LESS

Original Article

Laparosc Endosc Surg Sci 2019;26(2):41-44
DOI: 10.14744/less.2019.16362

Role of laparoscopy procedure in the diagnosis and treatment of traumatic acute abdomen: Original article

Murat Kanlioöz,[1] Uğur Ekici[2]

[1]Department of General Surgery, Private Kolan Hospital, İstanbul, Turkey
[2]Department of General Surgery, İstanbul Gelişim University Faculty of Medicine, İstanbul, Turkey

ABSTRACT

Introduction: The objective of this study was to analyze the role of laparoscopy in the diagnosis and treatment of traumatic acute abdomen.

Materials and Methods: Cases of patients with traumatic acute abdomen from between 2009 and 2017 diagnosed with laparoscopy but not examination, laboratory tests, or radiological methods were reviewed. These were patients with unstable vital signs for whom time was critical . The patient demographic data, causes of acute abdomen, procedures applied, and duration of hospitalization were analyzed.

Results: Of the total of 138 patients, the cause of admission was a traffic accident in 46 cases (33.33%), sharp object injury in 27 (19.56%), gunshot injury in 19 (13.76%), falling from a height in 16 (11.59%), work accident in 14 (10.14%), physical violence in 9 (6.92%), sports injury in 4 (2.89%), and an animal kick in 3 (2.17%). In all, 56 (40.58%) were female and 82 (59.42%) were male. The mean age was 27.45±9.81 years. Of the patients, 64 (46.38%) had only abdominal trauma, while 74 (53.62%) had multiple trauma. The procedures performed included 83 (60.14%) diagnostic laparoscopies, 30 (21.74%) laparoscopies with additional laparoscopic procedures, and 25 (18.11%) instances of post-laparoscopy open surgery. In the group, 113 (81.88%) were discharged after healing; morbidity and mortality were observed in 21 (15.22%) and 4 (2.89%), respectively. The mean hospital stay was 2.82±1.64 days in patients with only abdominal trauma and 4.34±2.08 days in those with multiple trauma.

Conclusion: Laparoscopy contributes significantly to the diagnosis and treatment of selected patients.

Keywords: Diagnostic laparoscopy; laparoscopic surgery; traumatic acute abdomen.

Introduction

As a general surgical emergency, traumatic acute abdomen is a picture that pushes us to act quickly, make an effective and quick decision and start treatment in the shortest time possible. This requires qualified knowledge as well as experience and algorithms. At least as much as a delayed treatment, we should also be aware that a medical attention given following a wrong diagnosis may cause irreversible damage. Putting wars aside, we see that most of the traumatic injuries develop after traffic accidents in modern societies.[1] The other abdominal traumas include sharp object injuries, gunshot injuries, falling from height, work accidents, sports injuries, physical violence, animal attacks and electrical injuries. Any information we

Received: 31.05.2019 **Accepted:** 03.06.2019
Correspondence: Murat Kanlioöz, M.D., Department of General Surgery, Private Kolan Hospital, İstanbul, Turkey
e-mail: muratkanlioz@gmail.com

get about the cause of trauma may be guiding in diagnosis and treatment. Multiple traumas require a multidisciplinary approach. The team leader evaluates and prioritizes the data in hand. Once the basic vital parameters are evaluated, we proceed to the abdominal examination. We should note that vascular damage in multiple traumas is one of the most important causes of mortality and therefore, we should act quickly.[2] Along with the examination, we use laboratory tests, radiological imaging and diagnostic tests (paracentesis, peritoneal lavage, etc.) to get closer to the diagnosis. We should also consider the allergic and nephrotoxic effects of radiopaque contrast agents used in radiological tests. It should also be noted that the rhabdomyolysis that occurs especially in multiple traumas may further aggravate borderline renal failures.[3] Modern imaging techniques may sometimes fail to reveal an abdominal injury due to trauma. In such cases, laparoscopy is an important diagnostic tool.[4] Along with the diagnosis, laparoscopy can also be used in the treatment process. When performed by experienced teams, laparoscopy is a useful method in decreasing morbidity and mortality in abdominal trauma. In our study, we aimed to assess the contribution of laparoscopy to diagnosis and treatment.

