CASE REPORT

Medycyna Ogólna i Nauki o Zdrowiu 2023, Tom 29, Nr 4, 339–343
www.monz.pl

Pleural effusion – a case report

Krótko o wysięku opłucnowym – podróż przez opis przypadku.

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article

Leciejewska M. Pleural effusion – a case report. J Pre-Clin Clin Res. 2023; 29(4): 339–343. doi: 10.26444/monz/176748

Abstract

Pleural effusion is a common abnormality detected in additional tests in patients hospitalized in Internal Medicine Departments. Properly carried out diagnostics allows to determine the cause of the fluid, thanks to which it is possible to initiate appropriate treatment. The paper presents the case of a 63-year-old man admitted to a district hospital due to dyspnea on exertion. Chest X-ray revealed fluid in the right pleura. The patient was admitted to the Department of Internal Medicine for diagnostics. Due to the large amount of fluid in the pleural cavity, the patient required multiple punctures. The article discusses the most important diagnostic tests that should be performed to determine the cause of the presence of fluid. A key role was assigned to distinguishing the etiology of the fluid based on Light's criteria, and other features of the fluid enabling its differential diagnosis were taken into account. Possible diagnostic points were also presented and an attempt was made to briefly discuss the correct procedure. During the diagnostics, pleural lymphoma was suspected and the patient was referred to a higher-reference center for further diagnostics. The author presents the necessary diagnostic steps necessary to establish the final diagnosis. The article is presented in the form of single-choice questions in which the reader can actively participate. The reading was enriched with imaging studies.

Key words

effusion, limphoma

Streszczenie

Wysięk opłucnowy jest częstą nieprawidłowością stwierdzaną w badaniach dodatkowych u pacjentów hospitalizowanych na Oddziałach Chorób Wewnętrznych. Prawidłowo przeprowadzona diagnostyka pozwala ustalić przyczynę płynu, dzięki czemu możliwe jest włączenie prawidłowego leczenia. W pracy przedstawiono przypadek 63-letniego mężczyzny przyjętego do szpitala powiatowego z powodu duszności wysiłkowej. W badaniu RTG klatki piersiowej stwierdzono płyn w prawej opłucnej. Pacjenta przyjęto do Oddziału Chorób Wewnętrznych celem diagnostyki. Ze względu na dużą ilość płynu w jamie opłucnej pacjent wymagał wielokrotnych nakłuć. W artykule omówiono najważniejsze badania diagnostyczne, jakie należy wykonać, aby ustalić przyczynę obecności płynu. Kluczową rolę przypisano rozróżnieniu etiologii płynu na podstawie kryteriów Lighta, w dalszej kolejności wzięto pod uwagę inne cechy płynu umożliwiające jego diagnostykę różnicową. Przedstawiono także możliwe punkty diagnostyczne i podjęto próbę krótkiego omówienia prawidłowego postępowania. W toku przeprowadzonej diagnostyki wysunięto podejrzenie chłoniaka opłucnej a pacjenta skierowano do ośrodka wyższej referencyjności celem dalszej diagnostyki. Przedstawiono konieczne wg autora kroki diagnostyczne konieczne do ustalenia końcowego rozpoznania. Artykuł zaprezentowano w formie pytań jednokrotnego wyboru, w których czytelnik może aktywnie uczestniczyć. Lekturę wzbogacono badaniami obrazowymi.

Słowa kluczowe

wysięk opłucnowy, chłoniak

INTRODUCTION

In physiological conditions, the pleural cavity contains 10–20 ml of fluid [1]. If a small amount of fluid is visible in an ultrasound examination, it is assumed that less than 100 ml of fluid can be visualized in this examination. Chest radiography remains the gold standard for fluid diagnosis. In the case of unusual location, the presence of encysted fluid and differentiation with pleural lesions, computed tomography provides valuable information.

