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BEDSIDE LAPAROSCOPY AS DIAGNOSTIC TOOL REVIEW OF ABDOMINAL PATHOLOGIES IN CRITICALLY ILL PATIENTS: REVIEW

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Abstract

Introduction: The diagnosis of abdominal pathologies in critically ill patients is often difficult because of inconclusive laboratory tests or imaging results, or the inability to safely transfer a patient to the radiology room. These causes give a delayed diagnosis of abdominal pathology in the intensive care unit (ICU) and increase rate of morbidity and mortality. The aim of this retrospective study is to evaluate the safety and diagnostic accuracy of bedside diagnostic laparoscopy in the identification of intra-abdominal pathology in critically ill patients.

Aim: The aim of this retrospective study is to evaluate the safety and diagnostic accuracy of bedside diagnostic laparoscopy in the identification of intra-abdominal pathology in critically ill patients.

Materials and Methods: A literature research was carried out including PubMed, Medline, Embase, Cochrane and Google Scholar databases to identify articles reporting on importance of diagnostic accuracy of bedside diagnostic laparoscopy in the identification of intra-abdominal pathology in critically ill patients.

Conclusions: Bedside diagnostic laparoscopy represents a safe and accurate technique for diagnosing intraabdominal pathology in an ICU setting and should be taken into consideration when patient transfer to radiology or the operating room is considered unsafe or when routine radiological examinations are not conclusive enough to reach a definite diagnosis.

Keywords: Bedside laparoscopy, critically ill patients, ultrasonography (US), computed tomography (CT) , emergency surgery

Introduction

The diagnosis of abdominal pathologies in critically ill patients is often difficult because radiological examinations sometimes do not provide any specific findings. Difficulties in diagnosis represent a challenge for surgeon in ICU patients. A large percentage of laparotomies are negative or non-therapeutic and are associated with a high-morbidity rate (22%) [1]. This is the reason why it is important to avoid a non-therapeutic laparotomy in critically ill patients. Despite ultrasonography (US) and computed tomography (CT) are available for surgeons to help them in the diagnosis, these diagnostic examinations are often non-conclusive to obtain a rapid diagnosis. Bedside Laparoscopy (BL) may be helpful in diagnosing abdominal diseases by providing the surgeon the possibility to explore abdominal cavity without moves patient in operating room [2,3]. BL could be helpful mostly when radiological examinations are not conclusive for a diagnosis and there are discrepancies between laboratory tests, clinical findings and radiological imaging, in such selected patients in which a prompt diagnosis and treatment are the sole chance of survival .Moreover BL provides a impaired morbidity and mortality rate and it allows to surgeons to perform a 'tailored laparotomy" because the surgeon already has a precise plan of what should be performed [4]. Limitations of the procedure can be identified as it is an invasive procedure which implies the possibility of complications, it often has a limited field, low sensitivity for retroperitoneal diseases and it need appropriate technologies in ICU associated with an expert laparoscopic equipe[5].We want to demonstrate the advantages and disadvantages of performing bedside diagnostic laparoscopy in the ICU setting as an option every time there is a doubtful diagnosis of an intra-abdominal pathology.

Materials and Methods

A literature research was carried out including PubMed, Medline, Embase, Cochrane and Google Scholar databases to identify articles reporting on importance of diagnostic accuracy of bedside diagnostic laparoscopy in the identification of intra-abdominal pathology in critically ill patients.

Inclusion and exclusion criteria

The keywords used were "Bedside laparoscopy, critically ill patients, ultrasonography (US), computed tomography (CT) , emergency surgery" . We analyzed all full-texts, randomised and nonrandomised clinical trials and

observational studies. We exclude all manuscript who talked about the use of diagnostic accuracy of bedside diagnostic laparoscopy in the identification of intra-abdominal pathology in critically ill patients.

Operative technique

With the patient in a supine Trendelenburg or anti-Trendelenburg position to obtain the most appropriate laparoscopic view (e.g. diaphragmatic exploration), trocar was placed into the paraumbilical region. In patients who underwent prior laparotomic surgery, trocar can be inserted through a portion of the laparotomy incision. Pneumoperitoneum was achieved by inflating the abdominal cavity with carbon dioxide at 8 to 15 mmHg.

