

Avoiding of Nontherapeutic Laparotomies in Blunt Abdominal Trauma with Aid of Laparoscopy

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Abstract

Introduction: As there is particular danger that an injury to the diaphragm or intestines be overlooked. The decision in favor of surgery or nonoperative conservative treatment in abdominal trauma requires a precise diagnosis that is not always possible with imaging techniques. Owing to this circumstance, the indications for exploratory laparotomy should be generous with laparoscopy up to 41% of exploratory nontherapeutic laparotomies could be, or could have been, avoided.

Methods: Only in stable blunt abdominal trauma patients. A diagnostic laparoscopy with therapeutic option should only be attempted. three trocars are used and the exploration of the abdomen is systematic, beginning with the right upper quadrant and continuing clockwise injuries to the diaphragm. Small lacerations of the intestines and mesentery can be detected and sutured endoscopically parenchymal organs Injuries can be sealed with tissue adhesive and collagen tamponade to prevent further bleeding.

Results: The number of unnecessary laparotomies and the related morbidity can be reduced with routine use of laparoscopy, because it sensitivity reached 90-100% in abdominal trauma.

Conclusions: In stable blunt trauma patient minimally invasive surgery has become established as a useful tool. The future holds exciting scope for this field of surgery through innovative development in computer technology and robotic systems. The advantages are reduction of morbidity, shortening of hospitalization and cost-effectiveness.

Aims and objectives: The aim of this review is to show the benefits and risks of laparoscopy in blunt trauma patients.

The benefits: The main benefits of laparoscopy are that it can reduce the rate of nontherapeutic and negative laparotomies, identify diaphragmatic injuries accurately, and in some cases provide a therapeutic option. It should be emphasized that the use of laparoscopy as a diagnostic or therapeutic method in patients with trauma is reserved only for hemodynamically stable patients. It should be kept in mind that laparoscopy has limitations in the diagnosis of hollow visceral injury. Laparoscopy can detect and repair diaphragmatic injuries and exclude the risk of nontherapeutic laparotomy due to a nonbleeding injury of the spleen or liver. Further advantages are reduced morbidity, shortened hospital stay, and lower cost.

The risks: (1) Overlooking of injuries, mainly involving the intestinal tract and so delaying their treatment, leading in turn to considerably increased morbidity; (2) Laparoscopy-specific complications, such as vascular and intestinal injuries; (3) Gas embolism.

Missed injuries are the most common of these three problems and probably pose the most serious risk, though the literature data are very unclear on this. While some authors find that laparoscopy is inadequate for detecting intestinal injuries.^{3,4} Even a very experienced surgeon should not hesitate to convert to open technique if there is any uncertainty.⁹ Minimally invasive surgery has become established as a useful tool in the management of trauma. The future holds exciting scope for this field of surgery through innovative developments in computer technology and robotic systems.

Material and methods: A literatures search was performed using Medline and the Search engine google, Springerlink and Highwire press. The following search terms were used: Laparoscopy, blunt trauma, diagnosis of abdominal trauma. Hundreds of literatures and papers published discussing this subject. The most recent selected. The selected papers were screened for farther references. Criteria for selection were the number of cases (excluded if less than 20), methods of analysis, operative procedure (universally accepted procedures were selected), and the institution where the study done.

Keywords: Laparoscopy, trauma, abdominal trauma, diagnosis of abdominal trauma.

INTRODUCTION

Laparoscopy has come to play an increasing role in the last 15 years to come into use as diagnostic and therapeutic methods in visceral trauma. In most industrialized countries, trauma is the most common cause of death in the younger population below the age of 50. About one-half of the deaths take place within minutes at the site of the accident; these are usually

severe head and cardiovascular injuries. Thirty percent of the deaths occur within a few hours of the injury and the remaining 20% after days to weeks due to infections and multiorgan failure. In the second group, in which victims die within a few hours' conservative estimates indicate that some 20-30% of them could be saved with timely diagnosis and proper treatment. Laparoscopy has come to play an increasing role in this concept. It is primarily a diagnostic measure, but when feasible, also be

applied therapeutically in patients who have no obvious indications for emergency surgery for intra-abdominal injury still poses a significant clinical challenge, in spite of several diagnostic methods are available for evaluation of trauma patients. The management of trauma patients should avoid delay, provide prompt diagnosis and appropriate treatment, and avoid complications.

DISCUSSION

Information's from history and clinical examination can provide us clue to the extent of organ injuries and bleeding. After that, there are two radiological examinations that owing to technological developments in the last two decades, have come to provide high-quality information. These are sonography and computer tomography (CT), both of which can be applied quickly and efficiently to trauma patients, whereby hemodynamic stability is a prerequisite for a CT general or trauma surgeons can perform sonography in emergency room.

