

for and improvement of methods of prevention and treatment remain always relevant. According to experts, herbal medicine is a promising area. Therefore, the aim of the study was to investigate the effect of aqueous extracts and alcoholic tinctures from Feijoa leaves and fresh fruits on biochemical parameters in the blood serum of rats with experimental hypothyroidism. Experimental hypothyroidism was induced by daily administration of a 0.05% aqueous solution of mercazolil to rats instead of drinking water for 30 days. The study substances were administered to hypothyroid animals intragastrically at a dose of 1 ml/100 g of body weight for 21 days. Serum levels of thyroid T3 and T4 were assessed, and alanine aminotransferase (ALT), aspartate aminotransferase (AST), creatine kinase (CK), lactate dehydrogenase (LDH), total protein, albumin, urea, creatinine, cholesterol (CHO) and triglycerides (TG) were also determined. Mercazolil-induced hypothyroidism is characterized by a decrease in the functional activity of the thyroid gland, which is manifested in a decrease in the content of thyroid hormones in the blood serum of experimental animals. The results of the study showed that hypothyroidism contributed to an increase in serum cholesterol, triglycerides, urea, creatinine, ALT, AST and CK enzymes, and a decrease in glucose levels, indicating a violation of lipid, protein and carbohydrate metabolism in the setting of hypothyroidism. The use of the studied extracts and tinctures contributed to the restoration of biochemical parameters in the blood serum, as well as the level of thyroid hormones. In the experimental group receiving the studied compositions against the background of hypothyroidism, the level of T4 and T3 increased, positive changes in biochemical parameters occurred, which can be regarded as a sign of restoration of metabolic processes. Thus, it was concluded that further studies of the effect of aqueous extracts and 30% alcohol tinctures of feijoa leaves and fresh fruits as promising objects for the development of drugs intended for the prevention and treatment of hypothyroidism are advisable.

Key words: Feijoa leaves, Feijoa fruits, experimental hypothyroidism, mercazolil, thyroid hormones.

ORCID and contributionship:

Kononenko A. H.: <https://orcid.org/0000-0002-2132-7702>^{ABCD}

Kravchenko V. M.: <https://orcid.org/0000-0001-6335-2490>^{FE}

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Corresponding author

Kononenko Alevtya Hennadiyevna
National University of Pharmacy
Ukraine, 61002, Kharkiv, 53 Hryhorii Skovoroda str.
Tel.: +380501838456
E-mail: alevtina19820103@gmail.com

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¹Marchenko O. H., ¹Bodnar V. A., ¹Pryimenko N. O., ¹Stetsenko O. O.,

¹Miahkikhlib A. A., ²Olefir S. A., ²Svyrydenko N. P.

CURRENT CLINICAL AND EPIDEMIOLOGICAL FEATURES OF MEASLES: A RETROSPECTIVE COHORT STUDY COMPARING THE 2006 AND 2018 OUTBREAKS

¹Poltava State Medical University (Poltava, Ukraine)

²Municipal enterprise «Poltava Regional Clinical Infectious Diseases Hospital of the Poltava Regional Council» (Poltava, Ukraine)

dr.marchenko.o@gmail.com

The article is dedicated to defining the clinical and epidemiological features of the current course of measles when comparing the outbreaks of the disease between 2006 and 2018.

The medical records of 218 patients who were in hospital in a communal enterprise of the Poltava Regional Clinical Infectious Diseases Hospital of the Poltava Regional Council with the diagnosis "Measles" for the periods of epidemic outbreaks of measles epidemic outbreaks between January and May 2006 and between January and December 2018.

The analysis showed that in general, among both groups, persons of young age from 18 to 39 years prevailed, however, during the outbreak of 2018, the age structure of patients was registered in more patients older than 30 years than during the outbreak of 2006. According to gender analysis, men were significantly more prevalent among those hospitalized during the 2018 outbreak when compared to data from 2006.

A comparative analysis of the clinical course of the disease depending on the year of the epidemic outbreak showed that among those hospitalized in 2018, such clinical symptoms as general weakness, runny nose, enlarge-

ment of local lymph nodes, conjunctivitis and Koplik spots were less likely to be diagnosed, but manifestations of intestinal syndrome were more often recorded than during the outbreak in 2006.

