

Clinical Science

Laparoscopy decreases the laparotomy rate for hemodynamically stable patients with blunt hollow viscus and mesenteric injuries



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Abstract

BACKGROUND: The aim of this study was to evaluate the effect of laparoscopy on patients with blunt hollow viscus and mesenteric injuries (BHVMIs).

METHODS: Hemodynamically stable patients with BHVMIs were diagnosed using computed tomography and serial examinations. Patients admitted from July 1, 1999 to June 30, 2006 underwent exploratory laparotomy (group A), and those admitted from January 1, 2007 to December 31, 2013 received laparoscopy (group B).

RESULTS: There were 62 patients in group A, and 59 patients in group B. There were no significant differences in demographic characteristics, injury severity score, and injuries requiring surgical intervention between the groups (all, $P > .05$). Patients in group B had a shorter hospital stay (mean 11.0 vs 17.6 days, $P < .001$) and lower wound infection rate (mean 5.1% vs 16.1%, $P = .049$). The conversion rate of laparoscopy to laparotomy in group B was 8.5%, compared with a 100% laparotomy rate in group A ($P < .001$). There was no difference in the complication rate between groups.

CONCLUSION: Laparoscopy is feasible and safe for hemodynamically stable patients with BHVMIs.

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Blunt hollow viscus and mesenteric injuries (BHVMIs) are not common, with a reported incidence ranging from .8% to 1.2% in patients who sustain blunt trauma.^{1,2} With advances in treatments such as angioembolization, most

patients with solid organ injuries who are hemodynamically stable are treated by nonoperative management.^{3,4} The major indication of an emergent laparotomy in patients with blunt abdominal trauma (BAT) is persistent hypotension in the presence of a positive ultrasound of the abdomen. Clinically significant BHVMI, which includes free bowel perforation and bowel wall necrosis after mesenteric ischemia, is the other important indication of surgical intervention in hemodynamically stable patients with BAT.⁵ The consequences of delayed recognition of clinically significant BHVMIs include intra-abdominal abscess and sepsis. Delayed diagnosis and treatment significantly

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increases the mortality and morbidity of patients with BHVMIs.⁶ After initial resuscitation, a patient with BAT may be suspected to have BHVMI based on physical and radiological examinations.

Early diagnosis provides better outcomes for patients with BHVMIs, but this remains a challenge to trauma surgeons. The typical findings of peritonitis might not be present initially, and the confounding factors such as associated injuries or drug or alcohol intoxication can reduce the reliability of physical examinations. The most popular radiological examination for a hemodynamically stable patient with BAT is computed tomography (CT). However, even with advanced imaging techniques such as multidetector CT (MDCT), BHVMI may still be overlooked.² CT scan alone cannot be used to predict the need of a surgical intervention for patients with BHVMIs.⁷

On the other hand, once a diagnosis of BHVMI has been made, the standard treatment is laparotomy. Although laparotomy is effective, the procedure is not without risks and is associated with a 5% mortality rate, 20% morbidity rate, and a 3% long-term risk of bowel obstruction.⁸ As experience in laparoscopy for trauma has accumulated, therapeutic interventions have been advocated for patients with penetrating abdominal trauma^{9–11} and BAT,^{11–13} including those with bowel perforations. However, although some successful results have been reported, the actual role of laparoscopy for the diagnosis and treatment of patients with BHVMIs has remained undefined because heterogeneity of patient populations and lack in a control group in these reports.^{11,12}

The purpose of this study was to evaluate the diagnostic and therapeutic value of laparoscopy for hemodynamically stable patients with BHVMIs. We hypothesized that laparoscopy can be effectively used to reduce the laparotomy rate and provide the advantages of minimally invasive surgery for hemodynamically stable patients with BHVMIs.

