

Досліджено умови та особливості реалізації Національної стратегії реформи системи охорони здоров'я України на 2015–2025 роки з точки зору забезпечення ефективної організації системи охорони здоров'я, зокрема в контексті розширення приватної медицини. Запропоновано перспективи подальших досліджень умов та шляхів удосконалення системи надання медичної допомоги в Україні.

**Ключові слова:** децентралізація влади, медична реформа, система медичного обслуговування, приватна медицина, видатки на охорону здоров'я.

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и особенности реализации Национальной стратегии реформы системы здравоохранения Украины на 2015-2025 годы с точки зрения обеспечения эффективной организации системы здравоохранения, в частности в контексте расширения частной медицины. Предложено перспективы дальнейших исследований условий и путей совершенствования системы оказания медицинской помощи в Украине.

**Ключевые слова:** децентрализация власти, медицинская реформа, система медицинского обслуживания, частная медицина, расходы на здравоохранение.

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## CLINICAL FEATURES OF THE COURSE AND RESULTS OF TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA IN PATIENTS WITH OPIOID ADDICTION

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The article describes the study results of the clinic features and effectiveness of traditional treatment methods of the community-acquired pneumonia with severe course in opioid addicted patients and non-drug users. It was found that the severity of the disease in this category of patients was caused by latent polyorgan pathology, association of antibiotic-resistant bacteria and fungi of the genus *Candida*, as well as the development of systemic inflammatory response. In addition, traditional approaches to the treatment of severe community-acquired pneumonia in this category of patients were found to be accompanied by longer ( $p < 0.05$ ) hospitalization and significantly ( $p < 0.05$ ) higher mortality.

**Key words:** community-acquired pneumonia, opioid addiction, latent polyorgan pathology, results of treatment of non-hospital pneumonia in drug-addicted patients.

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Despite advances in the management of severe infectious diseases, community-acquired pneumonia (CAP) remains the major cause of mortality in developed countries. Approximately 10% of hospitalized patients with CAP require admission to an intensive care unit (ICU), where 20-50% of them will ultimately die. [1, 4, 6, 7].

The issue of timely diagnosis and treatment of drug-addicts with CAP has long been medicinally and socially essential. However, it still remains understudied in terms of morphological changes and in the sphere of clinical manifestations. The patients of the group demonstrate strong risk factors as they are prone to a high level of complications, which reaches 100 cases per 1000 patients, whereas in the group of drug-free patients complications occur in only 10 to 40 cases per 1000 patients [8, 9, 12]. The features of causative agents of CAP in drug-dependent patients need further high-quality research studies that will address the impact of antimicrobial susceptibility and virulence on treatment decisions and patient outcomes [12, 13].

The analysis of literature has shown that the management of CAP treatment of patients with opium addiction holds no clear justification of the reasons for unsatisfactory results of fighting this pathology. The informative value of clinical and laboratory markers, as well as indicators of endogenous intoxication in the dynamics of the treatment of CAP, needs to be enriched with more evidence and treatment strategies. The species composition, biological properties and sensitivity of microorganisms to antimicrobial agents, which cause CAP in drug-dependent patients, also require further studies. Finally, there seems to be a lack of research on morphological changes in the lungs and other organs caused by the use of drugs. All of the above mentioned factors demonstrate the urgent need for in-depth analysis of treatment strategies for drug-dependent patients with CAP, the evidence of which will help develop new pathogenetically substantiated approaches to the treatment of this pathology and improve the results of CAP treatment in drug-dependent patients.

**The purpose** of the study was to define the treatment course and estimate the effectiveness of community-acquired pneumonia treatment by traditional methods in patients with opium addiction.

**Materials and methods.** The study has been done within the frame of integrated approach that combined the use of experimental, clinical, laboratory, microbiological and morphological methods. The study objects were 89 patients with severe CAP. The patients were divided into two groups. The main group consisted of 42 CAP patients with opioid addiction, including 25 males (59.5%) and 17 females (40.5%). The comparison group (47 patients) comprised 28 men (59.6%) and 19 women (40.4%) accordingly. The average age of the main group patients was  $27.5 \pm 5.5$  years, their history of drug abuse varied from 1 to 13 years.

Patients in both groups received treatment according to existing standards which included antimicrobial, detoxicational and symptomatic therapy.