The findings suggest some changes in the clinical course of measles and the frequent absence of measles-specific features during the last large-scale outbreak. This complicates the diagnosis of measles and requires increased awareness from doctors about this disease.

Key words: measles, epidemic outbreak, clinical features, course.

Connection of the publication with planned research works.

The study is a fragment of the research work «Improvement of diagnostics and therapeutic tactics in current infectious diseases based on the assessment of their clinical and pathogenetic characteristics», state registration № 0124U000091.

Introduction.

Measles is an acute, extremely contagious respiratory illness. It is characterized by the upper respiratory tract and eye tissues involvement, fever, intoxication syndrome, maculopapular rash [1]. It is characterized by the possibility of potentially dangerous complications from the nervous system such as meningoencephalitis and the development of pneumonia [2-3]. Despite the implementation of routine measles immunisation more than 60 years ago, measles remains a pressing problem for the healthcare system [4-5].

Measles is a re-emergent disease, with outbreaks occurring on average every 4-5 years. The last officially declared measles epidemic in Ukraine was in 2017-2019, when out of 115,000 reported cases, 41 were fatal [6-8].

Despite its cyclical character, the incidence of measles can also increase during periods of «epidemiological silence». According to WHO, in 2022, measles morbidity and mortality increased by 18% and 43%, respectively, compared to 2021 [9]. Due to the recent COVID-19 pandemic and the beginning of Russia's full-scale invasion, Ukraine experienced a decline in vaccination coverage in 2020-2022 in the face of reduced access to medical care. The lack of vaccination coverage in previous years raises the possibility of a new disease outbreak in the near future. Because data on the clinical features of the current measles outbreak are inconsistent,

characterization of measles at the present time with a comparison of the two most recent outbreaks is highly appropriate.

The aim of the study.

To determine current clinical and epidemiological characteristics of measles by comparing the 2006 and 2018 outbreaks.

Object and research methods.

The medical records of patients treated in the municipal enterprise «Poltava Regional Clinical Infectious Diseases Hospital of the Poltava Regional Council» with the diagnosis of measles during the epidemic outbreaks from January to May 2006 and from January to December 2018 were analyzed. 218 patient medical cards were processed, with an average age of 28.3 ± 3.4 years, 53.7% were male and 46.3% were female. Clinical and epidemiological data, as well as serological studies (ELISA detection of anti-measles IgM in blood serum), were used to establish the diagnosis of measles. The study of the history of life, epidemiological history, nature, sequence of occurrence and duration of the main clinical symptoms, the presence of concomitant pathology and complications were all taken into consideration when analyzing medical documentation.

We created two groups of patients based on the time of the outbreak.

Group 1 – patients who were hospitalized between January and May 2006 (n=140);

Group 2 – patients who were hospitalized between January and December 2018 (n=78).

The statistical analysis of the obtained results was carried out using descriptive statistics methods. The Kolmogorov-Smirnov test was used to verify the normality of data distribution. To figure out the central trend, we used the mean (M) and standard deviation of the mean (m) or median (Me) with upper and lower quartiles (IQR). The Student's t-test was used to determine the probability of differences in quantitative results in the comparison groups in the normal distribution, while the Mann-Whitney U-test was used in the distribution that was different from the normal distribution. Using Fisher's exact test and criterion χ^2 the calculation for qualitative variables was performed according to the analysis requirements. Statistical processing of the study results was carried out using the IBM SPSS statistical package (17th version).

Research results and their discussion.

The analysis revealed that young people aged 18 to 39 years (92.2%) were the dominant age group of patients. Most patients were admitted to the hospital during the rash period, which was the main reason for seeking medical help. The majority of patients are hospitalized on the 4th-6th day of their illness (on average, the 5th day).

