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Clinical Case Report

First Successful Treatment of Legionella Pneumonia in a Patient with Hemoblastosis in Kazakhstan: A case report

Yevgeny Merenkov [1], Jamilya Saparbay [2], Yerlan Naubetov [3], Seilbek Beketov [4], Viktor Derr [5], Ivan Mishutin [6]

[1] *Head of the Department of oncohematological intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: Merenkov.yev@mail.ru*

[2] *Department of hepatology, gastroenterology and organ transplantation, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: dzhamilyasaparbay@gmail.com*

[3] *Anesthetist-reanimatologist of the Department of oncohematological intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: Erlan_9993@mail.ru*

[4] *Anesthetist-reanimatologist of the Department of oncohematological intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: Seiljohn@mail.ru*

[5] *Anesthetist-reanimatologist of the Department of oncohematological intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: viktorderr84@gmail.com*

[6] *Anesthetist-reanimatologist of the Department of oncohematological intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan. E-mail: ketamin11101989@gmail.com*

Abstract

Legionella pneumonia one of the three most common causes of community-acquired pneumonia and is associated with a high morbidity. The reported incidence of Legionella pneumonia is 1.4-1.8 cases per 100.000 people; immunocompromised patients are in high risk of legionella pneumonia development.

Clinical presentation. A 55-year-old woman with multiple myeloma admitted to our center for autologous hematopoietic stem cell transplantation. Upon mobilization of hematopoietic stem cells, the patient developed Legionella pneumonia. Based on the clinical manifestations of an unknown pneumonia, it was decided to conduct a test for the Legionella I serotype in urine, and the result was positive. After confirming the diagnosis and prescribing etiotropic therapy, the patient's condition improved.

Conclusion. We suggest that in the treatment of patients with immunodeficiency and signs of pneumonia, it is necessary to actively use the available methods of express diagnostics of Legionella pneumophila. This can reduce the mortality rate to 0-5.5%. This case shows that the diagnosis is very important, but also in the case of an unusual clinical manifestation of pneumonia, Legionella should be suspected in immunocompromised patients.

Keywords: Legionella pneumonia, Multiple myeloma, immunocompromised, intensive care.

Corresponding author: Yevgeny Merenkov, Department of intensive care, National Research Oncology Center, Nur-Sultan, Kazakhstan
Postal code: 010000
Address: Kazakhstan, Nur-Sultan, Kerey, Zhanibek khandar st. 3
Phone: +7 777 0793300
E-mail: Merenkov.yev@mail.ru

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Introduction

The first epidemic outbreak of Legionella pneumonia was recorded in 1976 in Philadelphia (USA), when 4400 congress participants of the American Legion veteran organization 221 (5%) developed severe pneumonia, 34 (15,4%) of them died. Six months later J.E. McDade and C.C. Shepard could have isolated the pathogen from lung tissue of deceased patients, it was called Legionella pneumophila in memory of the first victims [1]. Legionella pneumophila is at the top of the 3 most frequent causes of community-acquired pneumonia and associated with high morbidity, as shown by the high proportion of patients requiring intensive care unit (ICU) admission [2-4].

The genus Legionella forms a genetically related taxonomic structure, while the Legionellaceae family consists of only one genus and belongs to the g-subtype of proteobacteria. Legionella is gram-negative rods 0.5-0.7 μm in diameter and 2-5 μm in length [5].