The estimation of the overall condition of patients was carried out by standard laboratory and biochemical tests and the indicators of endogenous intoxication (EI) were determined: leukocyte index of intoxication (LII), hematological indicator of intoxication (HII) and the levels of metabolites in the average weight (MAM) in blood [3, 5]. Besides, the determination of biochemical parameters of systemic inflammatory response (SIR): C-reactive protein (CRP) and Pro-inflammatory cytokines: the tumor necrosis factor -  $\alpha$  (TNF- $\alpha$ ) and interleukin-6 (IL-6) was performed [9, 11]. Microbiological studies have included determining the nature of CAP and their sensitivity to antibiotics and antiseptics [10].

The influence of antibiotics and antiseptics on the adhesive properties of microorganisms was studied according to the method of Bryliss et al. [2].

The study of morphological changes in internal organs under the influence of the use of opium drugs was performed in 32 opium addicted patients. The causes of death were drug overdose - 29 patients (90.6%), 3 suffered a violent death (9.4%).

Statistical processing of the obtained data was performed to determine the significance of differences in both groups of patients in the integrated system STATISTICA® 5.5 (STAT + SOFT® Snc, USA) using a licensed program (A XX 910A374605FA).

**The results of the study and their discussion.** The course of CAP in patients of the main group was significantly different from the course of CAP in patients of the comparison group.

The number of red blood cells in patients in the comparison group averaged  $4.2 \pm 0.18 \times 10^{12}/l$ , whilst in the main group their number was  $3.0 \pm 0.09 \times 10^{12}/l$  and significantly ( $p < 0.01$ ) differed from the indicators in the comparison group. Hemoglobin was  $97.4 \pm 5.2$  g/l, while in the comparison group this indicator was at the level of  $137.3 \pm 4.2$  g/l ( $p < 0.01$ ). The leukocyte count was  $6.76 \pm 1.91 \times 10^9/l$  in the main group versus  $17.6 \pm 2.31 \times 10^9/l$  to the comparison group ( $p < 0.01$ ).

Information on the dynamics of laboratory parameters is presented in tables 1, 2. In the group of drug-dependent patients on the third day of CAP treatment there was a decrease in the counts of red blood cells and hemoglobin. In the comparison group anemia was also on the increase up to the 7th day of treatment. On the 9th day of observation and before the patient discharge the average counts of hemoglobin and red blood cells were at the lower limit of the norm. In the main group of patients during the treatment period the red blood cells and hemoglobin counts remained low and the downward trend was observed up to 9 days, and was significantly lower ( $p < 0.05$ ) from that of the hospitalization, and only since the 15th day of observation, the indicators of hemoglobin and erythrocytes began to rise, but were still significantly lower ( $p < 0.05$ ) than in the comparison group. All drug addicted patients had anemia before discharge, red blood cell counts made up  $2.87 \pm 0.14 \times 10^{12}/l$ , hemoglobin –  $87.35 \pm 4.36$  g/l. Leukocytes counts were also significantly ( $p < 0.05$ ) lower during the entire observation period, although the treatment resulted in a significant increase in the number of leukocytes from  $6.75 \pm 1.91 \times 10^9/l$  at admission to  $10.3 \pm 4.12 \times 10^{12}/l$  on day 7 of observation ( $p < 0.05$ ) and then decreased to  $5.77 \pm 1.71 \times 10^{12}/l$  before discharge. The erythrocyte sedimentation rate (ESR) in contrast to the performance of ESR in patients in the comparison group showed a decreasing tendency.

If in the comparison group this figure gradually decreased to  $19.6 \pm 1.8$  mm/h before discharge, than in the main group ESR before discharge was  $63.41 \pm 8.84$  mm/h ( $p > 0.05$ ).

In both groups, a significant decrease in total protein was observed, but in the comparison group a decrease was observed at day 7, and since day 15, the total protein increased and reached  $70.0 \pm 0.9$  g/l, approaching normal levels. Whereas, the total protein score in the main group of patients at the third day from the start of treatment was  $65.4 \pm 1.8$  g/l, what was significantly lower ( $p < 0.05$ ) than in the comparison group patients.

Despite albumin transfusions, this index remained significantly lower ( $p < 0.01$ ) than in the comparison group. Urea and creatinine levels in the main group patients were also significantly higher ( $p < 0.05$ ) than in the comparison group patients.