The focused assessment for the sonographic examination of the trauma patient (FAST) protocol is intended to determine the presence of free fluid in the abdominal cavity and assess its quantity and location.⁵ It is noninvasive and nonstressful and can be repeated as necessary. With portable equipment, ultrasonography can be performed in emergency cases simultaneously with ongoing resuscitation without sedation, and it can also be done at the bedside without moving the patient. Rozycki et al⁶ achieved a sensitivity of 83.3% and specificity of 99.7% in 1540 patients with blunt and penetrating injuries.

CT scan is noninvasive and can provide valuable supplemental information on the size, number, and extent of pathological changes. The findings can be determined very precisely and reproducibly. CT has 97% sensitivity, 98% specificity, and 98% accuracy for peritoneal violation.¹⁰ In detecting bowel injury, CT has an overall sensitivity of 94% and 96% in detecting mesenteric injury.¹¹ Both sonography and CT show a weakness in diagnosing injuries to the diaphragm: Mihos et al.^{1,16,17} achieved a correct preoperative diagnosis in only 26% of 65 patients with a diaphragmatic injury, and in 74%, the diagnosis was made during operation. With these high quality methods, there is still a degree of diagnostic uncertainty with blunt abdominal trauma, especially when the gastrointestinal tract and pancreas are involved.¹²⁻¹⁵ This uncertainty justify for exploratory laparotomies undertaken to avoid overlooked injuries. A considerable number of these laparotomies is unnecessary or nontherapeutic and has corresponding morbidity to avoid overlooked injuries. A considerable number of these laparotomies are unnecessary or nontherapeutic and have corresponding morbidity. The literature shows that a variety of laparoscopic techniques are applicable to patients with abdominal trauma with good results. In a review by Villavicencio and Aucar, in two prospective studies screening laparoscopy for blunt trauma reported sensitivity of 90 to 100%, specificity of 86 to 100%, and accuracy

of 88 to 100%.² In nine prospective series, screening laparoscopy for penetrating trauma reported sensitivity of 85 to 100%, specificity of 73 to 100% and accuracy of 80 to 100% with 2 procedure-related complications among 543 patients.² Diagnostic laparoscopy for blunt trauma reported sensitivity of 100%, specificity of 91%, and accuracy of 96%; for penetrating trauma, sensitivity of 80 to 100%, specificity of 38 to 86%, and accuracy of 54 to 89%.² Missed injuries with screening laparoscopy were 0.4% (6 of 1708 patients) and laparoscopy-related complications were 1.3% (22 of 1672 patients).² Laparoscopy can prevent laparotomy in 63% of patients with a variety of injuries.² The laparoscopic approach avoids a negative laparotomy in 23-54% of stab wound and blunt abdominal trauma patients.⁹ Laparoscopy is cost-effective when compared with negative laparotomy.⁸

HOW TO PERFORM LAPAROSCOPY IN TRAUMA?

With three trocar the abdominal exploration can be performed in systemic manner.

The first access is achieved with open technique using 10 mm trocar at the umbilicus. Gas for the pneumoperitoneum should be insufflated slowly and carefully. After a preliminary inspection of the entire abdominal cavity, two further trocars are introduced on the right and left sides at the level of the navel and somewhat lateral to the medioclavicular line. These working trocars have a diameter of 5-10 mm. The abdomen is explored systematically, beginning with the right upper quadrant and proceeding clockwise. After a first fast survey, the exploration continues in the same order for a second time. This time, blood is vacuumed off into a cell-saver device and the liver, including the subphrenic surface and the visceral fascia, is explored. It is advantageous during this phase of the operation to have the table in the anti-Trendelenburg position to shift the abdominal organs caudally. In the supine position, the spleen is covered by the greater omentum and is not immediately visible. After the anterior wall of the stomach was inspected, the omentum is shifted caudally and the spleen is lifted from its bed with a blunt instrument. While the liver and spleen are being examined, the diaphragm can also be inspected. Even the most remote parts of the diaphragm can be explored more adequately by laparoscopy when compared with the open technique.

After the upper abdominal organs, the left flank with the left flexure, descending colon and sigmoid are examined for injuries down to the left lower quadrant. Then the operating table is brought into the Trendelenburg position for examination of the rectum, Douglas space, and urinary bladder and, in women, the internal genital organs. The examination is continued in the right lower quadrant with the cecum and right hemicolon. The omentum is shifted cranially so that the small intestine can be examined.

Using two atraumatic grasping forceps, the small intestine is followed from the ileocecal region in the oral direction to the duodenal-jejunal flexure. Exploration of the duodenum, posterior

gastric wall, and pancreas is only indicated when injury to these organs is suspected. It is justified when there are hematomas or thrombi adherent on these organs and/or on the basis of a CT image. Treatment depends on the equipment available in the respective hospital and the surgeon's personal experience.

CONCLUSION

In stable blunt trauma patient minimally invasive surgery has become established as a useful tool. The future holds exciting scope for this field of surgery through innovative development in computer technology and robotic systems. The advantages are reduction of morbidity, shortening of hospitalization and cost-effectiveness.

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