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MULTI-FACTORIAL ANALYSIS OF THE INTENSITY OF EXUDATE ACCUMULATION IN THE PLEURAL CAVITY

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ABSTRACT

Treatment of malignant hydrothorax primarily consists in eliminating the accumulation of fluid in the pleural cavity, which depends on the intensity of accumulation of the latter. Not fully developed problem is the prognostic factors affecting the outcome of the disease. Until today, adequate methods of treating this pathology have not been determined. Standards for indications for medicinal, radiation and surgical methods of treatment have not been developed.The intense progression of the disease indicates the aggressiveness of the tumor process, its expansiveness. Conversely, slow development, less intense progression, indicates a relatively favorable course of the disease. The patients included in our study had a history of malignant neoplastic process from 6 months to 5 years. 162 (80.2%) patients included in the study had a short, up to one year, history of malignant tumor. In 15 (7.4%) patients, the accumulation of pleural fluid coincided with the progression of tumor growth after a year of the onset of the disease. In 25 (12.4%) patients, local control was not achieved during treatment.

Keywords: The causes of PAD, ECG (if necessary, EchoCG, FVD), pulse oximetry, Ultrasound examination, Computed tomography (CT),

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МНОГОФАКТОРНЫЙ АНАЛИЗ ИНТЕНСИВНОСТИ НАКОПЛЕНИЯ ЭКССУДАТА В ПЛЕВРАЛЬНОЙ ПОЛОСТИ

АННОТАЦИЯ

Лечение злокачественного гидроторакса в первую очередь заключается в устранении скопления жидкости в плевральной полости, которое зависит от интенсивности скопления последней. Не до конца проработана проблема прогностических факторов, влияющих на

исход болезни. До сегодняшнего дня не определены адекватные методы лечения данной патологии. Нормы показаний к лекарственным, лучевым и хирургическим методам лечения не разработаны. Интенсивное прогрессирование заболевания свидетельствует об агрессивности опухолевого процесса, его разрастании. И наоборот, медленное развитие, менее интенсивное прогрессирование указывает на относительно благоприятное течение болезни. Пациенты, включенные в наше исследование, имели анамнез злокачественного новообразования от 6 месяцев до 5 лет. 162 (80,2%) пациента, включенных в исследование, имели короткий (до одного года) анамнез злокачественной опухоли. У 15 (7,4%) пациентов накопление плевральной жидкости совпало с прогрессированием роста опухоли через год от начала заболевания. У 25 (12,4%) пациентов во время лечения не удалось добиться местного контроля.

Ключевые слова: причины ЗПА, ЭКГ (при необходимости, ЭхоКГ, ФЖЗ), пульсоксиметрия, ультразвуковое исследование, компьютерная томография (КТ),

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PLEVRAL BO'SHIKDA EKSUDAT TO'PLASHISH INTENSUSLIGINI KO'P FAKTORIAL TAHLILI

ANNOTASIYA

Malign gidrotoraksni davolash birinchi navbatda plevra bo'shlig'ida suyuqlik to'planishini yo'q qilishdan iborat bo'lib, bu ikkinchisining to'planish intensivligiga bog'liq. To'liq rivojlanmagan muammo - bu kasallikning natijasiga ta'sir qiluvchi prognostik omillar. Bugungi kunga qadar ushbu patologiyani davolashning etarli usullari aniqlanmagan. Davolashning dorivor, radiatsiyaviy va jarrohlik usullariga ko'rsatmalar standartlari ishlab chiqilmagan. Kasallikning intensiv rivojlanishi o'simta jarayonining agressivligini, uning kengayishini ko'rsatadi. Aksincha, sekin rivojlanish, kamroq intensiv rivojlanish kasallikning nisbatan qulay kursini ko'rsatadi. Tadqiqotimizga kiritilgan bemorlarda 6 oydan 5 yilgacha malign neoplastik jarayon mavjud edi. Tadqiqotga kiritilgan 162 (80,2%) bemorda qisqa muddatli, bir yilgacha bo'lgan xavfli o'sma tarixi bor edi. 15 (7,4%) bemorda plevra suyuqligining to'planishi kasallikning boshlanishidan bir yil o'tgach o'simta o'sishining rivojlanishiga to'g'ri keldi. 25 (12,4%) bemorda davolanish vaqtida mahalliy nazoratga erishilmadi.

Kalit so'zlar: PAD sabablari, EKG (kerak bo'lsa, EchoCG, FVD), pulsoksimetriya, Ultratovush tekshiruvi, Kompyuter tomografiyasi (KT).

Introduction: The incidence of malignant pleural effusion (PCV), according to the American and British Societies of Thoracic Surgeons, is 660 cases per million population, affecting more than 1 million people worldwide and representing a growing health burden [2,3,4]. In the United States (USA) alone, more than 125,000 hospitalizations per year are attributable to PWV, with an in-hospital mortality rate of about 12% and a corresponding cost of more than US $ 5 billion per year [1,6].