**Dynamics of laboratory blood indicators changes in patients with severe flow of CAP at drug users and patients of the comparison group**

No	Index Term	Erythrocytes, $\times 10^{12}/l$		l Hemoglobin, g/l		Leukocytes, $\times 10^9/l$		ESR, mm/hour	
		Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)
1.	Hospitalization	4.20 $\pm 0.18$	3.0 $\pm 0.09^{**}$	137.3 $\pm 4.2$	97.4 $\pm 5.2^{**}$	17.6 $\pm 2.31$	6.76 $\pm 1.9^{**}$	65.3 $\pm 7.2$	53.3 $\pm 3.5^*$
2.	3rd day	3.77 $\pm 0.13$	2.86 $\pm 0.53^*$	128.1 $\pm 2.7$	94.8 $\pm 4.8^{**}$	16.1 $\pm 1.62$	7.27 $\pm 3.7^{**}$	64.7 $\pm 6.3$	54.8 $\pm 4.1^*$
3.	5th day	3.56 $\pm 0.17$	2.54 $\pm 0.71^*$	125.0 $\pm 3.8$	96.4 $\pm 2.9^{**}$	14.2 $\pm 1.87$	8.1 $\pm 2.9^{**}$	49.8 $\pm 5.4$	48.6 $\pm 4.5$
4.	7th day	3.38 $\pm 0.12$	2.31 $\pm 0.09^{**}$	107.2 $\pm 5.1$	100.0 $\pm 4.5^{**}$	13.8 $\pm 1.32$	10.3 $\pm 4.1^{**}$	44.3 $\pm 4.6$	50.1 $\pm 3.1^{**}$
5.	9th day	3.49 $\pm 0.14$	2.38 $\pm 0.11^{**}$	110.3 $\pm 3.9$	88.7 $\pm 1.3^{**}$	12.3 $\pm 1.52$	8.24 $\pm 2.1^{**}$	32.2 $\pm 4.5$	50.7 $\pm 5.4^{**}$
6.	15th day	3.55 $\pm 0.10$	2.62 $\pm 0.42^{**}$	118.4 $\pm 2.9$	83.7 $\pm 1.5^{**}$	9.4 $\pm 2.10$	5.84 $\pm 2.3^{**}$	28.4 $\pm 3.7$	62.7 $\pm 5.9^{**}$
7.	Before discharge	3.86 $\pm 0.21$	2.87 $\pm 0.14^*$	129.2 $\pm 3.1$	87.3 $\pm 4.3^{**}$	7.6 $\pm 0.53$	5.77 $\pm 1.7^*$	19.6 $\pm 1.8$	63.4 $\pm 8.8^{**}$

Note. 1. \* -  $p < 0.05$  the difference is significant in comparison with the data of the group of patients, who did not use drugs. 2. \*\* -  $p < 0.01$  difference is significant in comparison with the data of the group of patients, who did not use drugs.

Table 2

**Dynamics of biochemical parameters in blood at drug addicts and patients from the control group with severe CAP**

No	Index Term	Total protein, g/l		Urea, $\mu\text{mol}/l$		Creatinine, $\mu\text{mol}/l$	
		Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)
1.	Hospitalization	73.9 $\pm$ 3.89	68.9 $\pm$ 2.04	8.87 $\pm$ 0.64	9.11 $\pm$ 0.77*	118.6 $\pm$ 11.43	6 $\pm$ 11.27*
2	3rd day	71.1 $\pm$ 2.63	65.4 $\pm$ 1.8	8.64 $\pm$ 0.72	9.06 $\pm$ 0.84*	116.4 $\pm$ 9.8	120.8 $\pm$ 9.92*
3.	5th day	70.9 $\pm$ 1.81	62.3 $\pm$ 0.7**	8.81 $\pm$ 0.65	8.93 $\pm$ 0.57	117.2 $\pm$ 10.71	120.1 $\pm$ 11.4*
4.	7th day	64.2 $\pm$ 1.73	58.6 $\pm$ 7.1*	8.29 $\pm$ 0.31	8.69 $\pm$ 0.64	114.6 $\pm$ 8.36	117.5 $\pm$ 8.36*
5.	9th day	63.6 $\pm$ 0.86	59.2 $\pm$ 1.3*	7.94 $\pm$ 0.42	8.38 $\pm$ 0.76**	109.5 $\pm$ 5.3	115.8 $\pm$ 9.56*
6.	15th day	68.7 $\pm$ 0.92	63.6 $\pm$ 0.9*	7.80 $\pm$ 0.81	8.11 $\pm$ 0.41*	100.2 $\pm$ 4.3	109.8 $\pm$ 5.32**
7.	Before discharge	69.8 $\pm$ 0.88	66.5 $\pm$ 1.78*	7.23 $\pm$ 0.02	7.42 $\pm$ 0.24	76.8 $\pm$ 2.76	100.7 $\pm$ 3.43**

Note. 1. \* -  $p < 0.05$  the difference is significant in comparison with the data of the group of patients, who did not use drugs 2. \*\* -  $p < 0.01$  difference is significant in comparison with the data of the group of patients, who did not use drugs.