Outcomes

In a study published by Just et al.[6], the authors showed CT Scan identifies a potential infectious source in critically ill surgical patients in 52.8% of cases and this was associated with a change in treatment in 85.5% of cases. Conversely, in patients without identification of an infectious source at CT imaging, treatment was changed in 16.2% of cases. A retrospective review by Alemanno et al[4].129 patients were submitted to bedside laparoscopy with the aim to avoid non-therapeutic laparotomy. The authors showed that in 55.03% of all patients submitted to bedside laparoscopy, a non-therapeutic laparotomy was avoided, while the 33.76% of patients submitted directly to laparotomy had a non-therapeutic laparotomy that could be avoidable. Bedside laparoscopy had similar intraoperatory complications to patients submitted directly to laparotomy, post-operatory complications were higher in the group of patients submitted to laparotomy, especially in the subgroup of patients who were reported negative to explorative laparotomy. Mortality rate after a negative bedside laparoscopy was 18% and it was statistically lower than the percentage of patients deceased after a negative exploratory laparotomy about 38%. Several authors have described this procedure demonstrating a change in clinical management after bedside laparoscopy with a range from 27% to 70%. All studies showed the efficacy and safety of the BL to obtain the diagnosis of intra-abdominal diseases in patients with sepsis of unknown origin. [7,8,9,10]. Peris et al.[11] presented a retrospective studies on 32 patients in ICU who were applied BL. They stated the procedure was performed on an average of eight days after ICU admission (95% confidence interval = 5 to 15 days) and mean procedure duration was 40 minutes. Bedside diagnostic laparoscopy was diagnostic for intraabdominal pathology in 22 patients, who subsequently underwent surgery,without complications during BL procedures.They concluded Bedside diagnostic laparoscopy represents a safe and accurate technique for diagnosing intraabdominal pathology in an ICU setting. Karasakalides A et al.[12], had made a study applying BL on 35 ICU patients. Thy demonstrated laparoscopic findings were negative for intra-abdominal disease in 57.1% (n = 20) patients. The remaining patients (42.9%; n = 15) had positive laparoscopic findings for intra-abdominal disease. The overall mortality rate in the group of patients was 60%. The time required for BL was less (21.8 +/- 7.6 minutes) than the time required for a CT scan (38.2 +/- 6.2 minutes; $P < 0.05$). They concluded that diagnosis of the abdomen in intensive care (ICU) patients who are intubated can be very challenge. For this reason,bedside X-Ray or bedside US and peritoneal lavage are available to assist the clinician, but these tests can be often unreliable .CT scan is more reliable, but it requires transportation to the Radiology Department. Diagnostic Laparoscopy (DL) in the ICU seems to be safe and diagnostic. A retrospective study was performed by Ceribelli et al.[13] of the 62 patients who underwent bedside diagnostic laparoscopy, 43 (69.3%) had positive findings and 29 (46.7%) had acute acalculous cholecystitis. The mean operation time was 38 min and no procedure-related deaths occurred. They stated BL had high diagnostic accuracy for acute intraabdominal conditions and avoided negative laparotomies for unstable patients. Jaramillo EJ et al.[14] studied the results of 13 bedside diagnostic laparoscopy in the ICU Forty-six percent of the patients were diagnosed with mesenteric necrosis. Fifteen percent were diagnosed with acute acalculous cholecystitis .They concluded BL was feasible, safe and accurate in the assessment of possible intraabdominal problems in properly selected, critically ill patients. Even Iberti TJ et al.[15],described a case report with the use of BL to identify suspected gangrenous bowel in critically ill postoperative patient after aortic aneurysm surgery. Rosin D et al.[16] described the use of BL in 4 patients concluding earlier use of this diagnostic modality may improve patient outcome.Sajid MA et al.[17]recommended the use of DL as a safe and feasible investigation after applying it on 28 consecutive patients divering the causes of unexplained lactic acidosis in ICU.

Discussion

Abdominal symptoms are often hidden by the presence of deep sedation and/or analgesia, so laboratory tests (e.g. leucocytes count, procalcitonin, lactate or specific enzymes plasma levels), arterial blood gas analysis and, above all, radiological findings, become the key to a correct diagnosis of intraabdominal pathology[18]. A bedside diagnostic laparoscopy was performed if clinical signs or symptoms or imaging or laboratory studies are unable to unexplaine sepsis or multisystem organ failure or there is inability to perform a CT scan because of the critical conditions of the patients. Contraindications for bedside diagnostic laparoscopy included patients with a clear indication for surgical operation and/or with a CT scan or US images diagnostic for abdominal pathologies, previous multiple abdominal surgery with multiple incisional scars, the presence of an uncorrectable coagulopathy and the presence of cardiorespiratory failure.[4]. Some review

underlined the importance of BL during penetrating and blunt trauma and in the obscure abdomen, acalculous cholecystitis, abscess drainage, as a tool to avoid risky transport trips and negative or nontherapeutic laparotomy with its known associated risks. The study recommended it is important to limit insufflation pressures and laparoscopy time. The authors also recommends using the open Hasson technique.[19,20,21,22,23,24]

Conclusions

Bedside diagnostic laparoscopy should be contemplated anytime there is the suspicion of intraabdominal pathology based on suggestive, but not conclusive, laboratory and radiological results or in the case of the inability to transfer a critically ill patient to the radiology department. This review demonstrates the advantages of the use of bedside diagnostic laparoscopy in the ICU setting such as the possibility of early diagnosis, of an early surgeon's plan in operating room as avoid non conclusive diagnostic exams o non-therapeutic laparotomy.[25,26,27,28]

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