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TREATMENT OF ACUTE PURULENT-DESTRUCTIVE LUNG DISEASES CONSIDERING THE ASSESSMENT OF THE DEGREE OF IMPAIRMENT OF NON-RESPIRATORY LUNG FUNCTION

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Abstract.
The objective & methods: program of pre-operative preparation was developed based on examination and treatment of patients with acute purulent destructive pulmonary diseases (APDPD) with regard to process phase (Group 1 - septic process flow, Group 2 - stabilization, Group 3 - remission), endotoxemia severity, and non-respiratory function of lungs (NRFL). Group I patients under basic long-term intra-arterial catheter-based therapy (LIACT) followed our developed NRFL correction scheme and treated suppurative focuses with electrolyzed sodium hypochlorite solution. It has proven to be efficient for 202 (79,9%) out 254 Group 1 patients, enabling withdrawal from surgery, while only 52 (40.6%) of Group 2 patients and 26 (31.3%) of Group 3 patients have not undergone surgery.
Results & conclusion: simultaneously, clear NRFL malfunction degree correction augmenting impact was achieved accompanied by limiting and stabilizing the process. It has enabled to limit lung resection numbers to 109 (60.9%) out of 179 Group 1 patients who undergone surgery with 8,7% of surgical complications comparing to 18.4% for Group 2 and 24,6% for Group 3, emphasizing the efficiency of the pre-operative preparation strategy we proposed.
Key words: pre-operative preparation, acute purulent destructive pulmonary diseases, non-respiratory function of lungs, long-term intra-arterial catheter-based therapy

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INTRODUCTION

Surgeons' dissatisfaction with the outcomes of acute purulent destructive pulmonary diseases (APDPD) treatment is determined by sustainably high mortality rates (up to 70%) in its gangrenous forms spurred numerous researches on various aspects of pathogenesis and treatment of this disease [1,2,3,4].

With the progress in resuscitation and intensive care recently a combination of features of various bodies and systems malfunction is noted while APDPD treatment, defined by practicing clinicians as multiple organ failure [5,6,7].

We think that non-respiratory malfunction of lungs (NRFL) remain underestimated comparing to the other mechanisms of this syndrome development, though the lungs are the main protective barrier preventing spread of infection and intoxication with further disruptions in critical systems of an organism [8,9,10].

APDPD treatment is complex, long-term process accompanied by a number of complications. Moreover, there is still a lack of consensus on treatment of APDPD. Usually, treatment starts with intensive comprehensive therapy with antibacterial medicines, non-specific anti-inflammatory drugs, detoxification therapy, tracheobronchial tree suction, correction of metabolism dysfunctions [11,12]. Lack of effect obtained from such treatment made within 3 weeks, process chronicity occurring, according to various authors, within 6-14 weeks' term from the beginning of the disease, life-threating complications are considered as indications for surgery [18,19]. Significance the researchers attach to these criteria is far from being unambiguous.

The above determined a purpose and tasks of this research, which is a clarification of indications for conservative pre-operative treatment for patients with APDPD with the regard to NRFL malfunctions in order to improve direct and long-term outcomes of invasive treatment.

THE OBJECTIVE OF THE STUDY

465 APDPD patients (age 28-60) were examined divided by clinic groups.

Group I included 254 (54.6%) patients with clear clinic manifestation of inflammatory lung destruction process. These patients underwent targeted correction of NRFL as per the method we developed alongside with long-term selective intra-arterial catheter therapy (LIACT).

Group II was composed of 128 (27.5%) patients on stabilized path treated using conventional LIACT scheme with commonly accepted metabolism dysfunctiobs correction [13,14].

Group III included 83 (17.9%) patients underwent conventional treatment in other hospitals and transferred to our clinic to proceed with the treatment due to inflammatory process remission. Such disbursement of APDPD patients reflects different stages of developing and introduction of these diseases diagnostics and treatment methods in the clinic of Tashkent Medical Academy.

Overwhelming majority of the patients - 341 (73,3%) persons were hospitalized within 2,5 months since the beginning of a disease, 119 (25,6%) patients were exposed to it up to 3 months and only 5 (1.1%) patients experienced it for a longer time.

