Prospective evaluation of abdominal sonography for the diagnosis of bowel obstruction

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Abdominal sonography with a 3.5 MHz transducer.

Type of intervention
Diagnosis.

Economic study type
Cost-effectiveness analysis.

Study population
Patients (men and women aged 19 to 82 years) with possible bowel obstruction, determined by clinical or plain x-rays findings.

Setting
Hospital. The study was carried out in Milwaukee, Wisconsin, USA.

Dates to which data relate
The effectiveness and cost data were collected from July 15, 1992, to May 14, 1993. The price date was unclear.

Source of effectiveness data
Single study.

Link between effectiveness and cost data
The costing was undertaken prospectively on a different sample from that used in the effectiveness analysis.

Study sample
No power calculations were reported. 50 patients were included. These patients had sonographic and radiographic images obtained contemporaneously (the former being performed shortly after or before the x-ray examination).

Study design
Prospective cohort study. Single centre. The duration of follow up was up to 10 months.

Analysis of effectiveness
The analysis was based on intention to treat. The primary outcomes used were sensitivity and specificity rates.
Effectiveness results
For the sonographic diagnosis, the sensitivity rate was 88% (95% CI: 75-100); the specificity rate was 96% (CI: 89-100). The sensitivity of plain radiographs was 96% (CI: 88-100) and specificity was 65% (CI: 47-83).

Measure of benefits used in the economic analysis
The primary outcomes used were sensitivity and specificity rates.

Direct costs
Some costs and quantities were reported separately. Length of hospital stay was analysed. The costs measured were operating costs (hospital and physician bills) of treatment of SBO (not of the diagnostic strategies). The boundary adopted was the hospital. The quantities and costs were based on actual data. The source of quantities and costs was the patients' clinical records and the billing office files. The prices used are presumed to relate to the period July 1992-May 1993 during which the quantities were measured (no other information was provided).

Statistical analysis of costs
The mean and ranges of costs were reported.

Currency
US dollars ($).

Estimated benefits used in the economic analysis
For the sonographic diagnosis, the sensitivity rate was 88%, (CI: 75-100) and the specificity rate was 96% (CI: 89-100). The sensitivity of plain radiographs was 96% (CI: 88-100) and the specificity was 65% (CI: 47-83) (p = 0.05).

Cost results
Of 54 patients with a final discharge diagnosis of SBO, 32 were treated operatively, at an average charge of $36,976 (range $9,389-$130,230). The average charge for the 22 nonoperatively treated patients was $4,834 (range $919-$13,810). Of those patients with simple SBO (n=19), the average charge for those subjected to early surgical intervention (n=18) was $26,849 (range $9,389-$78,852). The average charge for the remaining 13 operatively treated patients was $50,552 (range $18,431-$130,230). 3 patients were discovered to have strangulated bowel at operation and, for this group, the average charge was $69,370 (range $35,110-$130,230).

Synthesis of costs and benefits
Costs and benefits were not combined since the costs measured were those for the treatment of SBO, whereas the benefits related to the accuracy of the diagnostic test strategy.

Authors' conclusions
Bedside abdominal sonography appeared to be an accurate method for diagnosis of simple bowel obstruction and was more specific than plain x-rays in establishing this diagnosis. The use of sonography to differentiate strangulation versus simple bowel obstruction may permit earlier operative intervention for strangulation while also allowing wider use of nonoperative management for simple bowel obstruction. In turn, the overall costs and complications associated with treatment of bowel obstruction might be significantly reduced. Wider use by clinicians of bedside ultrasonographic examination merits further investigation.

CRD Commentary
The study had very limited aims regarding the desirability of ultrasonographic examination as opposed to plain x-rays examination. The cost of each diagnostic strategy could have been reported and a cost effectiveness ratio calculated in terms of cost of additional cases of SBO detected. The estimated cost of treatment of an SBO case could have been obtained and added to the calculation. The study therefore remains, from an economic evaluation viewpoint, within the limited category of studies describing cost and consequences.

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