The most common cause of fluid in the pleural cavities (approximately 50%) is heart failure. If this etiology of fluid is suspected – with consistent signs and symptoms and imaging tests – fluid testing may be waived. The second most common cause of fluid is cancer (22%), and the third – parapneumonic fluid (17%)[2]. Fluid in the pleural cavities is associated with 15% of malignant tumours. Most often, it is recurrent, sometimes called 'malignant' [3]. The selection of appropriate diagnostic methods, and in particular a thorough assessment of fluid parameters, in conjunction with the physical and subjective examination, play a key role in diagnostics by enabling determination of the cause of the presence of fluid, and limiting the need for more invasive diagnostics. It is believed that despite proper diagnostics, the cause of the presence of fluid cannot be determined in approximately 20% of patients [4].

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Received: 26.09.2023; accepted: 11.12.2023; first published: 20.12.2023

CASE REPORT

A 63-year-old male with a history of hypertension was admitted to the Department of Internal Medicine for the diagnosis of exertional dyspnea. He did not observe any pain, no infectious symptoms, no history of coughing, haemoptysis or weight loss, but experienced exertional dyspnea, reduced exercise tolerance (when climbing stairs, uphill). He was taking ACEI and a loop diuretic, ambulatory blood pressure measurements were normal. He denied previous surgeries, injuries, and the patient's and family's medical history of tuberculosis was negative. Currently retired, he had previously worked as a driver and in the production of PVC. He denied smoking, but had smoked cigarettes in the past – about 10 pack years, 20 years ago. He lived with his family in good housing conditions. He has not performed outpatient examinations for many years and did not provide previous medical documentation.

In physical examination on admission, the general condition of the patient was quite good, conscious, in logical contact, oriented to place and time, body build normostenic, abdominal obesity, SpO2 93% without oxygen therapy, respiration 14/min, RR 120/70, pulse about 90/min, temperature 36.7 degrees C, ECG regular sinus rhythm with a frequency of about 90/min, normogram. Skin – pink, elastic, moist, properly insulated, no efflorescence. Subcutaneous tissue well developed. Peripheral lymph nodes not enlarged. Head – not painful to percussion and palpation. Eye – set symmetrically. Conjunctiva – correctly coloured, pupils equal, round, react correctly to light. Nose – symmetrical, patency of the ducts preserved. Oral mucosa – pink, without eruptions. Throat – clean; ears – external auditory canals without pathological discharge. Neck – symmetrical; thyroid – not enlarged. Chest – symmetrical, properly arched, on the right side a muffled percussion sound to the level above the lower corner of the scapula, reduced vesicular murmur, normal vesicular murmur on the left side, single crackles in the lower lobe. Heart – rhythmic action 90/min., clean tones, correctly accented, Pulse – peripheral symmetrical, consistent with the action of the heart. Abdomen – symmetrical, soft, arched above the level of the chest, painless, without pathological resistance; liver and spleen not enlarged. Lower limbs – without oedema, varicose veins present in both lower limbs.

In laboratory tests, an elevated level of CRP protein was observed, no leukocytosis, and normal levels of renal and hepatic parameters. A chest X-ray performed on admission showed fluid in the right pleural cavity reaching the level of the 6th rib (Figure 1).

Further management of the patient:

1. empirical antibiotic therapy;
2. diuretic treatment under the control of fluid balance, echocardiography;
3. diagnostic pleural puncture with effusion/transudate assessment.

The patient underwent a diagnostic puncture of the right pleural cavity under ultrasound guidance, obtaining 1,500 ml of slightly turbid, copper-coloured fluid. The fluid was collected for general examination and microbiological culture.

