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Rupture of the diaphragm was left-sided in 74 patients (67%), right-sided in 35 (31,25%), and bilateral in 3 (2,6%). Blunt trauma accounted for the injuries of 89 patients (79,46%). Early diagnosis was obtained in 98 patients (87,5%). The diagnosis was established preoperatively in 29 patients (25,83%), and intra-operatively in 83 (74,1%). Multiple associated injuries were observed in 106 patients (94,64%). Postoperative complications were observed in 12 (10,71%), and the overall mortality was 14%. Injury severity score (ISS) and haemorrhagic shock upon admission strongly influence the outcome. A high index of suspicion and a thorough examination of both hemi diaphragms during laparotomy is recommended in order to avoid early or late complications.

P2417**The role of video-assisted thoracic surgery on the diagnostic evaluation and the therapeutic management of thoracic injuries**

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Aim: The aim of this study was to evaluate the experience of our institution with the use of video-assisted thoracic surgery (VATS) in chest trauma.

Materials and methods: Between January 1999 and December 2011, 75,126 patients presented with chest trauma to the emergency room, and 6865 were admitted to our service. Fifty five (55) hemodynamically stable patients (0,8%) underwent VATS. They were 44 men and 11 women with an average age of 42 years (range, 19–67 years).

Results: Indications included post-traumatic hemothorax in 26 patients, and post-traumatic empyema in 7, treated after 24 h of trauma. Indications for exploratory VATS in the acute phase included suspected diaphragmatic injury in 6 patients, persistent pneumothorax in 5, continued hemorrhage in 8 and removal of intrathoracic foreign body in 3. There was no mortality and complications occurred in 8 patients (14,54%).

Conclusions: Management of hemodynamically stable thoracic injuries by using VATS provides diagnostic accuracy and therapeutic efficacy. It can be successfully applied in the trauma setting and surgeons should gain experience with its use.

P2418**Over 2000 cases of thoracic trauma – 10 years experience of a single clinical centre**

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Objectives: We present the experience of our clinic in the diagnosis and treatment of thoracic trauma, there being some controversial issues in this field in medical literature.

Material and methods: This study encompasses 2156 cases admitted over a period of 10 years (2002 – 2011). Patients were analyzed in terms of sex, age, causative mechanism, as well as thoracic and extrathoracic lesions. Methods of diagnosis and surgical treatment, complications that occur, duration of hospital stay, and evolution under treatment are presented.

Results: Hospitalization due to thoracic trauma represents on an average 21% of all admissions. Cases of polytrauma (35%) were managed by a multidisciplinary team. Regarding diagnostic tools, computerized tomography was used in 35% of the cases and bronchoscopy in 6%. Fine needle aspiration biopsy was used for the differential diagnosis of pulmonary contusions in 1.4% of the cases. The most frequent thoracic lesions were rib fractures, pleural effusions, and pulmonary contusions. Pleurotomy was most frequently used (47%) while thoracotomy was used in 8% of the cases operated upon. Complications affected 18% of the cases. 76% of patients that required over 3 weeks of hospitalization presented with extensive pulmonary contusion. Unfavorable results were seen in 4% of the patients while 2.6% of the patients died.

Conclusions: Thoracic trauma represents a difficult challenge, often with a surprising evolution. The diagnosis and application of the best surgical management, often with the help of a multidisciplinary team, is paramount. Associated pulmonary contusion prolongs hospital stay.

P2419**Spontaneous rib fractures**

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Introduction: Other than trauma, rib fracture can occur in patients spontaneously due to a severe cough or sneeze. In this study, patients with spontaneous rib fracture were analyzed according to age, sex, underlying pathology, treatment and complications.

Materials and methods: 12 patients who presented between February 2009 and February 2011 with spontaneous rib fracture were analyzed retrospectively. The patients were evaluated according to anamnesis, physical examination and chest X-rays.

Results: 7 patients (58,4%) were male. The age of the patients ranged from 34 to 77 years (mean ± SD, 55,91±12,20). All patients had severe cough and chest

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P2416**Traumatic rupture of the diaphragm: Experience with 112 patients**

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Traumatic diaphragmatic rupture is reported with increasing frequency and is associated with high morbidity and mortality. The purpose of this study was to present our experience with the management of this injury. 112 patients with TDR were treated in our hospital between January 1989 and December 2011. They were 89 men (79,46%) and 23 women (20,5%). Mean age was 36,57 years (range 15-76 years).

