Thoracoabdominal trauma: Improved Diagnosis and Management Algorithm

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ABSTRACT

The study is based on the results of surgical treatment of 190 patients with thoracoabdominal injuries. The main group consisted of 68 patients, and the improved surgical algorithm was used in the stages of their diagnosis and treatment, the comparison group consisted of 122 patients, and traditional standard methods of diagnosis and treatment were used. In the study, improved surgical tactics were proven to be highly effective for thoracoabdominal injuried patients.

Keywords: thoracoabdominal injuries, laparascopy, thoracoscopy

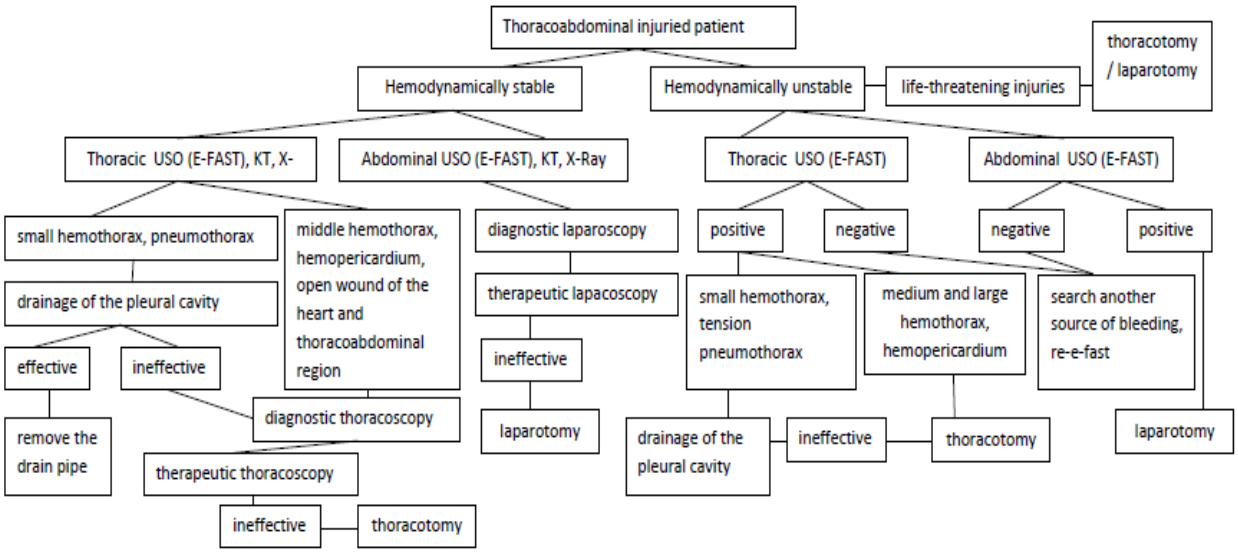
Introduction. A diagnosis and treatment of thoracoabdominal injuried patients is one of the major problems of emergency surgery. This situation is related not only to the prevalence of this type of injury, but also to the high frequency of diagnostic and treatment errors and complications [3,5,9]. A very large percentage of diagnostic thoracotomy and laparotomies remains, therefore, according to a number of authors, the frequency of diagnostic laparotomies reaches from 24.9% to 33.5%. At the same time, in 27.6% of cases, there is no damage to internal organs in the case of open wounds of the abdominal cavity. Until now, the frequency of unnecessary thoracotomy for chest injuries in peacetime is 12-14.6% [4,6,7]. Unnecessary operation always harmful for human body and it leads to decline ability of compensation and later to death.

In many cases, various diagnostic and tactical errors occur due to the limitations of traditional diagnostic and treatment methods. The use of modern minimally invasive methods in surgical practice, in particular, endovideosurgery, has been proven to significantly improve the quality of diagnosis and treatment after the using of these methods, especially in the round-the-clock service of emergency hospitals [1,3,6,8].

Until now, despite many scientific studies, the requirements for diagnostic methods of patients with thoracoabdominal injuries, i.e. immediate performance, reliability of results, less trauma, the ability to quickly transition from diagnosis to treatment, have not been clearly defined, and an integrated treatment and diagnosis algorithm has not been developed [2,4,9]. At the same time, researches require to continue to search for optimal diagnostic methods in patients with thoracoabdominal injuries, choosing the correct surgical tactics at all stages of treatment, using less invasive technology, and measures to avoid increasing the risk of complications in the post-diagnosis period.

Based on the above problems, the aim of the study is to improve the results of surgical treatment by developing an optimal diagnosis and treatment algorithm based on the use of endosurgical methods in thoracoabdominal injuries

Materials and methods. Clinical study was conducted at Andijan State Medical Institute and the Department of Emergency Surgery of the Andijan Branch of the Republican Emergency Medical Center during the period of 2017-2022 years. The results of surgical treatment of 190 thoracoabdominal injuried patients were analyzed. Patients were divided into two large groups, first group (comparison group) includes 122 (64.21%) patients who were treated during 2017-2020, and their diagnosis and treatment were carried out by standard-traditional surgical tactics. The second group (main group) - 68 (35.79%) patients, surgical management of this patients based on improved diagnosis and treatment algorithm developed by endovideosurgical methods (pic.1.) on during 2021-2022 years. Age of patients ranged from 18 to 88 years, males -53 (77.94%) and 103 (84.43%), females -15 (22.06%) and 19 (15.57%) at the main and comparison groups, respectively. According of nature of injury patients divided in three groups: thoracic, abdominal and combined thoracoabdominal injuried patients. Injury severity was determined by the NISS scale, chest injuries were -12.05±1.34 and 12.32±1.15 (p=0.878), abdominal injuries were -13.57±1.04 and 13.51±0.84 (p=0.962), in patients with thoracoabdominal injuries equal to -19.35±1.45 in the main group, and -19.22±1.33 in the comparison group (p=0.947).