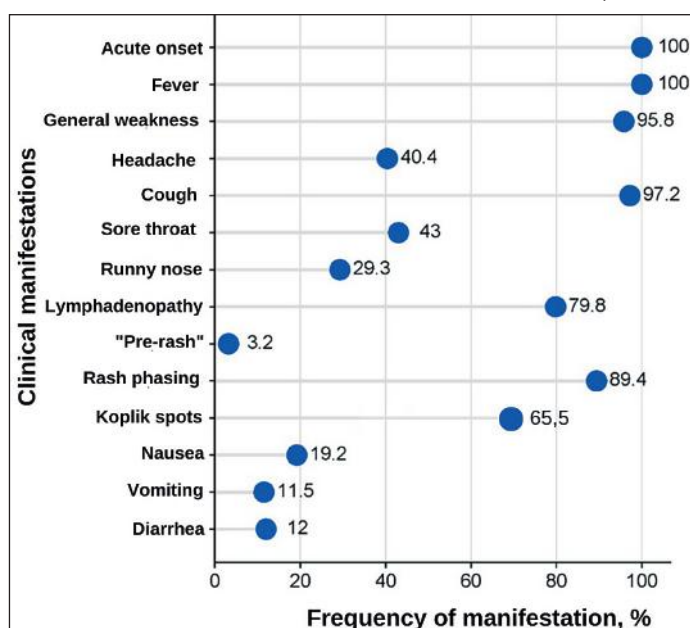


Figure 1 – Frequency of clinical manifestations of measles in patients.

Most often, patients were hospitalized by referral from family doctors/polyclinic doctors and emergency doctors: 114 (52.3%) and 84 (38.5%), respectively. 17 (7.8%) patients went to the infectious diseases hospital on their own. Furthermore, there were instances of patients transferring from other hospitals: gynecological – 2 and pulmonological – 1.

170 patients (77.9%) were diagnosed with 'Measles' by primary care doctors at the pre-hospital stage. In other cases, acute respiratory viral infection (ARVI) was diagnosed in 17 patients (8.6%), rubella in 6 (3.0%), scarlet fever in 2 (1.0%), tonsillitis in 1 (0.5%), herpetic tonsillitis in 1 (0.5%), acute gastroenterocolitis in 1 (0.5%), 17 patients who self-referred to the hospital and 3 transferred patients were not included.

At the time of hospitalization, measles was diagnosed in 201 patients (92.2%), measles contact in 3 (1.4%), ARVI in 12 (5.5%), and sore throat in 1 (0.9%) patient. The diagnosis was corrected in all instances based on the phasing of the rashes.

A typical form of measles occurred in 202 patients (92.6%), with abortive or mitigated cases occurring in 12 (7.4%). The majority of patients, 183 (83.9%) identified moderate severity, mild, and severe measles in 8 (3.7%) and 27 (12.3%) cases respectively. In 55 patients (25.2%), complications were noted, with 37 acute bronchitis (64.1%), 10 otitis (20.5%), pneumonia (4.6%), encephalitis, 2 (2.5%) hepatitis and 2 (2.5%) sinusitis cases.

The disease onset was acute and fever was present in all the examined individuals. The average maximum temperature was 39.1 °C (from 37.4 °C to 41.5 °C). Fever lasted an average of 6.8 days (from 2 to 19 days). General weakness was noted by 209 (95.8%), headache by 88 (40.4%), and dizziness by 19 (8.7%) patients. All patients (100%) showed symptoms of catarrhal syndrome. Cough, mostly dry suprasadal, bothered 212 people (97.2%), sore throat 94 (43.1%), and runny nose 64 (29.3%). On average, the initial period lasted 3 days (from 1 to 7). In 7 (3.2%), the first manifestation of the disease was a small-droplet rash, which is regarded as a «pre – rash».

In 14 patients (6.4%), there was a short-term decrease in temperature prior to the rash, while in 195 patients (89.4%), the rash phasing was observed. Enanthema on the oral mucosa (mainly the soft and hard palate) was determined in 119 patients (85%), and Koplik's spots were found in 142 patients (65.5%). Dyspeptic disorders were present in some patients, resulting in nausea of 42 (19.2%), vomiting of 25 (11.5%), and rarefied bowel movements of 26 (11.9%). Moderately enlarged regional lymph nodes were discovered

Table – Comparative characteristics of measles in patients during outbreaks in 2006 and 2018