The following results were obtained (Figure 2):

2023–05–10 Examination of fluid from the pleural cavity, Amylase – 28 U/L; Protein – 5.80 g/dL; ALB – 3.09 g/dL; LDH – 556 U/L; Specific Gravity – 1.010; pH >=9.0; colour

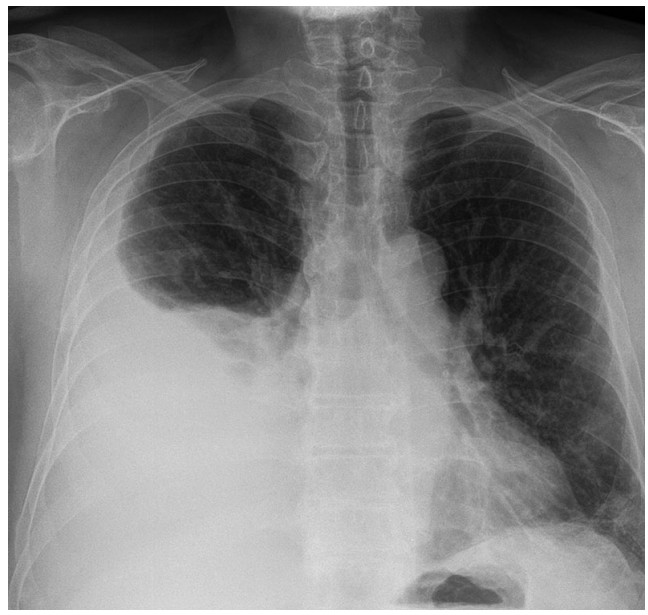


Figure 1.

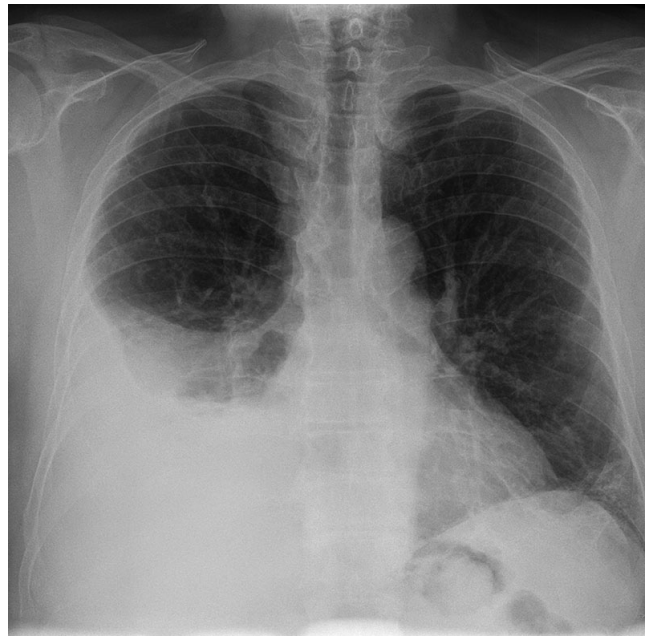


Figure 2.

previously yellow, previous clarity slightly cloudy.

Precipitate LOOSE erythrocytes in PW; LEUKOCYTES LOOSE IN PW.

PLT 0.0 K/ul HCT 0.6% HGB 0.000 g/dl WBC 1.836 K/ul RBC 0.068 M/µL BASO% 0.493% EOS% 1.232% MONO% 5.484% LYM% 87.860% NEUT% 4.929% BASO# 0.009 K/ul [0.000–0.100] EOS# 0.023K/ul [0.000–0.700] MONO# 0.101 K/ul [0.000–0.900] LYM# 1.613 K/ul [0.6–3.4] NEUT# 0.091 L K/ul [1.90–8.00]

Serum test:

ALBUMIN ALB 3.4 g/dL [3.5–5.2]

TOTAL PROTEIN TP 7.21 g/dL [6.60–8.30]

Lactate dehydrogenase (LDH) LDH 232 U/L [0–248]

On the basis of the performed examination, it is necessary to recognize:

1) effusion – pleurisy should be diagnosed, empirical antibiotic therapy should be initiated;
2) effusion – diagnostics should be extended with cytological examination, chest CT;
3) transudate – diuretic treatment should be implemented;
4) transudate – diagnostics should be extended with echocardiography, angio-CT.

In the diagnosis of pleural effusion, a key role is played by determining whether the fluid is exudate or transudate – determined using Light›s criteria [5–7]. The most common causes of effusion are infections, primary lung and pleural neoplasms as well as metastatic (breast, ovary, pancreas) and pulmonary embolism. The most common causes of transudate are heart failure, liver cirrhosis, nephrotic syndrome, and hypoalbuminaemia. In determining the etiology of the fluid, the history and physical examination play a superior role [8–9].