Materials and Methods

We reviewed the laparoscopies that we performed in cases with acute abdomen due to blunt and penetrating trauma between 2009 and 2017. Those patients were admitted to the hospital due to traffic accident inside or outside the car, falling from height (from tree, balcony, roof), physical violence, sharp object injury, gunshot injury, work accident, sports injury and animal kicking. We did not perform diagnostic laparoscopy for all patients admitted with this type of traumas. The patients for whom we decided to perform diagnostic laparoscopy included the patients in whom we failed to deliver a diagnosis with physical examination, laboratory tests and radiological methods. Those patients had severe vital complaints. The patients for whom we decided to perform laparoscopy were those in which we believed that additional examination and clinical observation would cause a time loss that would weight against the patient and those in which could not eliminate acute abdominal pathology in any way possible. We reviewed case records and file contents and included those which had complete information in our study. We recorded and analyzed patients' age, gender, type of trauma, non-abdominal injury, laparoscopy results, morbidity, mortality, complementary treatments, open surgeries, length of hospital stay and discharge from hospital.

Results

Of a total of 138 patients included in the study, the cause of admission included: traffic accident in 46 (33.33%), sharp object injury in 27 (19.56%), gunshot injury in 19 (13.76%), falling from height in 16 (11.59%), work accident in 14 (10.14%), physical violence in 9 (6.92%), sports injury in in 4 (2.89%), animal kicking in 3 (2.17%). Of the 138 patients in total, 56 (40.58%) were female and 82 (59.42%) were male. The mean age was 27.45±9.81 years. Of the patients, 64 (46.38%) had only abdominal trauma and 74 (53.62%) had multiple trauma. While 83 (60.14%) of the patients underwent only a diagnostic laparoscopy, 30 (21.74%) were subjected to additional procedures (laparoscopic splenectomy, coagulation for hemostasis, lavage, drainage, etc.) along with diagnostic laparoscopy. In the remaining 25 (18.11%) patients, an emergency open surgery was performed by aborting the laparoscopy. Of the patients, 113 (81.88%) were discharged after healing whereas different types of morbidities and mortality were observed in 21 (15.22%) and 4 (2.89%), respectively. In two out of the four mortality cases, the mortality was caused by abdominal trauma only, whereas two patients had multiple traumas and died because of non-abdominal trauma (Table 1). Of the two mortality cases with abdominal trauma, one was admitted due to gunshot injury and the other due to falling from height. On the other hand, of the two mortality cases with multiple trauma, one was admitted due to falling from height and the other due to sharp object injury. Two of the traumatic mortality were due to abdominal trauma, while others were due to intracranial hemorrhage and respiratory failure. If there are two mortality rates due to abdominal trauma; One of the patients with ex trauma was colon injury, while the other had liver and spleen injury. There was no delay as interventional laparoscopy was performed in the early period in order not to delay the intervention.

The mean hospital stay of 64 patients with only abdominal trauma was 2.82±1.64 days, including 1.62±0.74 days in 39 (60.93%) patients who underwent no other procedures except for diagnostic laparoscopy, 2.15±1.37 days in 13 (20.31%) patients who underwent additional laparoscopic intervention besides laparoscopy and 7.44±4.46 days in 12 (18.75%) patients who underwent open surgery after laparoscopy (Table 2).