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pain. Multiple rib fractures were detected in five patients (41.7%). The fracture were detected most frequently between 4th and 9th ribs. 8 (66.66%) patients had COPD, 2 (16.66%) patients had bronchial asthma and 2 (16.66%) patients had osteoporosis as well. The patients with COPD and bronchial asthma were treated with high dose steroids for over a year. Bone densitometry revealed high risk of bone fracture in all patients.

Conclusion: Spontaneous rib fracture due to severe cough may occur in patients with osteoporosis or with COPD and bronchial asthma receiving long-term steroid therapy. If these patients have severe chest pain, chest radiography should be evaluated for bone lesions particularly.

P2420

Analysis of 430 chest trauma patients in Kashan trauma center: 2003-2011
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Background: Chest trauma as a potentially life threatening injury is increasing with increased number of high-speed accidents in Iran.

Methods: 430 patients were treated for chest trauma (Mar 2003 and Dec 2011) patients' age and gender, blood pressure, respiratory rate on admission, Glasgow Coma Scale (GCS) scores, types of trauma, the extent of intra thoracic injury, types of associated injuries, length of hospital and ICU stay, morbid conditions, and deaths were analyzed.

Results: 343 pt were male (80%). Mean age was 37.67 ± 19.14 . 305 patients (70.9%) had blunt and the rest (29.1%) penetrating chest trauma. (83 patients (19%) had hemothorax 53 patients (12%) pneumothorax and the rest were, cardiac, (10pt), great vessel (12pt) and tracheal injuries (8pt).

Rib fracture was the most common thoracic injury with 270pt (63%), were treated with closed thoracostomy drainage. 65 patients (15%) had hemothorax and lung contusion, whoever 42 patients (11%) of penetrative injury and lung contusion leads to empyema, who need thoracotomy with decortications and diaphragmatic repair Motorcycles and car accidents were the most common etiologic causes in 331 (76%).

The most frequent extra-thoracic injury with (33%) was pelvic and limb injuries, while (25%) needed surgical intervention during the first 24 hours. The most common operation was laparotomy. Mean duration of hospital stay was 7 ± 9.6 (range: 1-70) and ICU stay 1.9 days. overall mortality was (11.7%)

Conclusion: Chest trauma is a major preventable cause of mortality and morbidity in our country. Systolic blood pressure ≤ 90 , pulse rate ≥ 120 , respiratory rate > 29 , GCS < 8 at the time of admission, and blunt type of trauma were found as the predictors of mortality and morbidity.

P2421

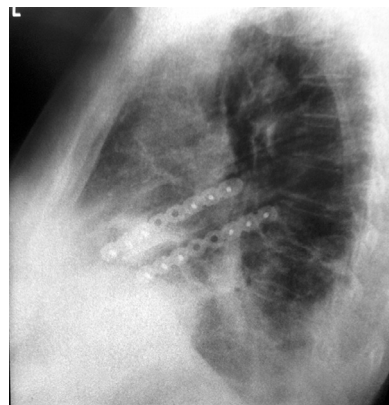
Our first steps in osteosynthesis of fractured ribs using Matrix Rib technologies

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Objective: Surgical management of multiple fractured ribs is the one of the undecided questions of thoracic trauma.

Aim: Illustration of our experience of osteosynthesis of fractured ribs using Matrix Rib technologies.

Materials and methods: Since December 2011 we have operated 5 patients. All they had blunt thoracic trauma with multiple fractured ribs and other injuries. Number of fractured ribs was from 4 to 9. Three patients had bilateral rib fractures. Also, 2 patients had hemothorax, 1 patient had fracture of sternum, and 1 patient had rupture of left cupula of diaphragm. The middle terms from moment of trauma to operation were 1,5 days. To all of patients we have applied Matrix Rib technologies for rib osteosynthesis. The number of synthesized ribs was from 2 to 5.



Also we have performed 3 thoracoscopy (1 including suturing of diaphragm) and 1 osteosynthesis of sternum.

Results: We have observed all 5 patients during postoperative period. The average of ventilation days was 2,4. There were no respiratory or wound complications. All patients had early activation. The respiratory function improved rapidly, increase of FVC before discharge was 25%. Long-term results didn't show any significant respiratory failure.