The causes of PAD are direct tumor growth (breast cancer, lung cancer, chest) into the pleural cavity, spread to the visceral pleura through embolization and invasion of the pulmonary vessels, as well as spread into the parietal pleura through hematogenous spread and metastasis [1,5].

A large number of works are devoted to the problem of diagnosis and treatment of malignant pleural effusions. Diagnostics of the etiology of pleural effusion is reduced to traditional radiation, laboratory methods, as well as cyto- / histological analysis of pleural biopsy taken with video thoracoscopy (VTS) or transthoracic biopsy. VTS allows the most reliable recognition of carcinomatosis and specific lesions of the pleura. The use of modern methods for diagnosing the

etiology of exudative pleurisy using computer technology and nuclear medicine, along with classical morphological techniques, is a poorly studied area [1, 3, 5, 6].

The factors contributing to the rate of accumulation of malignant pleurisy have not been sufficiently studied. Against the background of numerous publications on the study of malignant exudative pleurisy, the problem of finding an ideal method for the edification of pleural effusion is still widely discussed.

Treatment of malignant hydrothorax primarily consists in eliminating the accumulation of fluid in the pleural cavity, which depends on the intensity of accumulation of the latter. Not fully developed problem is the prognostic factors affecting the outcome of the disease. Until today, adequate methods of treating this pathology have not been determined. Standards for indications for medicinal, radiation and surgical methods of treatment have not been developed.

The purpose of this study is a multifactorial analysis of the intensity of the accumulation of exudate in the pleural cavity in patients with malignant tumors, depending on the characteristics of the primary tumor, clinical and morphological variants, biochemical characteristics of the exudate, type, area, localization of lesions of the lungs and pleura.

To solve the set tasks, we carried out a prospective analysis of the diagnosis and treatment of 202 patients with malignant tumors of various localizations complicated by hydrothorax, who were treated from 2017 to 2020 at the Surkhandarya branch of the RSNPMTSOiR. All patients were previously examined and treated for malignant tumor lesions of various localizations. Of 202 patients in 32 (15.8%), treatment aimed at achieving local control of the primary tumor continued.

The intense progression of the disease indicates the aggressiveness of the tumor process, its expansiveness. Conversely, slow development, less intense progression, indicates a relatively favorable course of the disease. The patients included in our study had a history of malignant neoplastic process from 6 months to 5 years. 162 (80.2%) patients included in the study had a short, up to one year, history of malignant tumor. In 15 (7.4%) patients, the accumulation of pleural fluid coincided with the progression of tumor growth after a year of the onset of the disease. In 25 (12.4%) patients, local control was not achieved during treatment.

All patients underwent standard examination methods for diagnosis, follow-up and monitoring. At the initial examination, all patients underwent:

1. General and clinical – biochemical analyzes of blood, urine, coagulogram.
2. Fluoroscopy / graphy of the chest organs, Ultrasound examination of the chest, abdominal cavity and retroperitoneal space, CT / MRI of the chest organs.
3. Morphological examination of the material from the tumor taken for histological verification of the variant definition (when the histological variant was not established earlier).
4. ECG (if necessary, EchoCG, FVD), pulse oximetry.
5. Endoscopic examinations.
6. Diagnostic thoracocentesis with the determination of the cellular composition of the aspirate. Biochemical indicators of exudate.

To assess the radiological changes in the lung tissue, the following criteria were used:

The number of elements of the broncho-vascular pattern per unit area of the roentgenogram in the irradiation zone, the thickness of the elements, the clarity of their contours, the shape, cellularity and looping of the pulmonary pattern. The state of analogous fields of the opposite pulmonary field was studied.

The size of the area of the pulmonary field, the position of the domes of the diaphragm, the state of the pleural cavities, mediastinum and roots of the lungs.

The severity of hydrothorax was determined by radiographs obtained both before treatment and immediately after treatment and at various periods after its completion (1, 3, 6 and 12 months and once a year in the absence of clinical manifestations, or as needed, if indicated). Although the X-ray method of the monitor is affordable and valuable, for routine examination, it is also more convenient to use ultrasound examination of the pleural cavities to determine a small amount of effusion.

Ultrasound examination (ultrasound) of the mediastinal organs of the thoracic and abdominal cavity, retroperitoneal space, small pelvis, lymphatic collectors, was carried out on the Sone-Scape S 22 apparatus (PRC), in the Surkhandarya branch of the RSNPMTSOiR and LOGIQ F8 Gi (PRC) in private medical centers Termez. In the process of diagnostics, a small-diameter sensor with a power of no more than 3.5 MHz was used. The small diameter of the sensor allows better scanning through the intercostal spaces, the pleural cavity. On average, the procedure takes 10-20 minutes.

