



CONCOMITANT INJURIES OF CHEST AND ABDOMEN: THE MINIMAL INVASION

Poznanskii S.V., Brovtsev O.V., Akulinina M.S.

The results of surgical treatment of patients with combined chest and abdominal injuries are analyzed. The use of Computer Assisted Surgery technology has significantly increased the accuracy of diagnosis, and the introduction of minimally invasive techniques has shown to be indispensable in cases of severe trauma.

Keywords: injury, shock, diagnostics, treatment.

Introduction. Growth of injuries over the latest decade caused by processes of urbanization, natural disasters, criminal situation to a large extent shape up as civilization disease (1, 6). The main role in this problem belongs to road traffic situation, which is compared with “road war” (4, 9). Traumatism pattern is changing due to essential increase of multiple and concomitant injuries, which reach 80% (5). WHO reports about 3 place of polytrauma in the structure of mortality (7). It's confirmed that general element in development of shock as well as fatality in case of polytrauma is heavy internal hemorrhage (3, 8). Visualizing technologies are of great values in diagnostics of major concomitant injury when checkup is thickened by critical condition, impairment of consciousness, lay-up of damages of several systems (2, 3). In case of shock-producing polytrauma endovideosurgery also becomes the only possible method of treatment complying with fundamental principles of Hippocrates “Never do harm”. However minimally invasive operations have not yet become common use in emergency, still being platform for development of selective surgery.

Purpose. To estimate efficiency of video-endoscopic surgery in diagnostic and treatment of major concomitant injury of breast and abdomen.

Material and methods. We have analyzed results of treatment of 128 patients with different types of concomitants injuries of breast and abdominal cavity organs using video-endoscopic technologies. Patients took treatments at thoracic department of Ivanovo regional clinical hospital during 2009 and 2012. Age of patients were from 15 to 74 years old (average $33 \pm 2,5$). Among them there were 83 men and 45 women. The reasons of injuries were (fig.1): pedestrian accident at 98 (2 of them had railway injury) people (76,6%), fall from a height – 17 (13,3%), compulsive actions – 5 (3,9%), impaction – 2 (1,6%) and others – 6 (4,7%). In addition 113 (88,3%) people had non-penetrating trauma, but 15 (11,7%) people had thoracoabdominal injuries. It is important to note, that all thoracoabdominal injuries are suffered as a result of criminal circumstances. Mostly injured were delivered to the hospital far gone. Injury severity were defined according to International standards (AIS and ISS scales), but condition severity according to APACHE II system. Diagnostic of traumatic shock level and fate prognosis was conducted according to Nazarenko score scale (includes hemodynamic parameters, injuries morphology, continuity time of shock). 16 patients' (12,5%) condition was critical and they died during 2 hours at a time when reanimation being performed. In addition 19 (14,8) people with major, amphibolous injuries (5 scores according to AIS) shortly after operation had complications that brought on death. Package of diagnostic maneuver included X-ray examination of breast, ultrasound investigation of abdominal cavity and



retroperitoneal space, video laparoscopy, video thoracoscopy. According to indications X-ray scan of continuities, axis and skull. 106 (82,8%) patients 24 hours a day have multi-layer spiral CT (MSCT) within the program of decreasing road accidents mortality since 2008.