Of the 74 patients with acute abdomen who were admitted for multiple trauma, the mean hospital stay was 4.34±2.08 days, including 1.87±0.95 days in 44 (59.46%)

Table 1. Patients undergoing Laparoscopy

	Gender			Trauma		Process made (n)			Result		
	Female	Male	Total	Abdominal trauma	Multiple trauma	Laparoscopy only	Laparoscopic (+) laparoscopic intervention	Laparoscopy (+) open surgery	Discharged with healing	Morbidity	Mortality
Injury reason (n)											
Traffic accident	19	27	46	14	32	33	11	2	44	2	0
Injury with a penetrating object	12	15	27	22	5	14	6	7	21	5	1
Firearm Injury	6	13	19	14	5	6	4	9	14	4	1
Falling from high	7	9	16	2	14	10	3	3	9	5	2
Work accident	2	12	14	5	9	8	3	3	11	3	0
Physical violence	7	2	9	2	7	8	1	0	9	0	0
Sports injury	1	3	4	3	1	3	1	0	3	1	0
Animal tread	2	1	3	2	1	1	1	1	2	1	0
Total	56	82	138	64	74	83	30	25	113	21	4

Table 2. Hospitalization period of patients undergoing laparoscopy

	Hospitalization period (day)
Abdominal trauma	
Total (n=64)	2.82±1.64
Laparoscopy only (n=39)	1.62±0.74
Laparoscopic (+) Laparoscopic intervention (n=13)	2.15±1.37
Laparoscopy (+) Open surgery (n=12)	7.44±4.46
Multiple trauma	
Total (n=74)	4.34±2.08
Laparoscopy only (n=44)	1.87±0.95
Laparoscopic (+) Laparoscopic Intervention (n=17)	2.48±1.12
Laparoscopy (+) Open surgery (n=13)	15.16±9.21

patients who underwent no other procedures except for diagnostic laparoscopy, 2.45±1.12 days in 17 (22.98%) patients who underwent additional laparoscopic intervention besides laparoscopy and 15.16±9.21 days in 13 (17.57%) patients who underwent open surgery after laparoscopy (Table 2).

Discussion

During the period when did not use laparoscopy for diagnostic purposes, we used to diagnose the traumatic acute abdomen with examination, laboratory tests and imaging methods. In cases where they remained insufficient, we used to employ paracentesis and peritoneal lavage methods. And in cases where we could not manage to deliver a diagnosis using those methods, our path to diagnosis included clinical follow-up and diagnostic laparotomy. As a minimally invasive method, laparoscopy has opened new horizons to us in both diagnosis and treatment. In their study, Caruso et al.[5] set forth that performing laparoscopy for diagnostic and therapeutic purposes in non-traumatic acute abdomen is a highly effective, reliable and inexpensive method to finalize the diagnosis. Laparoscopy constitutes both a therapeutic and a diagnostic method. Of the 138 patients in our study, we managed to complete the treatment only using laparoscopy in 113 (81.88%) patients whereas we performed open surgery only in 25 (18.12%).

Perri et al.[6] reported in their study that the rate of proceeding to urgent and elective open surgery was 13% in all laparoscopy series. In their study, Lee et al.[7] reported that they proceeded to open surgery in 16.8% of acute abdomen patients undergoing laparoscopy. The 25 patients in which we proceeded to open surgery had severe organ injuries (bowel perforation, bile duct damage, liver laceration, splenic laceration, pancreas damage, abundant bleeding due to vascular trauma, etc.). If we were in the period when we did not use laparoscopy, we might only follow a part of those 138 patients and might not perform laparotomy for a good part thereof. Thanks to laparoscopy, we could manage to detect a total of 55 (40%) patients -including 25 patients in which we proceeded to open surgery and 30 patients in which performed laparoscopic intervention in addition to laparoscopy- who required clinical response without losing time. If this happened during the period in which we did not use laparoscopy, we probably might perform laparotomy for some of these 55 patients and might only follow up the other patients. There might also occur mortality and morbidity in some patients followed up. Cherry-Bukowiec et al.[8] reported in their study that laparoscopy reduces unnecessary surgical burden in nontraumatic emergency surgery. Some of the 83 patients completed with diagnostic laparoscopy might probably require diagnostic laparotomy. We believe that, thanks to laparoscopy, a serious group of patients have been eluded from undergoing laparotomy. In their study, Pucher et al.[9] reported that performing laparoscopy instead of emergency laparotomy decreases mortality, length of hospital stays and medical costs. No mortality and morbidity were observed in 83 patients who underwent diagnostic laparoscopy. Of the patients who underwent diagnostic laparoscopy, the mean length of hospital stay was 1.62±0.74 in those with abdominal trauma only and 1.87±0.95 in those with multiple trauma. The shorter length of hospital stays in 83 patients who underwent diagnostic laparoscopy is important in terms of costs. Also, our study showed us that laparoscopy is of great importance in the diagnosis. Al-Mulhim et al.[10] stated in their study that they delivered a final diagnosis in 89% of the patients to whom they performed laparoscopy. Based on our clinical observations, we can say that we have come a long way in the selection and performance of laparoscopy. In their well-attended survey on surgeons in Italy, Agresta et al.[11] reported that laparoscopy is increasingly being used in acute abdominal surgeries performed in the period of 2010–2014.

