

3 Trocars Laparoscopic Right Hemicolectomy for Gunshot Wound

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Abstract

Introduction: Penetrating abdominal trauma can present a large array of symptoms and clinical status. Laparoscopic and laparotomy approaches can be considered for patients presenting a penetrating abdominal trauma.

Case Presentation: A 49-year-old male was admitted to the Emergency Unit of Saint Pierre University Hospital, Brussels, with a gunshot wound localized on the right flank. A laparoscopic 3 trocars right colectomy for ileal transection and ascendant colon perforation was performed.

Discussion: The laparoscopic approach can be considered for the hemodynamically stable patients or those responsive to initial resuscitation. It can allow the identification of the hemoperitoneum, the solid or hollow organ injury and option of treatment by resection and suture.

Keywords: Trocars; Gunshot Wound; Laparotomy

Introduction

Penetrating abdominal trauma can present a large array of symptoms and clinical status. The initial clinical examination is very important for a quick and efficient medical treatment. The mechanism of injury as stab wounds, gunshot wounds and also the localization of the lesion (intraperitoneal, retroperitoneal, and thoracoabdominal) can offer important information for the surgeon [1].

A debate stands on whether laparoscopic approach or a laparotomy is the best initial approach in patients who present with penetrating abdominal trauma [2]. Laparoscopy is cost effective, reduces the patient's stay in hospital and mortality and allows early mobilization and resumption of work [3]. In case of negative laparotomies, the hospitalization is longer (5.3 days for no injury vs. > 11 days is associated with injuries) and there is a higher incidence of deep vein thrombosis, pulmonary embolism, pneumonia, wound infection, wound dehiscence, abscess formation and later bowel obstructions from adhesions and ventral hernias [1]. The contraindications of the laparoscopic approach are patients who are hemodynamically unstable and the impossibility to view all surfaces of the intra-abdominal organs [4]. Clinical suspicion for hollow viscus injury for a hemodynamically stable patient must include without doubt a diagnostic laparoscopy [5].

We present the laparoscopic management of a patient who arrived in our hospital for a gunshot wound localized on the right flank with bowel transection and ascendant colon perforation.

Case Presentation

A 49-year-old male was admitted to the Emergency Unit on Hospital with a gunshot wound localized on the right flank.

On arrival his vital signs showed auricular temperature of 37.5°C, heart rate of 110 bpm and blood pressure of 110/70 mmHg. The patient was hemodynamically stable.

The physical exam revealed generalized abdominal voluntary guarding and rebound tenderness. The inspection of the right flank revealed a bleeding round wound that correspond to a gunshot but also the same type of wound on the dorsal region who correspond to a transfixant gunshot.

Laboratory data showed an inflammatory syndrome with leukocytosis at $15.58 \times 10^3/\mu\text{L}$ (normal $3.50\text{-}11.00 \times 10^3/\mu\text{L}$) and CRP at 124mg/L (normal <10.0) and also an anemia with hemoglobin at 11.5 g/dL (normal $13.0 - 18.0\text{g/dl}$). The CT scan revealed a free extra-visceral air on the right flank and infra-diaphragmatic region, and a generalized intra-abdominal collection (Figure 1). An emergency exploratory laparoscopy was performed and revealed a hemoperitoneum, a transection of the small bowel at 15 cm from the ileo-caecal valve and a perforation of the ascendant colon. On the parietal entry point, the abdominal presented a 3 cm wound. A 3 trocars right hemicolectomy with a semi-mechanical side-to-side intra-corporeal anastomosis was performed. An extensive peritoneal lavage was also completed. A drain next to the anastomosis was placed. The parietal wound was also closed. A broad-spectrum antibiotic therapy was initiated. The patient's postoperative course was marked by a parietal infection on the entry point of the bullet and also on the level of exit point. The patient resumed oral intake on the 3rd postoperative day and was slowly progressed to soft diet. He was discharged from the hospital on the 15th post-operative day due to the parietal infection.