Clinical signs	Group 1 (n=140)	Group 2 (n=78)	p
Initial period (days)	3,2±0,3	4,5±0,3	0,371
Period of rash (days)	4,2±0,1	5,2±0,2	0,456
Duration of fever (days)	7,2±0,4	6,3±0,6	0,336
Headache, abs (%)	60 (42,9)	28 (35,9)	0,315
Weakness, abs (%)	139 (99,3)	70 (89,8)	0,001
Cough, abs (%)	137 (97,9)	75 (96,1)	0,461
Runny nose, abs (%)	53 (37,9)	11 (14,1)	0,000
Sore throat, abs (%)	63 (45,0)	31 (39,7)	0,425
Enlargement of regional lymph nodes, abs (%)	125 (89,3)	49 (62,8)	0,001
Conjunctivitis, abs (%)	129 (92,1)	49 (62,8)	0,001
Rash phasing, abs (%)	125 (89,3)	70 (89,7)	0,915
Koplik's spots, abs (%)	99 (70,7)	43 (55,1)	0,020
Nausea, abs (%)	21 (15,0)	21 (26,9)	0,032
Vomiting, abs (%)	14 (10,0)	11 (14,1)	0,362
Diarrhea, abs (%)	11 (7,9)	15 (19,2)	0,013
Disease severity			
Mild, abs (%)	5 (3,6)	3 (3,8)	0,917
Moderate, abs (%)	114 (81,4)	69 (88,6)	0,175
Severe, abs (%)	21 (15,0)	6 (7,6)	0,116

Notes: p – the significance level obtained using Student or Mann-Whitney tests, Fisher's exact test, or χ^2 test, depending on the prerequisites for the analysis.

in 174 patients (79.8%) during the acute period (**fig. 1**). The duration of the rash period ranged from 2 to 11 days and averaged 6 days.

To establish the current clinical course of measles, it was appropriate to compare the clinical picture of adult patients during outbreaks in 2006 and 2018.

Therefore, the analysis of patients by demographic characteristics showed that in general, among both groups of patients, young people between 18 and 39 years of age were the majority. However, it has been noticed that during the outbreak of 2018, there were 4.3 times more patients aged 30-39 years and over 40 years in the age structure of patients than in the 2006 outbreak (52.4% vs. 19.3%, $p<0.001$, **fig. 2**). This confirms the previous results obtained in the countries of the European region [10-11].

Gender analysis revealed that men were significantly more prevalent among those hospitalized during the

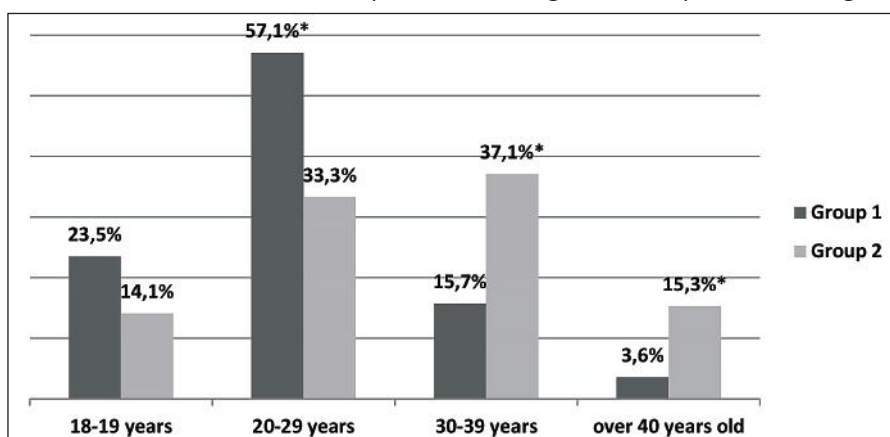


Figure 2 – Age structure of hospitalized patients during the 2006 and 2018 outbreaks.

Notes: p – level of significance obtained using Fisher's exact test or χ^2 criterion, depending on the prerequisites of the analysis. * – statistical difference between groups $p \leq 0.05$

2018 outbreak compared to 2006 data (65.4% vs. 47.1%, $p=0.009$).

The clinical course of measles in adults during disease outbreaks is compared and presented in **table**.

Comparing the clinical course of measles based on the year of the epidemic outbreak showed that the clinical manifestations of the disease in adults generally corresponded to the typical course, but there were certain differences in the frequency of individual symptoms recorded. It was established that in patients during the epidemic outbreak of 2018 less often than during the outbreak of 2006 were diagnosed with general weakness – 1.4 times ($p=0.001$), runny nose – 2.7 times ($p=0.000$), lymphadenopathy – 1.4 times ($p=0.001$), signs of conjunctivitis – 1.5 times ($p=0.001$).