Legionella pneumonia lacks diagnostic specificity. Warm-season, age over 40, male sex, smoking, presence of concomitant diseases, accompanied by a course of systemic hormonal and/or intensive immunosuppressive therapy are defined as the risk factors that have been associated with the severity of legionella pneumonia [5]. Legionella pneumonia is often misdiagnosed, which leads to under-treatment of legionella accounted community-acquired pneumonia [6]. The mortality rate ranges from 8 to 40 %, in cases of legionella pneumonia admitted to the ICU mortality was around 33%, duration of symptoms before ICU admission longer than 5 days, and intubation was reported to be associated with increased mortality [7]. Early initiation of appropriate therapy decreases the mortality rate to less than 5%. Delay in the initiation of appropriate antibiotics is associated with a worse prognosis (8). Diagnosis is based mainly on the isolation of the pathogen from sputum, bronchoalveolar lavage fluid, pleural fluid, and occasionally from blood cultures. Legionella pneumophila serotype 1 accounts for about 90% of all Legionella pneumonia. Widespread use of rapid methods for the determination of soluble antigen of Legionella pneumophila serotype 1 in urine has led in recent years to a tangible decrease in mortality in this disease. The method allows confirming the diagnosis within 1-2 hours. This method has advantages over others due to non-invasiveness and timing [9].

We present a case of clinical manifestation of legionellosis in an immunocompromised patient with multiple myeloma.

Case presentation

A 55 years old woman with multiple myeloma. She has been treated with six cycles of VCD (bortezomib/cyclophosphamide dexamethasone) scheme chemotherapy. After 6 cycles she had no major toxic events and achieved partial response according to the uniform response criteria of the International Multiple Myeloma Working Group (IMWG). She was proposed for autologous hematopoietic stem cell transplantation, which was performed in our center.

On admission was WBC 5.8x109 mg/l, C-reactive protein 5.22 mg/l (normal range below 5.0). Mobilization of hematopoietic stem cells started on November 8th, 2019. The patient tolerated well the administration of drugs and remained clinically stable. The first count of CD 34 was planned for November 18th, 2019. On the 10th day after hematopoietic stem cell mobilization initiation, the patient's condition worsened. The patient was transferred to the intensive care unit (ICU) for further treatment. On admission to ICU body temperature 400C, SpO2 - 88-90% without oxygen, with oxygenation was 96-97%, respiratory rate is 30-35/minute, hemodynamically stable, leucocyte count 15.1x109/hemoglobin 97 g/l, platelet - 34x103/mkl, C-reactive protein 404.45 mg/l (normal range below 5.0). Antibacterial therapy (cefepime 2.0 g), noninvasive mechanical ventilation (CIPAP, FiO 35%, Vt-450 ml PEEP-5. Pasb-12 every 3-4 hours for 1 hour) and High Flow therapy (FiO2 – 50-60%, 40-50 l/min) was initiated.

Chest computed tomography (CT) showed bilateral pneumonia, bilateral exudative pleuritis, multiple foci of chest bone destruction (myeloma disease). In comparison with the CT study dated 31.10.2019 increase in infiltration in the lower lobe of the left lung and the development of bilateral pleuritic (Figure 1).

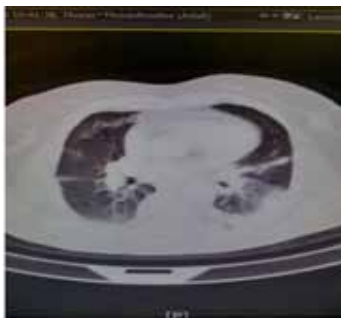

Figure 1 - CT signs of bilateral pneumonia, bilateral exudative pleurisy, multiple foci of chest bone destruction (myeloma)

Patient condition showed no improvement, body temperature was 38-390 C, leucocyte count 14.9x109/l C-reactive protein 417.78 mg/l. Additional therapy: cefepime was changed to alpitoz 4.5 g, antifungal (Kansidas 50 mg). Despite the therapy patient's condition kept on worsening (Table 1). Based on the clinical manifestation of unknown pneumonia, it was decided to make an express test for Legionellosis I serotype in urine (BinaxNOW Legionella Control Swab Pack, Manufacturer: Alere Inc., USA), the result was positive Legionella pneumophila serogroup 1. Moxifloxacin 400 mg was added to the therapy. The following day, the patient's respiratory status gradually improved, body temperature, breath rate of 22-26, C reactive protein normalization was detected (Table 1). Respiratory support High Flow therapy and CIPAP were also discontinued on the fourth day of moxifloxacin treatment. Saturation was 98% without oxygen therapy.