Patients and Methods

This study protocol was approved by the institutional review board of Far Eastern Memorial Hospital in Taiwan. We retrospectively reviewed the medical records from the trauma registry database for hemodynamically stable adult patients who were suspected to have BHVMIs from July 1, 1999 to December 31, 2013. Patients younger than 16 years of age, who were pregnant, or not hemodynamically stable were excluded. After arriving at the emergency department, all patients with BAT were treated and resuscitated according to Advanced Trauma Life Support principles. Patients who were hemodynamically unstable (systolic blood pressure <90 mm Hg) after fluid resuscitation were taken to the operating room for exploratory laparotomy. A CT scan was arranged for every hemodynamically stable patient after fluid resuscitation to detect the presence of intra-abdominal injuries. CT scans were performed at 5-mm intervals without or with intravenous contrast (Iopamidol, Bracco,

Milano, Italy) by a 4-slice, 16-slice, or a 64-slice CT scanner. Findings suggestive of BHVMIs included intraperitoneal free air, contrast medium extravasations in the mesenteric vessels, or free fluid without solid organ injury. Patients were managed nonoperatively and followed up with physical examinations every 2 hours if no indications for emergency surgery were present. Surgical intervention was performed if clinically significant BHVMI was suspected. Patients with free intraperitoneal fluid on CT who did not exhibit peritoneal signs on serial examinations were managed nonoperatively. Surgical findings of BHVMIs included bowel perforation, laceration, hematoma, or devascularization of the mesentery, stomach, duodenum, small intestine, large intestine, or rectum.

At our institution, on July 1, 2006, laparoscopy was adopted as a diagnostic and therapeutic method for treating hemodynamically stable patients with BAT, including those with BHVMIs. Patients admitted from July 1, 1999 to June 30, 2006 (before the adoption of laparoscopy) underwent exploratory laparotomy for suspected BHVMIs and were categorized as group A. Patients admitted from January 1, 2007 to December 31, 2013 received laparoscopy for suspected BHVMIs and were categorized as group B. An interval of 6 months between the 2 study periods was chosen to decrease the occurrence of protocol violations. The diagnostic criteria of BHVMIs and the principles of postoperative care were all the same in both time periods, and patients might or might not have associated injuries.

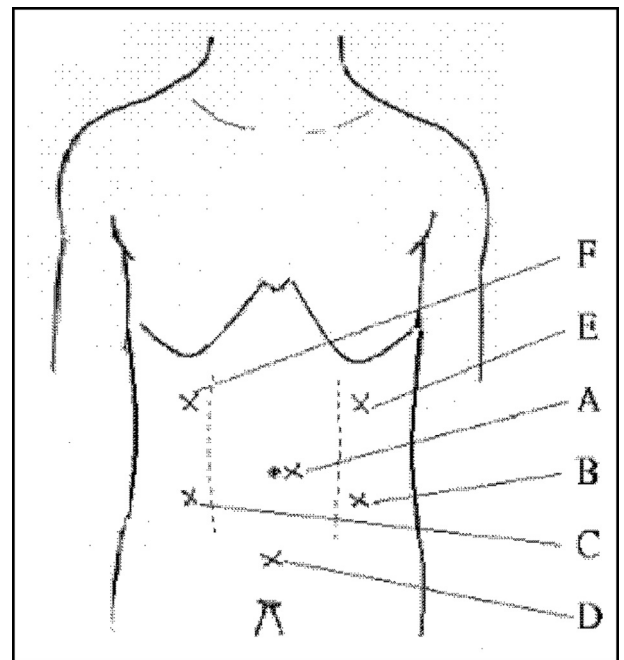


Figure 1 Trocar sites for laparoscopy for patients with blunt hollow viscus and mesenteric injuries. (A) Umbilical port for laparoscope. (B) Working port at left paramedian site. (C) Working port at right paramedian site. (D) Suprapubic port for alternative use of the laparoscope. (E) Optional working port at the left upper abdominal wall. (F) Optional working port at the right upper abdominal wall.

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