Summary

Monitoring of pleural effusion parameters during the treatment of chest empyema

Chest empyema is a severe complication with collection of pus in the pleural cavity. The mortality rate of chest empyema is up to 40 %. Generally, treatment involves a drain insertion into the inflammatory focus and pleural space irrigation with local application of medication. These processes are usually lengthy with high risk of relapse. Our aim is to shorten the period of treatment using cytological–energy analysis of pleural effusions. This approach is based on simultaneous cytological and metabolic investigation of the pleural effusions. Results allow us to determine the type and intensity of local immune response in the pleural cavity. Repetitive investigations of pleural effusions in time give us information aiming the development of local immunity response in the pleural cavity and can follow the effect of therapy. Our goal is to define the theoretical framework for application of cytological-energy analysis of pleural effusions in patients with chest empyemas. The determination of the catalytic activities of aspartate aminotransferase (AST) and lactate dehydrogenase (LDH) in pleural effusions as parameters of tissue damage is introduced by us. We established that cytological-energy analysis of pleural effusion is complementary with traditional Light's criteria. The advantage of cytological-energy analysis is to characterize the local immune response and intensity of inflammation. Pleural effusions with predominance of neutrophils in this study were obtained from 91 patients with transudates caused either by heart failure or systemic sepsis, 95 patients with uncomplicated parapneumonic effusion caused by bacterial pneumonia, and 282 patients with chest empyema (complicated purulent effusion). We found the absence of inflammation in the control group of patients with transudates and the presence of purulent inflammation in patients with uncomplicated parapneumonic effusion and with complicated purulent effusion. The intensity of purulent inflammation is increased from uncomplicated parapneumonic effusion to complicated purulent effusion. This is also supported by increased tissue injury caused by destructive purulent inflammation in pleural cavity. Furthermore, in patients after thoracic surgery, we evidenced the importance of cytological-energy analysis of pleural effusion for monitoring these patients because the risk of purulent complications. We evaluate time development of purulent inflammation in the pleural cavity in 81 patients with chest empyema and demonstrated the high benefit of cytological-energy analysis of pleural effusions in the treatment of chest empyema thus reducing the risk of subsequent complications.