Disclosures

Financial disclosure: There are no financial supports.

Ethichs Committee Approval: The study was approved by the Local Ethics Committee.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

References

1. Siegel JH, Smith JA. Multiple Trauma. In: Sayek İ, translation editor. Temel Cerrahi. 4th ed. Ankara: Nobel Kitabevi; 2013. p. 383–406.
2. Iacobellis F, Ierardi AM, Mazzei MA, Magenta Biasina A, Carrafiello G, Nicola R, et al. Dual-phase CT for the assessment of acute vascular injuries in high-energy blunt trauma: the imaging findings and management implications. Br J Radiol 2016;89:20150952. [CrossRef]
3. Stewart IJ, Faulk TI, Sosnov JA, Clemens MS, Elterman J, Ross JD, et al. Rhabdomyolysis among critically ill combat casualties: Associations with acute kidney injury and mortality. J Trauma Acute Care Surg 2016;80:492–8. [CrossRef]
4. Kleanthis A, Mouravas V, Lampropoulos V, Babatseva E, Spyridakis I. Laparoscopic evaluation and management of isolated gastric rupture in a boy after blunt abdominal injury. Pan Afr Med J 2017;27:173. [CrossRef]
5. Caruso C, La Torre M, Benini B, Catani M, Crafa F, De Leo A, et al. Is laparoscopy safe and effective in nontraumatic acute abdomen? J Laparoendosc Adv Surg Tech A 2011;21:589–93. [CrossRef]
6. Perri SG, Altilia F, Pietrangeli F, Dalla Torre A, Gabbrielli F, Amendolara M, et al. Laparoscopy in abdominal emergencies. Indications and limitations. [Article in Italian]. Chir Ital 2002;54:165–78.
7. Lee KB, Wong SK. Emergency laparoscopic surgery-the Changi General Hospital experience. Ann Acad Med Singapore 2002;31:155–7.
8. Cherry-Bukowiec JR, Miller BS, Doherty GM, Brunsvold ME, Hemmila MR, Park PK, et al. Nontrauma emergency surgery: optimal case mix for general surgery and acute care surgery training. J Trauma 2011;71:1422–6. [CrossRef]
9. Pucher PH, Carter NC, Knight BC, Toh S, Tucker V, Mercer SJ. Impact of laparoscopic approach in emergency major abdominal surgery: single-centre analysis of 748 consecutive cases. Ann R Coll Surg Engl 2018;100:279–84. [CrossRef]
10. Al-Mulhim AS, Nasser MA, Abdullah MM, Ali AM, Kaman L. Emergency laparoscopy for acute abdominal conditions: a prospective study. J Laparoendosc Adv Surg Tech A 2008;18:599–602. [CrossRef]
11. Agresta F, Campanile FC, Podda M, Cillara N, Pernazza G, Giaccaglia V, et al. Current status of laparoscopy for acute abdomen in Italy: a critical appraisal of 2012 clinical guidelines from two consecutive nationwide surveys with analysis of 271,323 cases over 5 years. Surg Endosc 2017;31:1785–95.