Conclusion: The osteosynthesis is the indicated operation at multiple and bilateral rib fractures. It helps to early activation, prevents complications and improves respiratory function.

P2422

Predictive factors for succeeded thoracoscopic treatment in patients with retained hemothorax-experience from two centers

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Introduction: In 5-35% of retained hemothorax cases the chest tube doesn't allow adequate evacuation of hemothorax. Video-assisted thoracic Surgery (VATS) decrease the need of thoracotomy in 70% of the cases.

Aim of study: A retrospective analysis of patients, operated on for retained hemothorax, was performed in two thoracic surgery centers in order to investigate the predictive factors for succeeded VATS treatment.

Materials and methods: For five years period a total of 50 patients were operated on for retained hemothorax (35 by VATS and 15 by thoracotomy). The demographics and clinical parameters (age, sex, type of trauma, side of hemothorax, days after chest tube insertion, diameter of chest tube, antibiotic use, quantity of hemothorax, additional diaphragmatic injury, ribs trauma, days after trauma, injury severity score and abbreviated injury severity score) of all cases were investigate with univariate analysis by logistic regression analysis (statistical significance when $p < 0,05$).

Results: The perioperative antibiotic prophylaxis (OR, 2,4[1,9-4,9]; $p=0,03$), the volume of hemothorax > 900 cc. (OR, 4,2[2,1-6,8]; $p=0,01$), the diaphragmatic injury (OR, 3,4[2,0-8,6]; $p=0,04$) and the period between the trauma and surgery (OR, 4,8[3,4-12,1]; $p < 0,001$) were found to be the leading factors predicting conversion to thoracotomy.

Conclusion: VATS is effective in patients with performed perioperative antibiotic prophylactic, with no diaphragmatic injury, early performed chest tube drainage and hemothorax with volume less then 900 cc.

P2423

Bronchoscopic approach in the treatment of postoperative bronchopleural fistula

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Aim: Bronchopleural fistula (BPF) is one of the worst complications of thoracic surgery. Its incidence is between 0,8-15%. Its mortality can reach up to 70%. Most important reason of death is accompanying aspiration pneumonia or ARDS.

Method: Consecutive 13 cases that were treated with bronchoscopically due to postoperative bronchopleural fistula were evaluated.

Results: Twelve of the patients were male. Mean age was 55,6 (35-71). Fistula was located at the right in 9 cases while located on the left in 4 of them. Resection was applied to seven of the cases for squamous cell carcinoma, one of the cases for adenocarcinoma, one of the cases for aspergilloma and one of the cases for tuberculosis sequela. Silicon Y stent was placed in eight, metallic conic stent was placed in two and straight silicon stent was placed in one of the cases. In one of the cases in which empyema surgery was applied, lingula segments were closed by spigots. Small size fistula was closed by coagulation. Three of the cases were died 6, 35 and 94 days after the stent insertion. Procedures were successful in eight, partly successful in one and not successful in four of the cases.

Conclusion: If surgical reconstructive repair could not be done in postoperative bronchopleural fistula, mortality is high. In these cases, bronchoscopic treatment is the only treatment option. Cure can be obtained in some of the cases in which infection control is maintained. Survival is significantly increased in cases with wide fistulas after stent insertion.

P2424

Stratification of risk factors of developing of bronchopleural fistula after pneumonectomy

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Background: It is known that bronchial stump fistula (BSF) is general causes of efficacy decrease of surgical treatment of pulmonary cancer. Stratification of patients with local distributed and disseminated cancer forms of any localization is scientifically proved and it allows to determine heterogenicity of patients' group

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in relation to the nearest and remote prognosis as well as to work out volumes of surgical treatment into practice.

Methods: Stratification data of risk factors of bronchial stump failure (BSF) development in 575 patients, who underwent primary pneumonectomy in this article were presented. Control group (CG) consisted of 477 patients, 390 patients of them had different tumors of the lungs and 87 patients had purulent diseases of the lungs. The main group (MG) consisted from 98 patients. Formation of risk groups depending on localization of disease showed that in the planning of left sided PE minimum risk was determined in 258 (67,9%) patients, mean risk - in 83 (21,8%) and maximum risk - in 39 (10,3%) patients.