Results and discussion. Diagnostic final stage of all patients depending on detected injuries was endovideoscopy. In case of major trauma shock endoscopy was the only method of instrumental examination. In this situation procedure of injury control system was performed immediately and concurrently with intensive therapy (so called anti-shock therapy) in special anti-shock operating room. Immediately after delivering 4 patients had thoracoscopy, 7 – laparoscopy, and 2 toracoscopy and laparoscopy simultaneously. Others had torocoscopy in 39 cases, laparoscopy in 78, toracoscopy and laparoscopy in 4 cases. Amount and order of operations complied with damage control system. According to videotoracoscopy indications 33 had hemothorax, 14 – pneumothorax not corrected after drain. During thoracoscopy all patients are diagnosed following injuries: lung laceration – 17, lung laceration with hemorrhage from intercostal vessels – 8, hemorrhage from intercostal artery – 4, hemorrhage from intrathoracic artery – 2, costal hematoma – 11, cordis trauma (pericard, right atrium) – 2, hemothorax without detected source of hemorrhage – 3. Using videoendoscopic methods 39 (83,0%) patients were performed necessary amount of surgical aid in different combinations: intercostal vessels closure – in 5 cases, intercostal vessels coagulative hemostasis – 7, congelation of lung slight defects – 14, closure of lung major injury – 7, costal hematoma disclosure – 11, hemothorax elimination (including clotted) – 21 cases. All patients had sanitation of pleural cavity. Procedure was finished by setup of 1 or 2 basal apical drain tube with follow-up active vacuum aspiration system during 3-5 days. Conversion to thoracotomy was performed in 8 patients. Open operations indications were: intrathoracic artery injury with endless intrapleural hemorrhage – 2, deep lung laceration with endless hemorrhage – 3, lung crush injury – 1, cordis trauma (right atrium pericardia laceration) – 2. 4 people had traditional thoracotomy. In other 4 cases the second stage was video assisted thoracal surgery (VATS). Instrument developed by authors was extensively used in operations (useful model patent 84211 of 10.07.09). In 7 findings rupture of diaphragm was detected and hemoperitoneum was diagnosed. In addition 3 people through cupula defect were detected to have hepatorrhesis, 2 – ruptured spleen. Initially rupture of diaphragm was made. Then laparotomy with reversal of abdominal cavity organs injury (fig.3) was done. Separate group was 11 patients who had hemothorax with multiple floating cough fracture. All injured were in major condition according to AIS and ISS scales. According to APACHE II system condition severity was evaluated in 5 score. In order to eliminate pathologic lability of ribs and intrapleural complications we normalized breast bone skeleton using method of mini invasive wire fixation under thorascopic control. In our observations lung capacity mend and arterialization were registered in a day after fixation. 7 patients had early transfer from lung ventilator to spontaneous breathing. There was early activation of patients in 9 cases. We didn't notice suppurative complications and duration of stay of patients at emergency department and hospital was dramatically shortened. 87 patients had video laparoscopy. Laparoscopy indications in case of concomitant injury were: high energy mechanism of injury (road accidents, fall from a height, impaction), any abdominal presentation, altered state of consciousness, hematogenic shock and clinical picture of acute blood loss without source of external hemorrhage. Laparoscopy also was done after detection of free fluid and gas in breast based on the results of another testings no matter of clinical picture. During laparoscopy we diagnosed: hemoperitoneum without endoscopically detected source – 17, ruptured spleen – 38, hepatorrhesis – 21, ruptured intestine – 7, rupture of diaphragm – 4. In 28 (32,2%) cases necessary operation was done endoscopically. In any stigma of intraabdominal hemorrhage drain tube to abdominal cavity through endocamera port was setup in order to control injury possible evidence in postoperative period (fig.4). Other 59 (67, 8%) patients had conversion. Laparotomy indications were profuse hemoperitoneum with endless hemorrhage, gastrointestinal contents to abdominal cavity. Different operations were made to



patients: (splenectomy, hepatorrhesis closure, ruptured intestine closure, ileostomy, sigmoidostomy). Due to condition severity 3 (4, 2%) people died during operation. Total postoperative lethality was 23,8%.

Conclusions. Usage of endovideosurgery technologies significantly increased delicacy and promptness of diagnostics of abdominal and breast cavity organs injuries. Full volume of necessary operations in 67 (52, 3%) cases was made endoscopically. We managed to escape unreasonable explorative thoracotomy in 39 (83, 0%) cases which often were fatal stage in pathogenesis of traumatic shock. Used miniinvasive method of recovery of chest under thoracoscopic control reliably stabilized chest wall escaping wide dissection of injured soft tissues. Respiratory distress was reduced in all operated patients thanks to recovery of chest excursion; paradoxical respiration correction eliminated mediastinal flutter and accompanying pathological shock producing impulsation; there were no complications. Insertion of mini invasive technologies showed its indispensability in case of major shock producing injuries, when unjustified open operations act as fatal stage in trauma shock pathogenesis.

REFERENCES

1. Abakumov M.M. Main aspects in diagnostics and treatment of chest injury / M.M. Abakurhov, A.N. Pogodina, V.I. Kartavenko // Actual problems in diagnostics and treatment of pneumonial damage and it's complications at closed chest injury: materials of town scientific and practical conference. – Moscow, 2003. – P. 5-10.
2. Bagdasarova E.A. Features of surgical tactics at the left-side thoraco-abdominal injuries / E.A. Bagdasarova, V.V. Bagdasarov, A.E. Abagian // Grudnaya i serdechno-sosudistaia chirurgiia. - 2006.- №4.- P.63-66.
3. Diagnostics and treatment of posttraumatic convolved haemothorax / A.S. Ermolov [et al.] // Khirurgiia. – 2002. – № 10. – P. 4–9.
4. Medical help for patients with closed abdominal injury on pre-hospital stage./ N. A. Efimenko [et al.] // Voenno-meditsinski zhurnal. – 2005. – № 2. – P. 21– 26.
5. Surgical tactic and perspectives in endosurgery of closed abdomen injury at heavy polytrauma / A.N. Alimov // Khirurgiia. - 2006. - №6. – C. 34–36.
6. Shockogenic trauma and traumatic disease / Y.B. Shapot [et al.]. Materials of the First surgical congress of Siberia and FED // Bull. VSNC SB RAMS. – 2005. – № 3. – P. 94–102.
7. Mitchell, A. Air versus ground transport of major trauma patients to a tertiary trauma centre: a province-wide comparison using TRISS analysis / A. Mitchell, J. M. Tallon, B. Sealy // Can. J. Surg. - 2007. - Vol. 50 (2). - P. 129-133.
8. Morbidity from rib fractures increases after age 45 / J. B. Holcomb [et al.] // J. Am. Coll. Surg. – 2003. – Vol. 196, № 4. – P. 549—555.
9. Surgical management of traumatic pulmonary injury / J. Huh [et al.] // Am. J. Surg. – 2003. – Vol. 186, № 6. – P. 620–624.