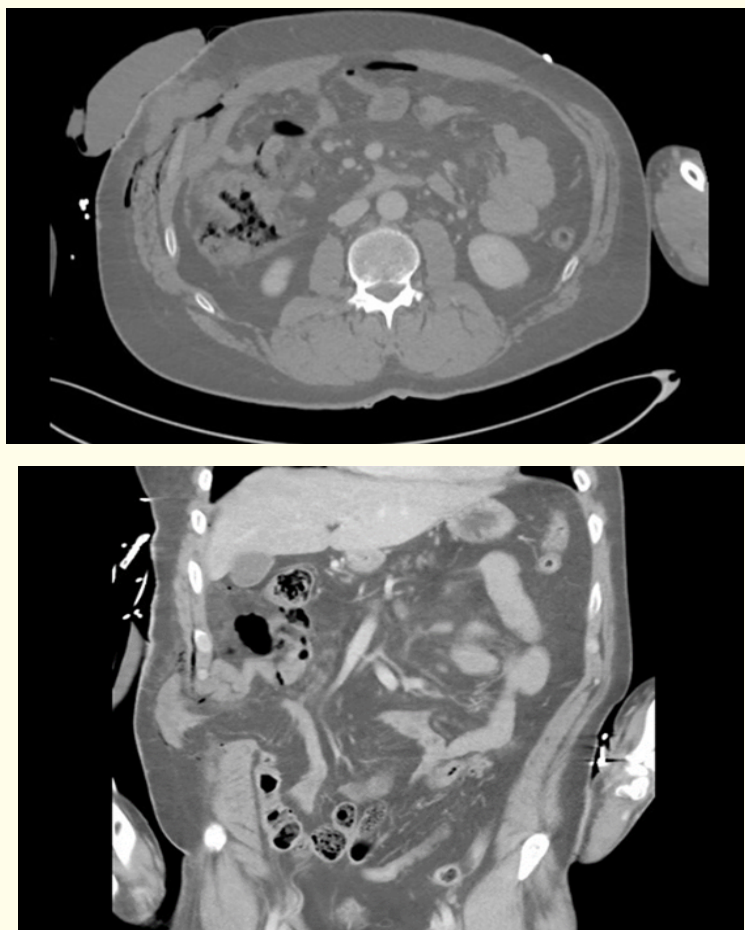


Figure 1: The CT scan revealed free intra-abdominal air and fluid on the right side of the abdomen.

Discussions

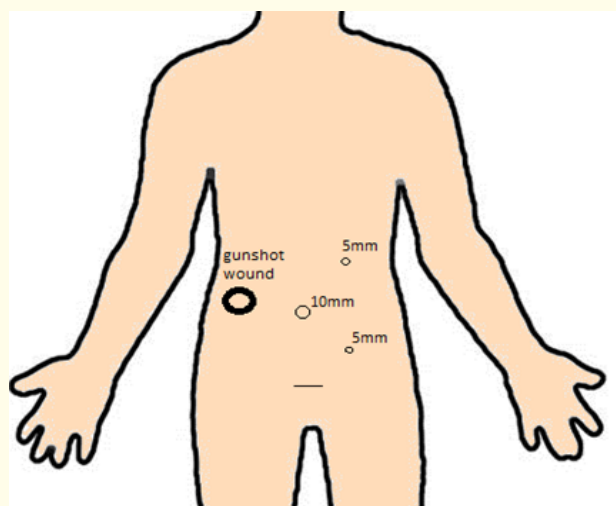
The laparoscopic approach is a technique that proved the feasibility for the elective setting. The use of laparoscopy in emergency surgeries is still in debate. The sensitivity and specificity of diagnostic laparoscopy for the trauma patients can be up to 99.1% [3].

The laparoscopic approach applies to the hemodynamically stable patients or those responsive to initial resuscitation. It can allow the identification of the hemoperitoneum, the solid or hollow organ injury and also give the option of resection and suture [6]. By laparoscopy the surgeon can detect and repair diaphragmatic injuries accurately and exclude the risk of non-therapeutic laparotomy due to a non-