Results: An incidence of BSF after PE in patients of CG accounted for minimal risk 1,3%, at an average - 16,0%, and maximal - 32,3%, in its turn, an implementation of factor estimation of risk degree of development of BSF after PE in MG allowed to reduce an incidence of this complication until 0,0%, 2,6% and 9,1% respectively.

Conclusion: Peculiarities of a tactics of surgical intervention in PE must be determined strong in accordance with risk degree of development of BSF and, depending on the latter, include various in their efficacy of hermetization as well as work volume of accomplishment methods of suturing bronchus stump and consolidation of suture line.

P2425

Extremely rare complication of pulmonary resection: Systemic tumor embolization (A case report)

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Introduction: Determining of systemic tumor embolization during pulmonary resection is a rarely seen situation. Tumor emboli of metastatic tumors of the lung are extremely rare unlike to primary lung cancers. Herein, we presented a case of systemic tumor emboli during metastasectomy of Ewing's sarcoma.

Case report: A 41-year-old man underwent chest wall resection for Ewing's sarcoma of the anterior chest wall. Then he was followed-up for three months period. The patient underwent metastasectomy for nodular lesion of right lower lobe after four years from initial resection. He was hospitalized again for the symptoms of dyspnea and pleuritic chest pain six months after the first metastasectomy. Computerized thorax tomography was revealed metastatic recurrence involving the entire right lower lobe. Then the patient underwent a right lower lobectomy. In the operation, when we divided the right lower pulmonary vena after dissection, we did not see any bleeding. In second postoperative day, he had a severe left leg pain. There was no pulsation of dorsalis pedis artery and the lower extremity ultrasonography was revealed no flow. He underwent embolectomy of left common iliac artery for two times within one week. The histopathologic examination of embolus was revealed a metastasis of Ewing's sarcoma. He was died one month later from his embolectomy operations.

Conclusion: Systemic tumor embolization after pulmonary resections in the early postoperative period should be considered in mind especially in patient with central large tumors.

P2426

A nasogastric feeding tube placed at the pleural space via bronchial system

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Nasogastric feeding tubes (NGFT) used for gastric decompression and feeding at the emergency services and intensive care units. Anatomic malformations, age, worsening of mental conditions due to primary disease or sedation, swallowing difficulties or depression of cough reflexes, intubation are the major risk factors. Tracheobronchial system is the most common reported disposition of NGFT. But intrapleural localization of the NGFTS are very rare. In our case we present a patient with a dispositioned NGFT via bronchial system.

Case: 93 years old female patient with the diagnosis of ischemic cerebrovascular disease was consulted for acute dyspnea after NGFT insertion. She was uncon-

scious, dyspneic with intercostal retractions. Breathing sounds were diminished at the right hemithorax. Distal part of the NGFT was seen at the pleural space via tracheobronchial system in chest X-ray. Pleural effusion and pneumothorax were also determined.

NGFT was removed immediately and chest tube thoracostomy was applied. Medical therapy was rearranged due to the patients clinical situation.

NGFT must be applied with care also chest X-ray controls may be helpful for prevention morbidity and mortality of malposition.

P2427

Delayed traumatic diaphragmatic hernia: Case series

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background: Traumatic diaphragmatic rupture after blunt trauma is an uncommon condition, and often is initially missed diagnosis. We report 6 cases diaphragmatic rupture after blunt injury 2 to 16 years prior to admission.

Case 1: 37-year-old man with chronic vomiting abdominal pain and recently thoracic empyema, he had car accident 2 years ago. Left thoracotomy revealed small perforation of stomach which repaired and reduced in abdominal cavity, then diaphragm repaired (fig. 1).

Case 2: 25 year-old man with multiple injury 2 years ago admitted for acute abdomen. Thoracotomy revealed omentum and transverse colon in left hemithorax (fig. 2).

Case 3: 43 year-old female with chest trauma in car accident at right posterolateral thoracotomy revealed herniation of right liver lobe (fig. 3).

Case 4: 29 year-old female with chest trauma and rib fractures. In 3 years ago left posterolateral thoracotomy revealed herniation of omentum, left liver lobe, some part of left colon and stomach. After reduction of these organs diaphragm repaired (fig. 1).

Case 5: 47-year-old man with history of vomiting abdominal pain and dyspnea in barium study stomach. Spleen, transverse colon, small bowel lie in left hemithorax with left 1 thoracotomy. These organs reduced. Diaphragm also repaired (figs. 4-7).