Table 1 – Dynamics of patient indicators

	1-st day inpatient	2-nd day inpatient	3-rd day inpatient	4-th day inpatient	5-th day inpatient	6-th day inpatient	7-th day inpatient	8-th day inpatient	9-th day inpatient	10-th day inpatient
Body temperature	40	38,4	38,3	39,1	37,8	36,9	35,9	36,4	35,9	36,1
Respiratory rate	40	36	38	35	30	28	24	22	22	18
WBC	15,1	18,7	14,9	6,5	7,4	4,7	4,8	4,3	6,2	6,5
CRP	404	332	417	312	328	180	82	52	30	21
Procalcitonin		1,79		1,69						
Cefepim	+	+								
Pipercallin-tazobactam			+	+	+	+	+	+	+	+
Kansidas			+	+	+	+	+	+	+	+
Moxifloxacin				+	+	+	+	+	+	+
Oxygenotherapy							+	+	+	+
CIPAP		+	+	+	+	+				
High-flow		+	+	+	+	+				

Discussion

Immunocompromised patients, especially those receiving cytotoxic chemotherapy are at higher risk for developing Legionella pneumonia [10]. Our case showed that delay in diagnosis verification led to worsened patient's condition due to respiratory failure. Only after pathogen verification in the urine, appropriate therapy was prescribed. We believe that in the treatment of patients with immunodeficiency and signs of pneumonia, it is imperative to actively use the available methods of express diagnosis of Legionella pneumophila. That can reduce the mortality rate to 0-5.5%. This case shows that the diagnosis is very important, but also with an unusual clinical manifestation of pneumonia, legionella should be considered in the differential diagnosis in immunocompromised patients.

Conclusion

We suggest that in the treatment of patients with immunodeficiency and signs of pneumonia, it is necessary to actively use the available methods of express diagnostics of Legionella pneumophila. This can reduce the mortality rate to 0-5.5%. This case shows that the diagnosis is very important, but also in the case of an unusual clinical manifestation of pneumonia, Legionella should be suspected in immunocompromised patients.

Conflict of interest. The authors declare that they have no competing interests.

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Қазақстанда гемобластозы бар науқастағы легионеллезді емдеудің алғашқы сәтті тәжірибесі: клиникалық жағдай

Меренков Е. [1], Сапарбай Ж.Ж. [2], Наубетов Е.Ж. [3], Бекетов С.Н. [4], Дерр В.В. [5], Мишутин И.А. [6]

[1] Онкогематологиялық реанимация бөлімшесінің меңгерушісі, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: Merenkov.yev@mail.ru

[2] Гепатология, гастроэнтерология және органдарды трансплантациялау бөлімі, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: dzhamilyasaparbay@gmail.com

[3] Онкогематологиялық реанимация бөлімшесінің анестезиолог-реаниматологы, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: Erlan_9993@mail.ru

[4] Онкогематологиялық реанимация бөлімшесінің анестезиолог-реаниматологы, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: Seiljohn@mail.ru

[5] Онкогематологиялық реанимация бөлімшесінің анестезиолог-реаниматологы, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: viktorderr84@gmail.com

[6] Онкогематологиялық реанимация бөлімшесінің анестезиолог-реаниматологы, Ұлттық ғылыми онкология орталығы, Нұр-Сұлтан, Қазақстан. E-mail: ketamin11101989@gmail.com

Түйіндеме

Легионеллез ауруханадан тыс пневмонияның ең көп тараған себептерінің үштігіне кіреді және аурушаңдықтың жоғары болуына байланысты, бұл пневмонияның осы түрі қарқынды терапия бөлімшесіне қабылдауды қажет ететін науқастардың жоғары үлесімен дәлелденеді. Тіркелген аурушаңдық 100 000 адамға шаққанда 1,4-1,8 жағдайды құрайды, ал иммунитеті төмен науқастар жоғары қауіп тобына жатады.