METHODS

A group of researchers from our Academy developed quantitative NRFL dysfunction extent assessment method - NRFLDE (compensatory, subcompensatory and de-compensatory degree of NRFL) for patients with chronic non-specific inflammatory lungs diseases based on integral indicators of albumen, globulin, general phospholipid and lipids, phosphatidylcholine and sphingomyelin blood content. We used this method with minor supplements and modifications, reflecting an extent of inflammatory process in bronchopulmonary system, mainly of bacteria-induced origin, while treatment of APDPD patients.

Formalized research data we're integrated into a following formula, describing NRFLDE in APDPD patients:

NRFLDE = ((AGR/2,3)-0,12) +(FLR/0,6) +(PCER/2,4) +(LII/0,8) +(3/R) +(3/S)

with AGR - Albumen-globulin ratio
FLR - Phospholipid and lipid ratio
PCER - Phosphatidylcholine-ethanol ratio
LII - Leukocytal intoxication index
R - Radiography examination data
S - Amount and features of sputum.

Comprehensive clinic and biochemical examination in APDPD patients at conservative and invasive treatment stages enabled to conclude that they were initially exposed to a certain NRFLDE, complicated at early post-invasive stage due to apostem in pulmonary parenchyma, impact of surgical invasion and general anaesthesia factors.

The major rule in treatment of patients with APDPD is early endobronchial or transthoracic drainage and purulonecrotic lung focus sanation fulfilled in proper manner. In 54,3% cases these sanation methods were employed simultaneously.

Intravenous infusion of fatty emulsions (Nirpid) and protein synthesis enhancing drugs (PSED) was prescribed for Group I patients due to NRFLDE by means of daily intra-arterious drip injections of 100 ml of 10% albumen or alvezin solution with intramuscular injection of Retabolil. 286 (61,5%) of patients with APDPD were treated based on conventional method obtaining certain positive results, 179 (38,5%) patients underwent surgery.

RESULT & DISCUSSION

163 (78,4%) out of 208 Group I patients fully recovered, clinic remission was observed in 39 (18,7%) APDPD patients. Only 6 (2.9%) patients showed further progress of a disease.

Only 4 (15.4%) out of 26 Group III patients fully recovered without surgery and 8 (30.8%) patients demonstrated clinic remission. Noteworthy, positive impact was achieved mostly in patients in severe condition. So far, 202 (97,1%) Group I patients fully recovered and showed sustainable clinic remission. Treatment proved to be ineffecient for 6 (2.9%) hospitalized with extensive course of a disease, clearly observed endotoxification and respiratory failure; the disease extended further resulting in their death of septic shock. Conventional treatment brought modest results in Group II: only 16 (30.8%) patients fully recovered. Clinic remission was observed in 20 (38.5%) patients, treatment produced no impact on 14 (26.9%) patients, while 2 (3.8%) patients faced further advancement of a disease, resulting in death. 12 (46.1%) patients undergone treatment in Group III fully recovered and demonstrated clinic remission, while for 14 (53.8%) patients' treatment proved to be ineffecient. In general, conventional treatment was efficient for 250 (87.4%) patients. 183 (64%) of them fully recovered, 67 (23.4%) withdrew from surgery upon achieving clinic remission. 28 (2,8%) patients showed no results from treatment, while 8 (2,8%) patients saw extension of pathological process with treatment measures producing no impact, and patients died due to various causes.

179 (38,5%) APDPD patients underwent surgery. 46 (18,1%) of them were from Group I, 76 (59.4%) from Group II and 57 (68.7%) from Group III. Lobectomy was a main type of surgery being performed in 109 (60,9%) patients. Extended surgeries such as pneumonectomy, bilobectomy and lobectomy with segment resection were made in 70

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patients. Prevailing number of organ-saving surgeries we explain with LIACT ensuring limitation and stabilization of destructive process in lungs [15].

Noteworthy, all the invasive treatment undertaken were complex and traumatic determining post-operational complications for 32 patients. Majority of complications were related to bronchial patency dysfunction, causing atelectasis and pneumonia for the remaining part of a lung (13 and 5 respectively).