An infectious background is suggested by a history of fevers (also a feeling of malaise, subfebrile states), sudden onset and symptoms related to respiratory tract infection – cough or a change in its nature, expectoration of purulent sputum, shortness of breath, pleural pain. In the elderly, infectious symptoms may be less pronounced – the only symptom may be the deterioration of motor and cognitive functions, contact, apathy, confusion, agitation.

A cancer background will be suspected in patients with slowly and secretly increasing symptoms, history of weight loss, haemoptysis, pain. Sometimes, as in the presented patient, the only symptom of a significant amount of fluid in the pleural cavity was reduced exercise tolerance. It can often happen that the symptoms of a malignant disease other than the lung/pleura are the only or the main symptoms of the patient.

Determination of the cellular composition of the fluid also plays a well-established role in the diagnosis of pleural effusion. The predominance of lymphocytes suggests diagnostics for tuberculosis, cancer and heart failure with long-lasting transudations The predominance of neutrophils directs the diagnosis towards bacterial infections and blockages. The etiology of fluid eosinophilia should include asbestosis, parasitic diseases, cancer and drug reactions, as well as the presence of blood in the pleural cavity [1–2].

The patient's diagnostics was extended by chest CT with contrast – imaged apart from the presence of fluid in the right pleural cavity up to 5.6 cm wide was depicted, consolidations of the lung parenchyma in the middle lobe and basal segments of the lower lobe of the right lung with an air bronchogram visible on their background – inflammatory and atelectatic changes, suprapphragmatic in the left lung, moderately severe irregular areas of the matte panes with accompanying fibrous changes and thickened interlobular septa and small areas of honeycomb densities – post-inflammatory changes. In the upper lobes of both lungs, there were slight fibrous changes and single, small areas of densities frosted glass. Enlarged, heterogeneous lymph nodes: right paratracheal, 1.7 cm wide, subcarinal, 2.1 cm wide, right lung hilum, 1.4 cm wide, right parasternal lymph nodes, 1.8 cm wide. Heart enlarged. Trace of fluid in the pericardial sac.

Staphylococcus epidermitis MSCNS was cultured in the cultured fluid.

From the marked tumour markers AFP, Ca 15.3, Ca 19.9, CEA, PSA normal.

Direct examination for the presence of tuberculosis negative.

Cytological examination in progress [4,10].

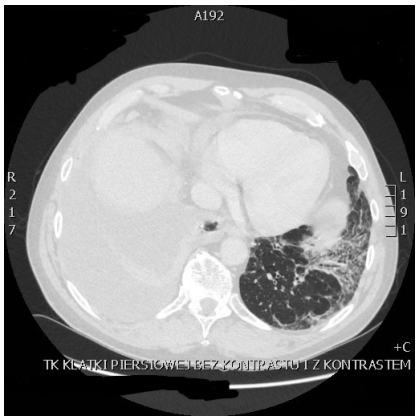


Figure 3a.

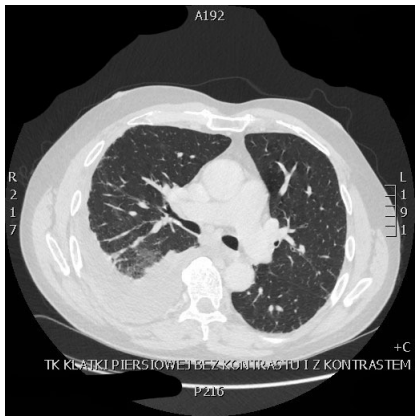
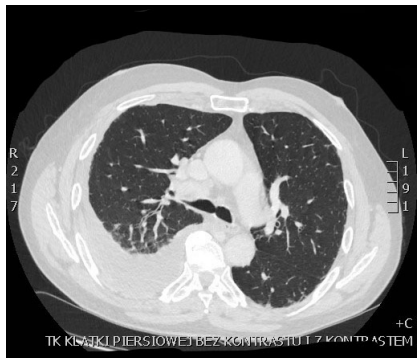


Figure 3b.