In addition, among inpatients in 2018 the frequency of registration of such a pathognomonic sign for the disease as Koplik's spots was 55.1%, which is 1.3 times less frequent ($p=0.020$) than in the outbreak in 2006. This partially confirms the previous findings of our Ukrainian colleagues [12-13].

It should be noted that during the most recent outbreak in 2018, the clinical pattern of the disease showed more cases of intestinal syndrome, particularly nausea and diarrhea (26.9% versus 15.0% ($p=0.032$) and 19.2% versus 7.9% ($p=0.013$), respectively). The severity was not found to have a significant difference between the study groups during a comparative analysis.

The findings suggest some changes in the clinical course of measles and the frequent absence of measles-specific features during the last large-scale outbreak. This complicates the diagnosis of measles and requires increased awareness from doctors about this disease.

Conclusions.

The results of this study show that among the patients there was a course of moderate disease, the disease was characterized by a typical clinical pattern with a predominance of intoxication syndrome, the appearance of a typical rash, the presence of catarrhal syndrome.

However, it was found that among patients in the last epidemic outbreak of measles in 2018, 1.4 times more men were and 4.3 times more people over 30 were registered than in the 2006 outbreak. The number of hospitalized patients in 2018 who reported clinical symptoms like general weakness, runny nose, enlargement of local lymph nodes, conjunctivitis, and Koplik's spots was significantly lower than during the outbreak in 2006, but manifestations of gastrointestinal syndrome were significantly more common than during the outbreak in 2006.

Prospects for further research.

The future goal is to study the link between measles incidence and vaccine coverage in Ukraine and the Poltava region, and evaluate the progression of the illness in vaccinated and non-vaccinated individuals.

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КЛІНІКО-ЕПІДЕМІОЛОГІЧНІ ОСОБЛИВОСТІ ПЕРЕБІГУ КОРУ НА СУЧАСНОМУ ЕТАПІ: РЕТРОСПЕКТИВНЕ КО-ГОРТНЕ ДОСЛІДЖЕННЯ НА ОСНОВІ ПОРІВНЯННЯ СПАЛАХІВ 2006 ТА 2018 РОКІВ

Марченко О. Г., Боднар В. А., Прийменко Н. О., Стеценко О. О., Мякохліб А. А., Олефір С. А., Свириденко Н. П.

Резюме. Кір – контагіозне небезпечне інфекційне захворювання, яке характеризується вираженим катаральним запаленням слизових оболонок, синдромом інтоксикації та плямисто-папульозним висипом. Попри багаторічну планову імунізацію населення, кір залишається актуальною проблемою для системи охорони здоров'я. Через пандемію COVID-19 та повномасштабне російське вторгнення, в Україні в умовах знижених

рівнів охоплення щепленнями за попередні роки цілком можна очікувати нового спалаху захворювання. Враховуючи це представилось за доцільне оцінити характеристики кору на сучасному етапі.

Метою дослідження було визначити клініко-епідеміологічні особливості перебігу кору на сучасному етапі при порівнянні спалахів захворювання 2006 та 2018 років.

Об'єкт і методи дослідження. Для досягнення поставленої мети було проаналізовано медичні карти 218 пацієнтів, які перебували на стаціонарному лікуванні в комунальному підприємстві Полтавська обласна клінічна інфекційна лікарня Полтавської обласної ради з діагнозом «Кір» за періоди епідемічних спалахів кору з січня по травень 2006 (n=140) та з січня по грудень 2018 року (n=78).

Результати дослідження та їх обговорення. Аналіз пацієнтів за демографічними характеристиками показав, що загалом серед обох груп переважали особи молодого віку від 18 до 39 років, однак під час спалаху 2018 р. у віковій структурі пацієнтів реєструвалось у 4,3 рази більше пацієнтів 30-39 років та старше 40 років, ніж під час спалаху 2006 року (52,4% проти 19,3%, $p<0,001$). Аналіз за статтю показав, що серед госпіталізованих під час спалаху 2018 р. достовірно переважали чоловіки, порівняно з даними 2006 р. (65,4% проти 47,1%, $p=0,009$).