Computed tomography (CT) was performed at a tomography step of 5 mm according to the standard technique on a high-speed double-helical device SIEMENS and General Electric CT Sytek (in the private clinic «Utan Polvon») with the possibility of three-dimensional reconstruction. All technical conditions were observed during the CT scan. The study was carried out with the patient lying on his back. Before the study, a topogram was performed – an overview image of a given area of the human body, made with a narrow collimated X-ray beam with a constant longitudinal movement of the table on which the patient lies. Based on the topogram data, the level of the beginning of the CT scan was determined. The study included scanning of the organs of the thoracic and abdominal cavity, retroperitoneal space, lymph nodes, depending on the affected areas.

Most often, the intensity of fluid accumulation in the pleural cavity was up to 1.0 liters per week, which is considered to be quite large. Only in 10.7% of cases the accumulation of liquid was very intense and amounted to more than 1.0 liter. Such an intensive accumulation was typical for patients with lesions of the urogenital zone and with a large lesion area in pleural mesothelioma.
To study the intensity of the accumulation of exudate in the pleural cavity in patients with malignant tumors, depending on the characteristics of the primary tumor, clinical and morphological variants, biochemical characteristics of the exudate, type, area, localization of lesions of the lungs and pleura, we analyzed the data in patients with malignant pleural effusion. Intensive accumulation of effusion in the hemithorax after its evacuation is an unfavorable factor. With exudate, the patient loses a large amount of protein and electrolytes. In addition, the presence of pleural effusion causes compression of the lung, displacement upward and centrally, and reduces the volume of ventilation.

In most cases (88.9%), hydrothorax was associated with visible metastases in the lungs. Of these, the most common type of lung lesion was multiple, miliary type of metastases and lymphangitis (70.8%).

We were unable to give an unequivocal conclusion about the influence of the histological variant of the primary lesion on the intensity of accumulation of exudate in the pleural cavity. Although, a preliminary study shows a statistically moderately significant relationship, about the possibility of this type of relationship, since, in breast cancer, fluid accumulation of more than 1.5 liters was observed in patients with double negative infiltrative cancer, no more than 30 days of doubling the size of the tumor. Likewise, in a primary tumor in the lungs, high-intensity accumulation of exudate was observed in poorly differentiated adenocarcinoma tumors ($p < 0.05$).

To determine the relationship between the biochemical composition of the exudate and the intensity of accumulation of pleural fluid, in this chapter, we studied the content of protein, glucose and LDH in pleural effusion and revealed a highly reliable relationship ($p < 0.001$) between the content of these substances in the pleural fluid and the intensity of accumulation of exudate. The high protein content in the pleural fluid significantly influenced the accumulation rate (11%; $p < 0.01$). When the LDH index was less than 1000 U / L, the accumulation of fluid in the pleural cavity was less intense ($p < 0.005$). The content of glucose in the pleural fluid showed a clear relationship between the content of the latter and the intensity of accumulation of exudate. In 133 (86.4%) patients, the glucose content in the pleural fluid was less than 4 mmol / L, superintense accumulation of fluid (more than 2.0 liters per week) was statistically significant only in patients with a glucose content less than 2.0 mmol / L (04, 07, 1.2; $p < 0.001$).

Also, the area of lung injury affects the intensity of fluid accumulation. With extensive lesions of the pleural surface (66.6%), accumulation of more than 1.5 liters of effusion was observed ($p < 0.001$). With relatively small lesion areas, the maximum accumulation did not exceed 1.5 liters per week. The analysis established a statistically weakly significant correlation between the affected area and the intensity of pleural effusion accumulation ($p<0.5$).

In a cytological study, the detection of tumor cells in the exudate indicates the involvement of the visceral pleura in the process. Cytological analysis of pleural effusion revealed tumor cells in 95 cases, which is 61.7%. As shown by the analysis of the data, the presence or absence of tumor cells in the pleural fluid does not affect the intensity of accumulation of exudate in the pleural cavity.

When studying the degree of shortness of breath depending on the primary lesion, the degree of shortness of breath did not depend on the primary localization of the lesion.

Aspiration of pleural exudate does not always lead to relief of the degree of shortness of breath, the reason for this is the relatively small amount of aspiration (no more than 1.5 liters) and prolonged accumulation of effusion. Prolonged accumulation of effusion leads to a chronic decrease in the vital capacity of the lungs, due to the development of fibrous and inflammatory changes in the compressed areas of the lungs.

Conclusion: Thus, from the foregoing, it can be concluded that the final results of the course, outcomes and complications of the nosological forms under consideration directly depend on the competent choice of reliable diagnostic signs that most fully reflect the clinical, functional, morphological and other features of the pathological process.

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