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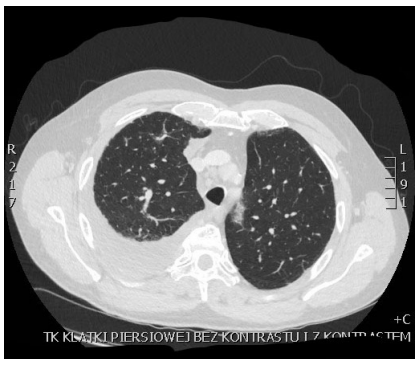

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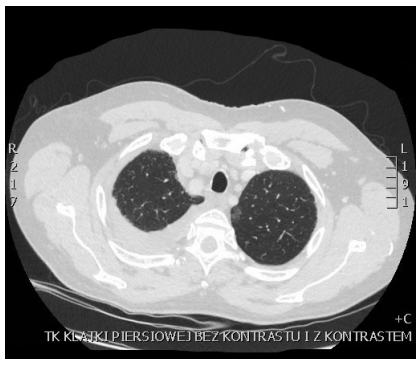

Figure 3e.

During hospitalization, the patient did not have fever, did not report shortness of breath, did not cough, CRP protein concentration was determined at a steady level (74mg/dl, 68mg/dl, 68mg/dl (normal 0–5)), procalcitonin 0.04ng/ml (normal < 0.05, risk of sepsis 0.05–0.5-> low) – low septic risk, no leukocytosis (WBC 10.9 K/uL).

At this diagnostic stage the following procedures should be performed:
1. refer the patient for an EBUS examination;
2. initiate targeted antibiotic therapy;
3. repeat pleural fluid culture, wait for cytological examination;
4. perform a videothoracoscopy.

Due to the lack of signs of infection, the decision was made to collect control pleural fluid cultures. No microorganisms were grown in the control cultures.

Abdominal USG was performed in the patient which showed no abnormalities. In the absence of symptoms, improvement of well-being, feverless interview, the patient was discharged home awaiting the result of cytological examination of the fluid.

After about 2 weeks, the patient was readmitted due to the recurrence of symptoms. An outpatient chest X-ray showed fluid in the right pleural cavity up to the fifth rib.

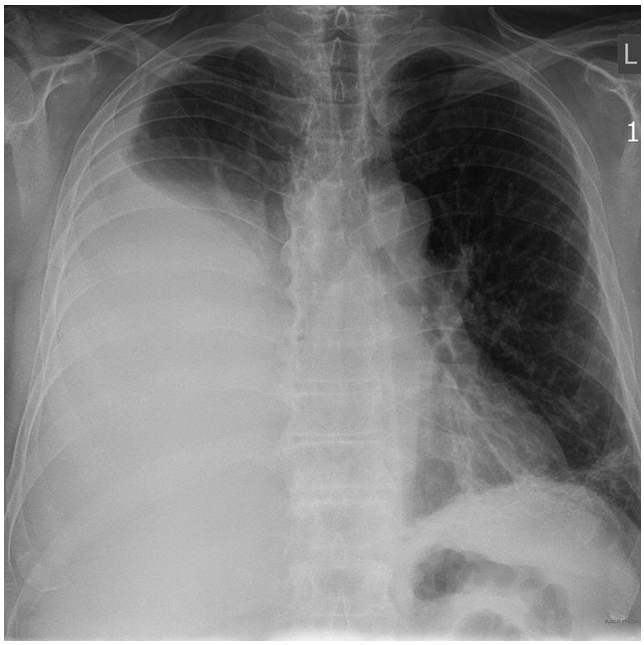

Figure 4.

Due to the large amount of fluid, the patient was consulted surgically [3]; the insertion of adrain was postponed until the result of the cytological examination of the fluid collected during the previous hospitalization was obtained. Therapeutic fluid puncture was performed, obtaining a total of 7,000 ml of exudate fluid.