Порівняльний аналіз клінічного перебігу захворювання в залежності від року епідемічного спалаху показав, що загалом клінічні прояви кору у дорослих відповідали типовому перебігу хвороби, проте частота реєстрації окремих симптомів мала певні відмінності. Так встановлено, що у пацієнтів під час епідемічного спалаху 2018 р. у 1,4 разу рідше, ніж під час спалаху 2006 р. діагностувалась загальна слабкість ($p=0,001$), нежить – у 2,7 разів ($p=0,000$), лімфаденопатія – у 1,4 рази ($p=0,001$), ознаки кон'юнктивіту – у 1,5 рази ($p=0,001$). Серед стаціонарних пацієнтів у 2018 р. частота реєстрації такої патогномонічної ознаки, як плями Бельського-Філатова-Копліка, склала 55,1%, що у 1,3 разу рідше ($p=0,020$), ніж у під час спалаху у 2006 р. Крім того під час останнього спалаху у 2018 р. у клінічній картині захворювання частіше реєструвались прояви кишкового синдрому, аніж у 2006 р, а саме нудота і діарея (26,9% проти 15,0% ($p=0,032$) та 19,2% проти 7,9% ($p=0,013$) відповідно).

Висновки. Результати цього дослідження свідчать що у віковій структурі пацієнтів під час останнього епідемічного спалаху кору в 2018 році реєструвалось у 4,3 рази більше осіб старше 30 років, ніж під час спалаху 2006 року. Серед госпіталізованих 2018 року рідше діагностувались такі клінічні симптоми, як загальна слабкість, нежить, збільшення місцевих лімфатичних вузлів, кон'юнктивіт та плями Бельського-Філатова-Копліка, однак частіше реєструвались прояви кишкового синдрому, аніж під час спалаху в 2006 році.

Ключові слова: кір, епідемічний спалах, клінічні особливості, перебіг

CURRENT CLINICAL AND EPIDEMIOLOGICAL FEATURES OF MEASLES: A RETROSPECTIVE COHORT STUDY COMPARING THE 2006 AND 2018 OUTBREAKS

Marchenko O. H., Bodnar V. A., Pryimenko N. O., Stetsenko O. O.,
Miahokhlib A. A., Olefir S. A., Svyrydenko N. P.

Abstract. Measles is a contagious dangerous infectious disease, which is characterized by severe catarrh of the mucous membranes, intoxication syndrome and patchy-papular rash. Due to the COVID-19 pandemic and the full-scale russian invasion, a new outbreak of the disease can be expected in Ukraine in the face of reduced levels of vaccination coverage in previous years. Given this, it seemed appropriate to evaluate the characteristics of the measles at the present stage.

The aim of the study was to determine current clinical and epidemiological characteristics of measles by comparing the 2006 and 2018 outbreaks.

Object and methods of research. To achieve this goal, the medical records of 218 patients who were hospitalized in a communal enterprise «Poltava Regional Clinical Infectious Diseases Hospital of the Poltava Regional Council» with the diagnosis of measles during the epidemic outbreaks from January to May 2006 and from January to December 2018 were analyzed.

Results of the study and their discussion. Analysis of patients by demographic characteristics showed that in general, among both groups, young people from 18 to 39 years old prevailed, however, during the outbreak of 2018. 4.3 times more patients aged 30-39 years and over 40 years were registered in the age structure of patients than in the 2006 outbreak (52.4% vs 19.3%, $p<0.001$). Analysis by sex showed that among those hospitalized during the 2018 outbreak significantly dominated by men, compared with 2006 data. (65.4% vs 47.1%, $p=0.009$).