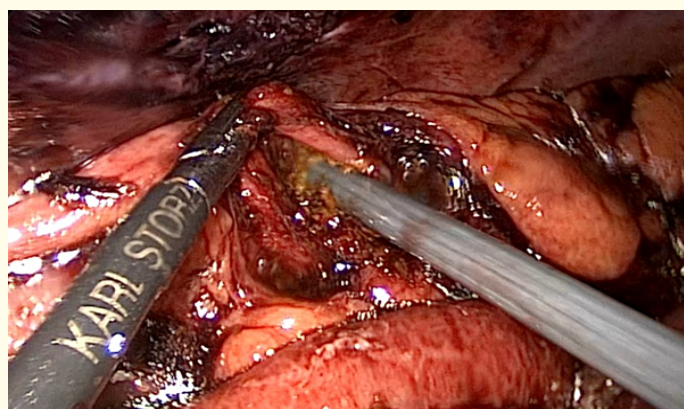
bleeding injury of the solid organs [7]. A good localization and understanding of the injury can allow a good positioning of the trocars [8]. Laparoscopy can avoid the non-therapeutic laparotomy, but controversies still exist on the therapeutic potential of laparoscopy and especially in case of missed injuries [9]. Still diagnostic laparoscopy allows for more accurate use of open laparotomy when significant injuries are identified [10,11]. It provides early mobilization, early oral intake, fast recovery, early resumption of work, reduced post-operative stay in the hospital and analgesic requirement. The conversion must not be considered as a complication but rather the correct way of completing the operation in an appropriate situation and applies for the patients with extensive intraabdominal bleeding suggesting the possibility of major vessel injury, a significant deterioration of the patient and the complexity of injuries requiring a prolonged laparoscopic procedure [12]. For the stable patient the surgical decision is taken after the routine exams: wound examination result, blood test, assessment sonography for trauma (FAST) and computed tomography (CT) [13]. Generally, the laparoscopic management of trauma patients is limited by reasons like lack of technical skills and resources [14]. The laparoscopy is widely accepted and used especially in centers with experience and laparoscopic skills [15]. Lately, the surgeon's choice primarily determines the surgical approach [16].

Operative technique

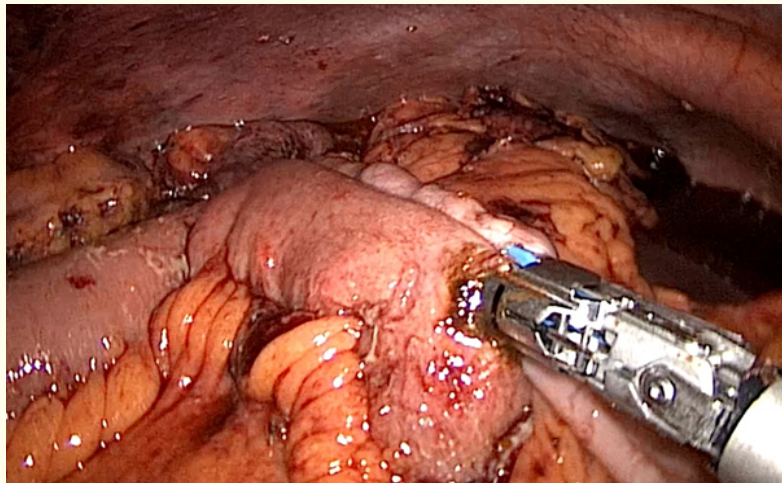
We performed a 3 trocars laparoscopic hemicolectomy. The disposition of the trocars was: 10 mm trocar was placed on the level of the umbilicus, 5 mm trocar on the left hypochondrium and a 5 mm trocar on the lower side of the left flank. A 5 cm pubic incision was used for the specimen's removed (Figure 2). For the coagulation we used an ultrasonic device and for the ileo-colic vessels we used plastic clips.



Trocars positioning



Identification of the colon perforation



Anisoperistaltic latero-lateral anastomosis.

Figure 2

The exploration intraoperative exploration revealed free blood that was aspirated. A sample was taken for the bacteriological exam. No active bleeding was noticed. A complete transaction of the small bowel at 15 cm from the ileo-caecal valve was revealed and also a complete anterior and posterior wall of the ascendant colon. We performed a complete mobilization of the right colon until to the right side of the transverse colon. After the ileon and colon section using a mechanic stapling device we performed a semi-mechanical anisoperistaltic anastomosis. The enterotomy was closed with absorbable suture. The mesenteric defect was closed using non-absorbable suture. An extensive peritoneal lavage was performed. The parietal entry point of the bullet was closed using absorbable suture. We placed one abdominal drain, next to the anastomosis. The drain was placed on parietal incision of the inferior 5 mm trocar.

Operative technique

The patient recovered the intestinal transit 48h hours after the surgery and the oral intake was resumed. The abdominal drains were removed after 5 days.

The most postoperative challenging par was the part was the parietal infection on the entry and exit point of bullet. The bacteriological exam revealed an infection with *Escherichia coli*, *Enterococcus faecalis* and avium. An intravenous antibiotherapy with Maxipime and Vancomycin was started. Local cares by isobetadine daily irrigations were performed, with a good evolution.

Conclusions

The laparoscopic approach is feasible for the penetrating abdominal trauma, for the patients who present hemodynamical stability. If there are no visceral injuries, a complete exploration can be realized without the inconvenient of the laparotomy. In case of visceral injuries by laparoscopy the surgeon can perform the therapeutic solution. In any case the conversion to laparotomy can be considered in front the local status of the patient.

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