Клиникалық жаңдай. Гемопоэздік дің жасушаларын аутологиялық трансплантациялау үшін 55 жастағы әйел Ұлттық ғылыми онкология орталығына келіп түсті. Гемопоэтикалық бағаналы жасушаларды жұмылдыру кезінде науқаста легионеллез (Legionnaire pneumonia) дамыды. Белгісіз пневмонияның клиникалық көріністеріне сүйене отырып, несепте legionellesis I серотипіне жедел тест өткізу туралы шешім қабылданды, нәтижесі оң болды. Диагноз қойылып, этиотропты ем тағайындалғаннан кейін науқастың жағдайы жақсарды.

Қорытынды. Иммундық тапшылық және пневмония белгілері бар науқастарды емдеуде Legionella pneumophila экспресс-диагностикасының қолжетімді әдістерін белсенді пайдалану қажет деп санаймыз. Бұл шешім өлім-жітімді 0-5,5% дейін төмендетуі мүмкін. Сипатталған клиникалық жағдай диагноздың өте маңызды екенін көрсетеді. Иммунитеті төмен науқастарда ерекше клиникалық ағымды пневмония анықталған жағдайда ажыратпалы диагностика жүргізуде легионелла ескерілуі керек.

Түйін сөздер: Legionella pneumophila, көптеген миелома, иммундық тапшылық, қарқынды терапия.

Первое успешное лечение легионеллеза у пациента с гемобластозом в Казахстане: клинический случай

Меренков Е.А. [1], Сапарбай Д.Ж. [2], Наубетов Е.Ж. [3], Бекетов С.Н. [4], Дерр В.В. [5], Мишутин И.А. [6]

[1] Заведующий отделением онкогематологической реанимации, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: Merenkov.yev@mail.ru

[2] Отделение гепатологии, гастроэнтерологии и трансплантации органов, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: dzhamilyasaparbay@gmail.com

[3] Анестезиолог-реаниматолог отделения онкогематологической реанимации, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: Erlan_9993@mail.ru

[4] Анестезиолог-реаниматолог отделения онкогематологической реанимации, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: Seiljohn@mail.ru

[5] Анестезиолог-реаниматолог отделения онкогематологической реанимации, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: viktorderr84@gmail.com

[5] Анестезиолог-реаниматолог отделения онкогематологической реанимации, Национальный научный онкологический центр, Нур-Султан, Казахстан. E-mail: ketamin11101989@gmail.com

Резюме

Легионеллез входит в тройку наиболее частых причин внебольничной пневмонии и связана с высокой заболеваемостью, о чем свидетельствует высокая доля пациентов, нуждающихся в приеме в отделение интенсивной терапии. Зарегистрированная заболеваемость этой болезнью составляет 1,4-1,8 случая на 100 000 человек, а пациенты с ослабленным иммунитетом относятся к группе повышенного риска

Клинический случай. Женщина 55 лет с множественной миеломой была направлена в Национальный научный онкологический центр для аутологичной трансплантации гемопоэтических стволовых клеток. При мобилизации гемопоэтических стволовых клеток у пациентки развился легионеллёз (Legionnaire pneumonia). На основании клинических проявлений неизвестной пневмонии было решено провести экспресс-тест на серотип Legionellesis I в моче, результат оказался положительным. После установления диагноза и назначения этиотропной терапии, состояние пациентки улучшилось.

Выводы. Мы считаем, что в лечении пациентов с иммунодефицитом и признаками пневмонии необходимо активно использовать доступные методы экспресс-диагностики Legionella pneumophila. Это может снизить уровень смертности до 0-5,5%. Этот клинический случай показывает, что диагноз очень важен, но также при необычном клиническом проявлении пневмонии, легионелла должна учитываться при дифференциальной диагностике пациентов с ослабленным иммунитетом.

Ключевые слова: Legionella pneumophila, множественная миелома, иммунодефицит, интенсивная терапия.