Results and discussion. A total of 10 (50.0%) patients used conventional methods in the diagnosis and treatment of patients with chest injuries in the main group, of which 6 (30.0%) patients finished with pleural cavity drainage and 4 (20.0%) patients with thoracotomy. Modern minimally invasive methods - thoracoscopy were used in 10 (50.0%) patients. In the comparison group, traditional methods were used in the diagnosis and treatment of patients in all cases, of which 13 (41.94%) patients underwent pleural drainage and 18 (58.06%) patients underwent thoracotomy. After the operations, various complications were observed in 9 (29.03%) patients in the comparison group, including wound suppuration-4 (12.9%), pleural empyema-2 (6.45%) and reactive pleurisy-3 (9.68%).) was detected in the patient. In the main group, only 1 (5.0%) patient (suppuration of the examination wound) had a complication after the examination. In the comparison group, 1 (32.26%) patient died as a result of acute blood loss, in the main group there were no lethal consequences (tab.1.).

Tab.1.

The number of occurrences of post-operative complications of thoracic injuries

Post-operative complication	Main group (n=20)		Comparision group (n=31)	
	n	%	n	%
wound suppuration	0	0,0	4	12,9
pleural empyema	0	0,0	2	6,45
reactive pleurisy	1	5,0	3	9,68
total	1	5,0	9	29,03
died	0	0,0	1	3,23

In the main group, laparotomy was performed in 11 (39.29%) patients with abdominal injuries, endovideosurgery methods were performed in 17 (60.71%) patients. All patients in the comparison group were treated conventionally. When we analyzed the effectiveness of using an improved diagnosis and treatment algorithm, high results were obtained. Complications were observed in a total of 2 (7.14%) patients after examinations performed in the treatment of the main group of patients: suppuration of the examination wound in 1 (3.57%) and pneumonia in- 1 (3.57%) patient. In the comparison group, wound suppuration-6 (10.17), peritonitis-2 (3.39%), pneumonia-4 (6.78), reactive pleurisy-4 (6.78%), pleural empyema -2 (3.39%) was observed in the patient. Complications after examination were eliminated by conservative and surgical procedures. Also, after examinations in the comparison group, 2 (3.39%) patients died on the 1st day of treatment, the cause of death was hemorrhagic shock and multiorgan failure (tab.2.)

Tab.2.

The number of occurrences of post-operative complications of abdominal injuries

Post-operative complication	Main group (n=20)		Comparision group (n=31)	
	n	%	n	%
wound suppuration	1	3,57	6	10,17
peritonitis	0	0,0	2	3,39
pneumonia	1	3,57	4	6,78
reactive pleurisy	0	0,0	4	6,78
pleural empyema	0	0,0	2	3,39
total	2	7,14	18	30,51
died	0	0,0	2	3,39

In the main group, traditional, endovideosurgery and hybrid (traditional in one cavity and endovideosurgery in the other) operation were used in the treatment of patients with combined chest and abdominal injuries. According to this, traditional procedures were performed in -5 (25.0%), endovideosurgery - 5 (25.0%), and hybrid procedures - 10 (50.0%) patients. In the comparison group, all patients received traditional treatment methods (drainage of the pleural cavity, thoracotomy and laparotomy) were used. The use of improved surgical tactics developed on the basis of endovideosurgery methods, in patients with thoracoabdominal injuries led to a reduction in postoperation complications in patients. For example, in this group, only two patients had post-operative

complications, which were surgical wound suppuration in patient-1 (5.0%) and reactive pleurisy in patient-1 (5.0%). In the comparison group, suppuration of the inspection wound - 4 (12.5%), subdiaphragmatic abscess - 1 (3.12%), peritonitis - 1 (3.12%), pneumonia - 2 (6.25%), reactive pleurisy - 3 (9.38%) and pulmonary artery thromboembolism was observed in 1(3.12) patient, which is directly related to open examinations. Also, in the main group, 1 (5.0%) patient died as a result of septic shock, polyorgan failure. In the comparison group, 2 (9.38%) patients died of polyorgan failure, 1 (3.12%) pulmonary artery thromboembolism, and another 1 (3.12%) patient died as a result of acute blood loss, acute hemorrhagic shock (tab.3.).

Tab.3.

The number of occurrences of post-operative complications of thoraco-abdominal injuries

Post-operative complication	Main group (n=20)		Comparision group (n=31)	
	n	%	n	%
wound suppuration	1	5,0	4	12,5
subdiaphragmatic abscess	0	0,0	1	3,12
peritonitis	0	0,0	1	3,12
pneumonia	0	0,0	2	6,25
reactive pleurisy	1	5,0	3	9,38
pulmonary artery thromboembolism	0	0,0	1	3,12
total	2	10,0	12	37,5
died	1	5,0	4	12,5

Conclusion. The algorithm of diagnosis and treatment of patients with thoracoabdominal injuries, developed on the basis of endovideosurgery methods, has a higher efficiency than standard traditional methods, reducing post-operative complications in thoracic injuries - from 32.26 to 5.0%, abdominal cavity It reduces from -31.04 to 7.14% in injuries, and from -37.5 to 10.0% in combine injuries of the chest and abdomen.

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