Case 6: 67 year-old man with history of vomiting abdominal pain, respiratory insufficiency, sepsis. He had car accident 16 years ago. Left posterolateral thoracotomy was done due to stomach torsion. Gangrene was happened. After operation the patient died.

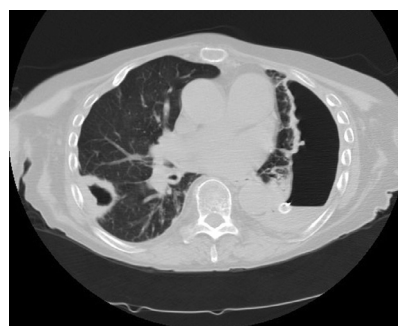
Conclusion: In patients with gastrointestinal complaints and history of chest and abdominal trauma, must have high index suspicion to diaphragmatic injury.

P2428

The pleura and rheumatoid arthritis: A case series

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Background: Pleurisy is observed in almost 30% and effusions can be recurrent, occasionally leading to fibrothorax in chronic seropositive rheumatoid arthritis [Chest 1991; 100:235-238]. Pulmonary nodules occur in up to 5%, 50% cavitating to cause pneumothorax, haemoptysis or bronchopleural fistula.



Recurrent pneumothoraces and effusions are difficult to manage by surgical decortication [J Thor Cardiovasc Surg 1975; 68:347-354].

Case series: We report four cases of chronic seropositive rheumatoid arthritis on long-term immunomodulator therapy, presenting with pleural effusions which were prone to recurrence & complicated by development of pneumothorax. The common theme was all had chest drains inserted initially, then surgical pleurodesis, re-presented with recurrent pleural effusions draining purulent material after failed pleurodesis and had indwelling pleural catheters inserted. One isolated Aspergillus species and died of multiorgan failure; the rest were left with indwelling chest drains.

Discussion: Our case series highlights the paucity of evidence in management of complicated rheumatoid pleural disease and calls for registries of interventions for



such patients. It is important to initiate early conservative approach in management of rheumatoid pleural effusions as surgical management is problematic due to trapped lung and pleural rind. Opportunistic infections in the context of an ever expanding use of immunosuppressive treatments have to be borne in mind.

P2429

Predictors of postoperative pulmonary complications in children undergoing cardiothoracic surgery

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Background: Postoperative pulmonary complications (PPCs) following cardiothoracic surgery remained to be alarmingly high. This study was done to determine the risk factors associated with PPCs following cardiothoracic surgery in children 6 years old and below who underwent cardiothoracic surgery from November 1, 2010-October 31, 2011 at the Philippine Heart Center.

Methods: A prospective cohort study was done among 120 patients. Thirty five risk factors were included. Outcome measures included postoperative pulmonary complications. Comparisons of categories between with and without postoperative complications were done using Chi-square and independent T-test for all continuous variables. All independent variables were entered into a binary logistic regression model.

Results: The incidence of PPCs in this study is 73%. The history of respiratory tract infection (RTI), preoperative mechanical ventilation, high pulmonary artery pressure (PAP), hypercarbia, hemoconcentration, lymphocytopenia, prolonged protime, hypoalbuminemia, high ASA and RACHS -1 scores, prolonged postoperative mechanical ventilation, recovery room (RR) stay, pediatric intensive care unit (PICU) stay and length of postoperative hospital stay were associated with PPCs. Tidal breathing analysis was not found to be significantly associated with PPCs.

Conclusion: Fourteen out of the 35 risk factors were associated with PPCs in children 6 years old and below. With the incidence of PPCs remaining to be high especially in the lower pediatric age group, knowing the risk factors of its occurrence is of paramount importance.

P2430

The retrospective analysis of reasons of prolonged air leakage after pulmonary resection

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Objective: Prolonged air leak is the one of most frequent complications after pulmonary resections.

The aim of our study is to identify the reasons of prolonged air leak by carrying out a retrospective analysis of cases with such complication.

Materials and methods: We have studied 878 case reports of patients, who underwent pulmonary resection, for last 10-year period (2002-2011). The patients had: chronic non-specific lung diseases – 266 (30,3%), interstitial lung diseases – 192 (21,9%), tumours – 182 (20,7%), purulent diseases of lung – 112 (12,7%), parasitic diseases – 71 (8,1%), tuberculosis – 55 (6,3%). We have performed: 218 lobectomies, 25 segmentectomies, 271 open and 364 VATS wedge resections.

