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Abdominal Sonography for the Diagnosis of Bowel Obstruction

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In their study, Ogata et al.[1] of the Departments of Surgery and Emergency Medicine at the Medical College of Wisconsin introduce a new diagnostic concept for the application of abdominal sonography in the management of bowel obstruction. This study comprised 50 patients who were evaluated prospectively with clinical or plain x-ray findings suggestive of small or large bowel obstruction. Of this series of evaluable patients, 24 of 50 (48%) were confirmed to have diagnoses of obstruction. Use of this bedside technology allowed sonography to demonstrate obstruction with evidence of fluid-filled dilated bowel loops proximal to collapsed bowel in 22 of 50 patients (44%). The authors acknowledge that sonography is as sensitive, but more specific, than plain radiographs, and, together with the clinical findings, should enhance the prediction of etiology of obstruction in the majority of cases. Importantly, ultrasonography may provide the clinician with etiology of the obstruction or abdominal pain that may not be obtainable from plain abdominal radiographs.

Japanese and European clinics have been predominantly responsible for applications of abdominal sonography in the diagnosis of bowel obstruction. Abdominal sonography has been highly acclaimed for the ability of the modality to provide early recognition of strangulation.[1,2] Therefore, these investigators are to be commended for bringing the applications of abdominal sonography to evaluate the potential for bowel obstruction with presentation of an acute surgical abdomen. This represents the first study in the United States that employs bedside sonography by surgeons to diagnose early small bowel obstruction and strangulation.

In this study, 82% of the patients had a previous history of one or more abdominal operative procedures. Further, this bedside technology allowed revelations in three patients of a specific cause of the obstruction that was not demonstrable by clinical examination or plain x-ray studies. This technology also provided the investigators additional findings that were not apparent on plain x-ray or clinical examination, including bilateral hydronephrosis, Crohn's disease of the colon, local accumulation of peritoneal fluid with bile peritonitis following laparoscopic cholecystectomy, clinically inapparent ascites in an individual with cirrhosis, and two additional instances of carcinomatosis with peritoneal implants.

In this era of cost containment, with attempts to decrease the length of hospital stay, the authors reviewed patient records to determine the average total charges (hospital and physician bills) for patients who were admitted during the study interval and were determined at discharge to have small bowel obstruction caused by adhesions. Unequivocally, the necessity

of operative intervention is more costly by a factor of approximately ninefold when compared with nonoperative management ($36,976 *vs.* $4,834, respectively). The investigators confirmed that delay of operation beyond day 2 of hospitalization essentially doubled the total hospital cost ($27,687 *vs.* $50,552, respectively). The addition of comorbid risk parameters such as strangulation further increased hospital stay and cost. Unfortunately, none of the patients with strangulated bowel had been examined previously by ultrasound and none had a diagnosis of strangulation recorded preoperatively. As the authors acknowledge, this experience reflects the difficulty in recognizing the presence of strangulation on the basis of clinical and radiographic findings. Unless obstruction, with or without strangulation, can be demonstrated conclusively, it is medically and economically beneficial to reduce the number of operations for simple obstruction because delay in operations for simple obstruction is possible if the technology allows the examination to possess high sensitivity and specificity. Ogata and associates 1 suggest that serial ultrasound examination may be used to evaluate response to nonoperative management and that the results of this examination may allow determination of the need for further surgical intervention. Should this hypothesis be confirmed in future analyses, it might be anticipated that this diagnostic and therapeutic strategy could reduce costs by reduction of complications in individuals with strangulation. Equally important, this therapeutic strategy would allow the clinician the broader acceptance and adoption of nonoperative management when simple small bowel obstruction can be confirmed objectively.

Ogata and associates 2 previously have noted that the presence of an akinetic dilated small bowel loop that is distal to dilated loops with peristaltic activity represents a sensitive and specific finding pathognomonic of strangulation. Furthermore, these investigators previously have reported that the presence of peritoneal fluid also may represent a sensitive indicator to the possible presence of strangulation. Although this study did not document precisely the differentiation between strangulation *versus* simple obstruction as a function of efficacy of the technology, real-time sonography does provide the clinician/observer the opportunity to document peristaltic activity in small bowel and further identifies free peritoneal fluid. These observations have been confirmed by Sasaki et al.3 and Meiser and Meissner.4

This evolving technology brought to the attention of the *Annals of Surgery* emphasizes the role of abdominal sonography as an accurate methodology for the diagnosis of simple bowel obstruction; it is more specific than plain x-rays in establishing this diagnosis. With increasing experience, clinicians may find abdominal sonography to be an objective, relatively inexpensive, and non-invasive technology for identification of causes of obstruction and for additional etiologies of an acute abdomen. Equally important in this era of managed care and cost containment is our duty to diminish the costs and complications for therapy of bowel obstruction. Increasing experience and familiarity with bedside ultrasonic techniques clearly are deserving of further investigation and application by surgeons evaluating the various etiologies of abdominal pain and obstruction. This report by Ogata and associates 1 suggests that its wider application will enhance diagnostic capability and, perhaps, diminish overall costs anticipated with the care of the patient with an acute abdomen.

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