A comparative analysis of the clinical course of the disease depending on the year of the epidemic outbreak showed that, in general, the clinical manifestations of measles in adults corresponded to the typical course of the disease, but the frequency of recording individual symptoms had certain differences. So it is established that in patients during the epidemic outbreak of 2018 1.4 times less frequently than during the 2006 outbreak. general weakness was diagnosed ($p=0.001$), runny nose – 2.7 times ($p=0.000$), lymphadenopathy – 1.4 times ($p=0.001$), signs of conjunctivitis – 1.5 times ($p=0.001$). Among inpatients in 2018 the frequency of recording such a pathognomonic sign as the Koplik spots was 55.1%, which is 1.3 times less frequent ($p=0.020$) than in the 2006 outbreak. Also during the last outbreak in 2018 in the clinical picture of the disease, manifestations of intestinal syndrome were more often recorded than in 2006, namely nausea and diarrhea (26.9% vs 15.0% ($p=0.032$) and 19.2% vs 7.9% ($p=0.013$), respectively).

Conclusions. The results of this study indicate that in the age structure of patients during the last epidemic outbreak of measles in 2018, 4.3 times more people over 30 were registered than in the 2006 outbreak. Among those hospitalized in 2018, such clinical symptoms as general weakness, runny nose, enlargement of local lymph

nodes, conjunctivitis and Koplik's spots were less often diagnosed, but manifestations of intestinal syndrome were more often recorded than during the outbreak in 2006.

Key words: measles, epidemic outbreak, clinical features, course.

ORCID and contributionship:

Marchenko O. H.: <https://orcid.org/0000-0003-2300-1287> ^{ABCD}

Bodnar V. A.: <https://orcid.org/0000-0002-1277-9344> ^{ADEF}

Pryimenko N. O.: <https://orcid.org/0000-0002-8265-1143> ^{ADEF}

Stetsenko O. O.: <https://orcid.org/0009-0000-5481-4251> ^{ABCD}

Miahkikhlib A. A.: <https://orcid.org/0000-0003-2261-2764> ^{BCD}

Olefir S. A.: — ^{BCD}

Svyrydenko N. P.: — ^{BCD}

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The authors declare no conflict of interest.

Corresponding author

Marchenko Olena Hennadiivna

Poltava State Medical University

Ukraine, 36011, Poltava, 23 Shevchenko str.

Tel.: +380996077977

E-mail: dr.marchenko.o@gmail.com

A – Work concept and design, B – Data collection and analysis, C – Responsibility for statistical analysis, D – Writing the article, E – Critical review, F – Final approval of the article.

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Munko M. A.

EFFECT OF THE ANTICOAGULANT ENOXAPARIN DIRECT ACTION ON THE METASTATIC ACTIVITY OF LEWIS LUNG CARCINOMA

SI "Institute of Pharmacology and Toxicology of the National Academy of Medical Sciences
of Ukraine" (Kyiv, Ukraine)

munandmax@gmail.com

Metastasis is the leading cause of death in patients with cancer. The spread of the tumor process to distant sites occurs mainly through the bloodstream. Tumor growth and aggressiveness largely depend on the ability of cancer cells to cause neoangiogenesis and metastasis. Special attention is paid to the study of various pathological changes in the hemostatic system in cancer patients to improve treatment outcomes by assessing the value of hypercoagulability markers and the coagulation framework of the tumor cell in treating this category of patients.

The aim of the experiment was to investigate the effect of a direct-acting anticoagulant, an antithrombotic drug of the LMWH group, enoxaparin at a dose of 10.0 mg/kg on the metastatic activity of Lewis lung carcinoma (LL), transplanted into male C57BL/6 mice by subcutaneous injection for 20 days and to assess pathological changes in platelet hemostasis, whole blood coagulation activity and their relationship with metastasis progression.

Under conditions of enoxaparin administration at a dose of 10.0 mg/kg against the background of metastatic tumor growth on day 28 of the study, a significant reduction in the metastatic activity of Lewis lung carcinoma was found. A comparative analysis of the platelet component of the hemogram and the coagulation activity of whole blood of experimental animals with LL carcinoma revealed a significant reduction in blood clotting time, pathological enlargement of the spleen (splenomegaly), which is a consequence of increased platelet sequestration and an increase in the splenic pool, causing thrombocytopenia. At the same time, enoxaparin therapy at a dose of 10.0 mg/kg is accompanied by a significant increase in blood clotting time and an increase in the number of platelets in the blood of experimental mice.

Key words: anticoagulants, Lewis lung carcinoma, metastases, C57BL/6 mice.

Connection of the publication with planned research works.

The experimental study was performed within the framework of the research work of the Oncopharmacology Laboratory of the Department of Pharmacology

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