Results: Prolonged air leak we have observed at 85 patients (9,7%). The reasons of prolonged air leak were integrated into 3 groups: a) reasons due to inadequate drainage functioning – 21 patient (2,4%); b) reasons due to thoracic wall – 2 patients (0,2%); c) reasons due to operated lung – 62 patients (7,1%).

At 68 patients the problem was eliminated with use of different therapeutic and auxiliary methods. Re-operation was needed at 18 patients (2,0%). During re-operation we have also revealed: migration of drainage – at 3 patients, pulmonary fistula on resection line – at 9, unnoticed bulla on previous operation – at 1, lung destruction with bronchopleural fistula – at 2, lung laceration because of pleural adhesions – at 2, perforation of lung tissue with drainage – at 1 patient. The pathological reason of prolonged air leak was eliminated in every case.

Conclusion: Identification of reasons of prolonged air leak assists to timely application of different curative methods for its elimination.

P2431

Karnofsky score, pH and degree of pleural involvement as prognostic factors for survival in patients with malignant pleural effusions

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Objective: The patients with malignant pleural effusions (MPE) have a short survival which is influenced by different factors. We investigate the prognostic value of pleural effusion pH, Karnofsky score and pleural involvement in these patients.

Methods: A prospective study was carried out for the period of 2.5 years. A total of 100 MPE patients were treated by video-assisted thoracoscopy with or without pleurodesis in case of trapped lung. Their preoperative fluid pH, Karnofsky score and the degree of pleural involvement were investigated. The last one was defined from 0 (minimum) to 3 (maximum) for each parietal, visceral and diaphragmatic pleuras at the time of thoracoscopy.

Results: The overall survival of 21 months in patients with pH>7,40 was statistically longer compared to the 15 months survival in patients with pH<7,40 (p<0,001). Patients with Karnofsky score 10-30 had overall survival up to 6 months, instead of these with Karnofsky score 70-80, who were alive for 21 months. The patients with scores 40-50 and 60 have a survival between 10 to 17 months. A coherence were also found between fluid pH and Karnofsky score with index of correlation equal to 0,5636, also between Karnofsky score and degree of pleural involvement with correlation index 0,7686 and pH and pleural involvement with index equal to 0,6749.

Conclusion: We can conclude that some preoperative factors (pH and Karnofsky score) and intraoperative one (degree of pleural involvement) can be useful as prognostic factors for survival in MPE patients.

P2432

Late radiation injury in preoperative chemoradiotherapy

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Background: Preoperative chemoradiotherapy (CRT) seems to increase survival rates in advanced non-small cell lung cancer. In the evaluation of this strategy, overall survival (OS) and early complications are generally referred. However, the influence of induction CRT remains controversial. Therefore, the aim of this study is to investigate late radiation injury.

Methods: From 1996 to 2010, 167 patients treated with major lung resections after CRT (139 lobectomy, 24 pneumonectomy, 3 wedge resection, and 1 segmentectomy) were enrolled. They were treated with platinum-based regimens and had 40 Gy delivered to the primary tumors, hilum and mediastinum. The postoperative condition of residual lungs was assessed in 142 cases.

Results: 72 patients died. Of 72, 49 died of lung cancer, 17 died of other disease, and 5 died of postoperative complications (operative mortality was 3.0%). Of other disease death, 3 aspergillosis and 2 idiopathic pulmonary fibrosis were related to induction therapies. The 5-year OS rates of p-stage 0, 1a, 1b, 2a, 2b, 3a and 3b/4 were 72.0%, 80.5%, 68.2%, 55.6%, 46.9%, 30.5% and 0%, respectively. The 5-year OS rates of p-N0, N1, and N2 were 69.5%, 50.7% and 22.0%, respectively. In 142 cases assessed postoperative condition of residual lungs, 27(19.0%) mild fibrosis, 5(3.5%) severe fibrosis, 37(26.1%) shrinkage, and 9(6.3%) cavity/dead space formation occurred. Radiation injury appeared when residual normal lung was irradiated.

Conclusions: Preoperative CRT increased survival rate in patients who achieved p-N0, but was associated with higher rates of pneumonectomy and operative mortality. Radiation might affect postoperative devastation in residual lungs. This therapy should be performed cautiously.