Microbiological examination showed no abnormalities. Cytological examination revealed eosinophilic content. Numerous B cells (LCA/+/; CD20 /+/; PAX /+/; CD 23/-/+/) and T cells (LCA/+/; CD5/+/; bcl-6/+/), and a fFew histiocytes and single mesothelial cells. No cancer cells were found.

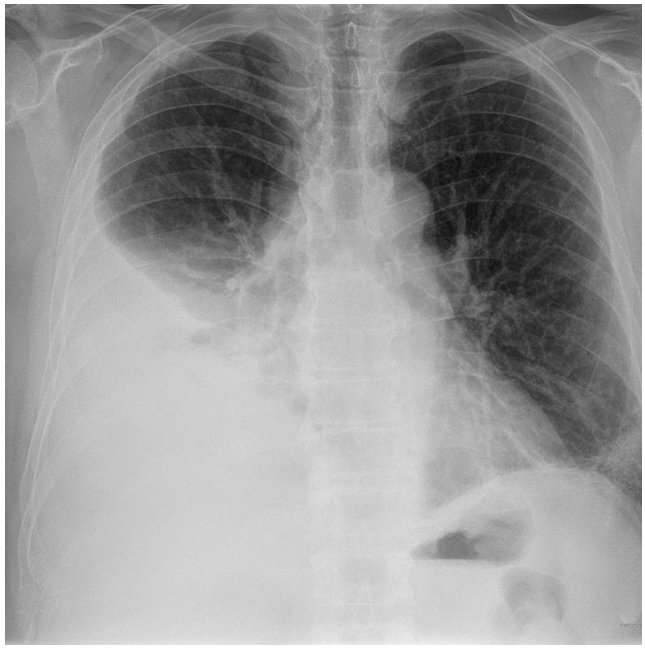

Figure 5a.

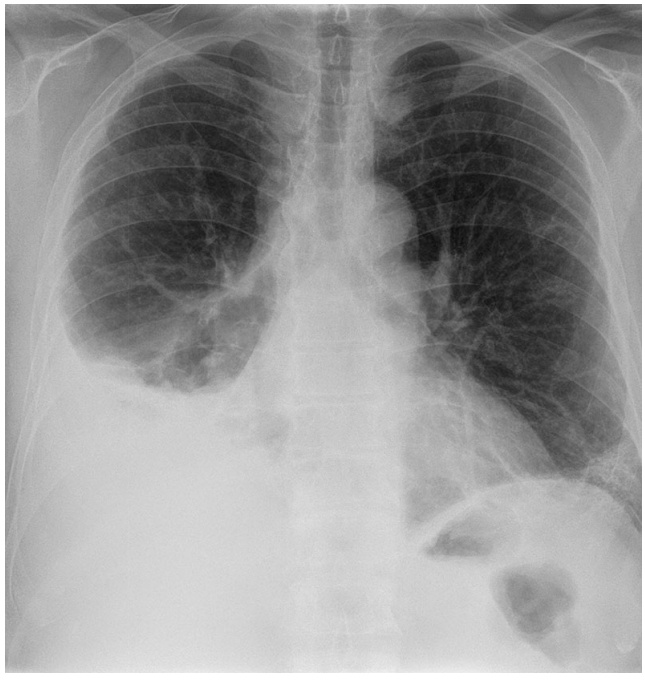

Figure 5b.

Next procedures to be followed:
1. suspicion of lymphoma – referral of the patient to EBUS;
2. suspicion of lymphoma – referral of the patient to videothoracoscopy in order to collect the node for histopathological examination;
3. starting chemotherapy;
4. if the result is questionable, collect fluid for another cytological examination;
5. if an empyaema is diagnosed, suction drainage should be placed into the pleural cavity;
6. perform a bone marrow biopsy/trephine biopsy.

The patient underwent an ultrasound examination of the superficial lymph nodes (cervical, axillary, inguinal), and

a follow-up ultrasound examination of the abdominal cavity to assess the abdominal lymph nodes, as well as a re-evaluation of the parenchymal organs – no hepatospleomegaly and no enlarged peripheral lymph nodes were found.

