in Argentina, the USA, The Netherlands, Israel, Brazil or Canada. The surgical specialities included general surgery, ophthalmology and dentistry. Some patients had comorbidities, including diabetes, hypertension, and chronic renal insufficiency. The definitions of abnormal test results differed across studies.

The authors did not state how many reviewers screened studies for inclusion.

Assessment of study quality
Randomised controlled trials (RCTs) were assessed using Centre for Reviews and Dissemination (CRD) criteria. Case series were assessed using a customised quality tool that combined the generic CRD criteria with criteria from a published article (fully described in the review).

The authors did not state how many authors assessed quality.

Data extraction
One reviewer extracted the number and proportion of patients who experienced the outcomes, along with their 95% confidence intervals. These data were checked for accuracy by a second reviewer and disagreements were resolved through discussion.

Methods of synthesis
Due to the diversity of outcome measures, the data were presented as a narrative synthesis and in tables.

Results of the review
Six studies, with over 3,242 participants, were included in the clinical effectiveness review. One was a pseudo-randomised trial, and two were prospective and three were retrospective case series. The quality of the prospective studies was reported to be higher than that of the retrospective studies, but it was still low for most studies. Attrition rates were rarely reported.

**Full blood count:** The limited evidence, from five studies, suggested that the proportion of patients with an abnormal full blood count was low (0.8% to 3.0%). The proportion of patients with an abnormal result and a consequent change in clinical management was lower (none to 1.9%).

**Electrolytes and renal function:** One of four studies reported a low proportion (0.7%) of patients with an abnormal test result, which did not lead to any change in clinical management. A second study reported no abnormal results, and the other two studies did not report the proportion of patients with an abnormal result.

**Adverse events:** Eight additional studies were included in the assessment of adverse events; two were observational, one was an uncontrolled before-and-after study, and five were case reports. Vasovagal reactions occurred in 0.9% and 3.4% of patients undergoing venepuncture (two observational studies). Pain and bruising was reported in 14.2% and 25% of patients (one observational study; one uncontrolled before-and-after study). There was one death, but it was unclear whether this was a patient with a normal or an abnormal test result.

Other findings, including the results of a survey of the usual practice for testing before surgery, were reported.

**Cost information**
A cost-effectiveness review was undertaken, but there was insufficient evidence to inform an economic model.

**Authors' conclusions**
There was insufficient evidence to support the use of these tests, for low-risk patients, before elective surgery.

**CRD commentary**
The review question and inclusion criteria were clearly stated, but the objectives changed due to the lack of data. A comprehensive literature search was undertaken and some criteria were used to assess study quality. Data extraction was performed by two people, but it was unclear whether this was true for other parts of the review process. Given the nature of the data, a narrative synthesis was appropriate. The authors highlighted the lack of evidence from the UK NHS, and they acknowledged the limitations of the available evidence, in terms of inadequate reporting.

In general, this was a well-conducted review and the authors’ conclusions reflect the poor evidence and are likely to be reliable.

**Implications of the review for practice and research**
**Practice:** There was insufficient evidence to support the use of the three tests in the routine assessment of otherwise healthy patients, before minor or intermediate surgery.

**Research:** The authors stated that well-designed research was needed on the clinical effectiveness, cost-effectiveness, and safety of these tests in patients without complications.

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