Empyema alongside with bronchial stump fistula occurred in 2 patients. Excessive cavity in early post-operstional period emerged in 4 (2.23%) patients as an outcome of incomplete spread of the remaining part of a lung. Post-operstional bleeding were recorded in 1 (0,56%) patient.

Pulmonary Artery Thromboembolism was a cause of death for 3 (1,7%) patients underwent surgery. Complications caused by post-operational wound were rare, encountered in 2 (1.12%) patients. Recording number and type of post-operational complications, we emphasize that they were observed in 14 (24.6%) examined patients from Group III, 14 (18.4%) patients from Group II and 4 (8.7%) patients from Group I. Analyzing and explaining the outcomes of conventional and invasive treatment in APDPD patients we examined dynamics of clinic manifestations of inflammatory process at all major stages of treatment. 46 (25,7%) out of 179 patients underwent surgery in the clinic were hospitalized with clear clinic manifestations of inflammatory process, which required intensive preparatory treatment with the regard to NRFLDE.

Employing conservative corrective methods, the disease course was stabilized and remission was achieved in 171 (95,5%) patients. Disease course was stabilized in 42 (23,46%) Group I patients, remission was recorded in 3 (1,68%) Group I and 14 (7,82%) Group II patients, pre-treatment produced no impact only in 1 Group I patient, while 7 patients with stabilized course experienced advancement of a disease. These patients underwent emergency surgery. So, by the time of surgery number of APDPD patients with clear manifestations of inflammatory process reduced to 4.47% as an outcome of conventional treatment, while stabilization number increased to 54.19%, remission was achieved in 41.3% patients, proving efficiency of proposed conventional treatment actions, though the explanation is still lacking on why pre-treatment outcomes in Group II and Group III APDPD patients were relatively worse comparing your those with clear clinic manifestation of a disease. As we as stated above, APDPD patients have a certain NRFLDE which is reflected in various combinations of dysfunction in systemic homeostasis and local protective reactions. Considering that compensatory and subcompensatory NRFLDE is usually a dynamic and reversible process [16] and pulmonary dysfunctions can vary across APDPD patients we examined NRFLDE within clinic groups.

We identified that 179 (38,5%) Group I patients had severe and moderate pulmonary dysfunctions specific to compensatory changes, while 75 (16,1%) patients had subcompensatory dysfunctions. Decompensatory NRFL dysfunctions were not recorded in Group I patients. 98 (21,1%) Group II patients were revealed to have compensatory NRFL dysfunctions, subcompensatory dysfunctions were rarely observed, recorded in 18 (3,9%) patients, decompensatory changes were even more rare, identified in 12 (2,58%) examined patients.

Decompensatory and subcompensatory types were specific to Group III APDPD patients recorded in 56 (12%) and 27 (5,8%) persons respectively.

Data provided prove that clinically defined stabilization and remission of a process in APDPD patients in majority of cases are not accompanied with pulmonary dysfunction normalization. This requires appropriate treatment for APDPD patients considering the NRFLDE as per rehabilitation requirements [17].

As such, it ensures a growing number of fully recovered patients and patients experienced remission, and in staged invasive treatment facilitates reducing number of pyoinflammatory complications in post-operational period, improves direct and long-term outcomes of a treatment.

CONCLUSIONS

1.Conventional treatment was efficient for 250 (53,76%) APDPD patients. 183 (64%) of patients fully recovered;

2.Conventional corrective pre-treatment we proposed enabled to stabilize process and achieve pre-surgery remission in 171 (95,6%) APDPD patients underwent surgery;

3.Efficient pre-treatment based on NRFLDE provide limitation and stabilization if inflammatory process, enabling organ-saving lung resection in 109 (60,9%) APDPD patients with 17,9% of complications

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in post-operational period;

4.Clinic stabilization and process remission is not always accompanied by pulmonary dysfunction normalization, requiring further rehabilitation of the patients considering their NRFLDE.

CONFLICT OF INTEREST, FINANCING & COMPLIANCE WITH PATIENT RIGHTS AND PRINCIPLES OF BIOETHICS

The author declares no conflict of interest. The study was performed without external funding. All patients gave written informed consent to participate in the study.

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