Authors:

Poznanskii Sergei Vladimirovich – assistant of SBEI HPE IvSMA Ministry of Health and Social Development, Brovtsev Oleg Vladimirovich – member of IvSM SSS, Akulinina Marina Sergeevna – member of IvSMA SSS, dil-vish@mail.ru

POLYTRAUMAS REASONS

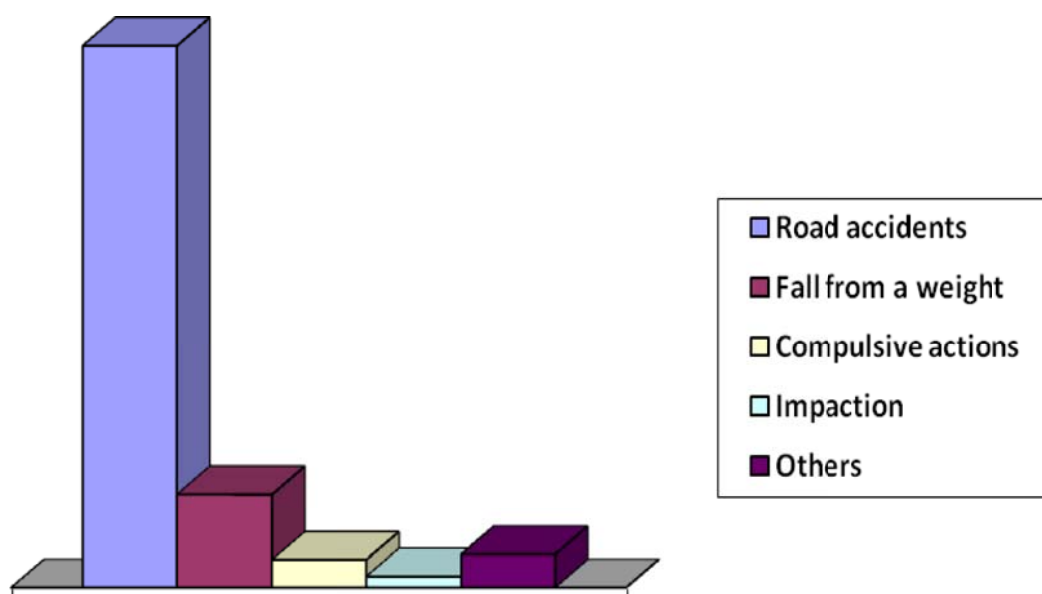


Fig.1

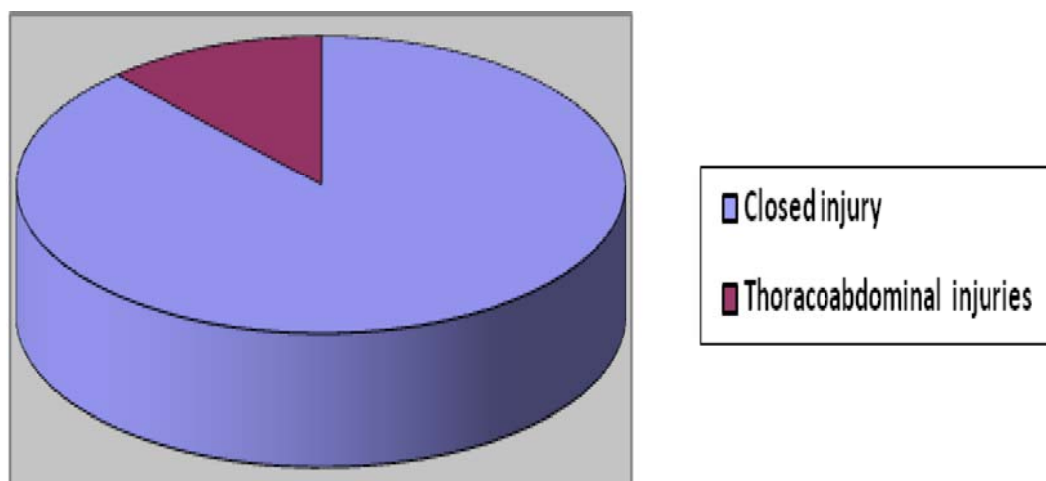


Fig.2

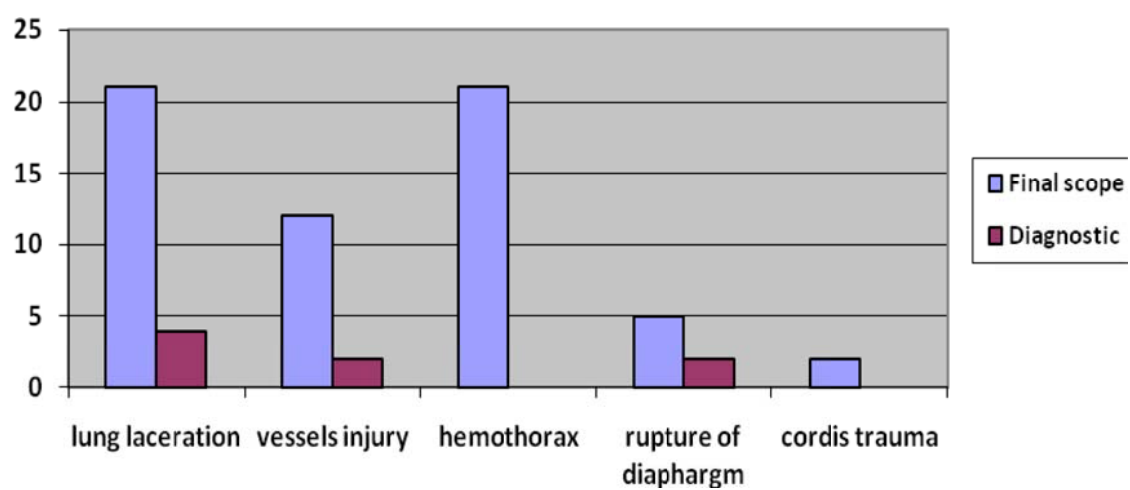
THORACOSCOPIC OPERATIONS RESULTS

Fig.3

LAPAROSCOPIC OPERATIONS RESULTS

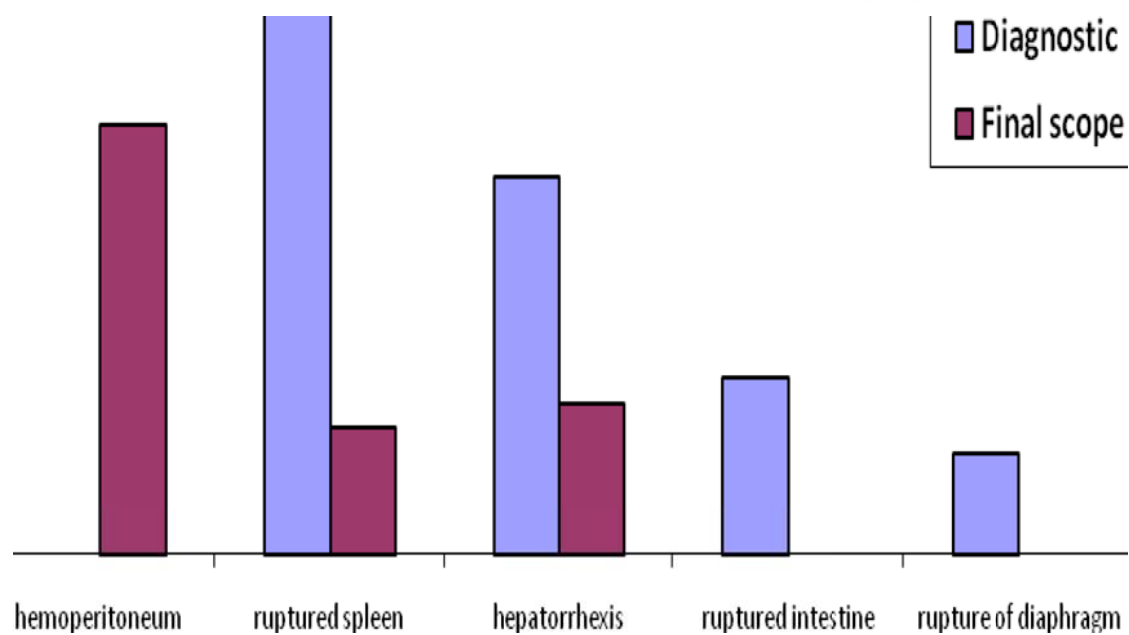


Fig.4