In spirometry without limiting the ventilatory reserves of the obstructive type, restrictive changes were suspected. The patient was consulted haematologically – lymphoma was suspected, diagnostics were planned, videothoracoscopy was scheduled.

DISSCUSION

The presence of fluid in the pleural cavities in the course of haematological diseases is common, and is present in 20–30% of non-Hodgkin›s lymphomas and Hodkin›s disease (HD) [11]. Primary effusion lymphoma is a very rare haematological disease, found in non-immunecompetent patients (e.g. HIV-infected, after transplantation). It is often associated with HHV-8 virus infection [12]. The pathomechanism of fluid formation is unknown, but it is believed to be caused by infiltration of the lung and pleural tissue [1], as well as obstruction of the thoracic duct, which results in difficult lymphatic drainage[11].

Immunocytochemistry (ICC), morphometry, flow cytometry (FCM) and cytogenetics (PCR, *in situ* hybridization and Southern blot) play an important role in the diagnosis of lymphatic effusions. It allows, among other things, to distinguish pleural and inflammatory reactions from lymphomas.

A separate cause of the presence of fluid in the pleural cavity in the course of lymphomas may be lymphorrhea or pleural transudate. Lymphorrhea is more common in patients with Hodkin's disease and may be associated with damage to the thoracic duct. A decisive role in the diagnosis of lymphorrhea is a general examination of the fluid sample taken during puncture, which reveals a high concentration of triglycerides and the presence of chylomicrons. Transudate fluid is most often associated with hypoalbuminaemia, and can be distinguished from exudate based on the previously mentioned Light Criteria. [1–2,5–6,9]. The presence of pleural effusion in the course of lymphomas is an unfavourable prognostic factor [11].

REFERENCES

1. Gajewski P, editor. Interna Szczeklika 2023. Medycyna Praktyczna. 2023;II B:701–702.
2. Antczak A, Pulmonology part 1.2nd ed. Warsaw: Medical Tribune Polska; 2020. p. 455–475.
3. Bibby A, Dorn P, Psallidas I, Porcel J, Janssen J, Froudarakis M, Subotic D, Astoul P, Licht P, Schmid R, Scherpereel A, Rahman N, Maskell N, Cardillo G, ERS/EACTS statement on the management of malignant pleural effusions. Eur J Cardiothorac Surg. 2019;55:116–132.
4. Ferreiro L, Toubes M, San José M, Suárez-Antelo J, Golpe A, Valdés L, Advances in pleural effusion diagnostics. Expert Review of Respir Med. 2020;14:51–66.
5. Hooper C, Lee G, Maskell N, Investigation of a unilateral pleural effusion in adults: British Thoracic Society pleural disease guideline 2010. Thorax. 2010;65.Suppl 2:ii4-ii17.
6. Corcoran J, et al. Pleural infection: past, present, and future directions. Lancet Respir Med. 2015;3.7:563–577.
7. Kołodziej J, Kacprzak G. Mechanism of pleural fluid formation and diagnosis. Fam Med Prim Care Rev. 2011;4:631–639.
8. Jany B, Welte T, Pleural Effusion in Adults-Etiology, Diagnosis, and Treatment. Dtsch Arztebl Int. 2019;116(21):377–386.
9. Beaudoin S, Gonzalez A, Evaluation of the patient with pleural effusion CMAJ. 2018;190(10):E291-E295.
10. Arnold D, Duneesha De Fonseka, Siobhan P, Morley A, Harvey J, Medford A, Brett M, Maskell N, Investigating unilateral pleural effusions: the role of cytology. Eur Respir J. 2018;52:1801254.
11. Das M, Dilip K. Serous effusions in malignant lymphomas: a review. Diagn Cytopathol. 2006;34:335–347.
12. Shimada K, Hayakawa F, Kiyoi H, Biology and management of primary effusion lymphoma. Blood. 2018;132:1879–1888.