Determination of EI indicators showed that no significant increase in LII in drug users was observed at hospitalization. LII was  $2.07 \pm 0.4$  CONV.U., which was only 4 times higher than normal, whereas patients in the comparison group during the time of hospitalization demonstrated LII of  $7.82 \pm 0.8$  CONV.U., which exceeded the normal rate by 15 times. In the dynamics LII in drug-users had a tendency to increase on day 3 to  $3.76 \pm 0.51$  CONV.U. Gradually up to the 5th day of observation LII figure reduced to  $1.36 \pm 0.2$  CONV.U., and before discharge exceeded normal levels by almost 3 times and did not differ significantly from LII at admission. At the same time, patients in the comparison group demonstrated a decrease in LII, which before discharge significantly ( $p < 0.05$ ) did not differ from the norm. The HII also did not fully illustrate the severity of the patients' conditions, which was associated with the discrepancy between LII and ESR. The treatment led to the growth of HII on the 3rd day of observation followed by the decrease on day 5 to  $4.66 \pm 1.4$  CONV.U., which was significantly lower ( $p < 0.05$ ) than the previous observation period. On the 7th day there was an increase of HII up to  $12.23 \pm 2.7$  CONV.U. followed by its further drop to  $3.36 \pm 1.06$  CONV.U. On the 15th day, a slight increase in the HII was recorded at  $5.43 \pm 0.52$  CONV.U., which remained 3.5 times higher than normal before discharge, whereas in the comparison group before discharge, patients' HII was within the normal range. The level of MAM in drug-dependent patients was consistently high, exceeding the normal markers almost twice, and had no tendency to decrease, remaining high even before discharge ( $0.415 \pm 0.24$  CONV.U.). In patients from the comparison group, the level of MAM for the 5th day of observation decreased to  $0.396 \pm 0.11$  CONV.U., and before discharge was within the normal range ( $0.248 \pm 0.15$  CONV.U.)

Laboratory indicators of SEI also differed in both groups of patients. Information on the dynamics of laboratory indicators is presented in tables 3. In the course of disease treatment there was a significant ( $p < 0.05$ ) growth of all indicators. Since the 9th day of observation in the comparison group there observed a decrease of these parameters (CRP –  $24.3 \pm 1.76$  mg/l, IL-6 and  $15.1 \pm 0.86$  pg/l, TNF- $\alpha$  –  $198.0 \pm 16.3$  pg/l), which were significantly ( $p < 0.05$ ) lower than during hospitalization.

**Dynamics of systemic inflammatory response laboratory indicators in patients with drug addiction and patients from the control group with severe CAP**

No	Index Term	C-reactive protein, mg/l		Interleukin -6, ng/l		Tumor necrosis factor - $\alpha$ , ng/l	
		Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)	Comparison group (n=47)	Main group (n=42)
1.	Hospitalization	34.3 $\pm$ 2.88	37.4 $\pm$ 2.68	17.6 $\pm$ 1.12	18.3 $\pm$ 1.26	272.0 $\pm$ 16.3	293.0 $\pm$ 24.3
2	3rd day	36.1 $\pm$ 2.57	39.5 $\pm$ 1.30	18.8 $\pm$ 1.22	19.0 $\pm$ 1.38	297.0 $\pm$ 17.5	308.0 $\pm$ 21.8
3.	5th day	37.2 $\pm$ 2.41	40.1 $\pm$ 2.55	21,9 $\pm$ 1,35	22.4 $\pm$ 1.41	302.0 $\pm$ 19.1	314.0 $\pm$ 23.6
4.	7th day	24.3 $\pm$ 1.76	30.3 $\pm$ 1.82*	15.1 $\pm$ 0.86	18.9 $\pm$ 1.02**	198.0 $\pm$ 12.6	251.0 $\pm$ 17.1*
5.	9th day	16.4 $\pm$ 1.42	23.8 $\pm$ 1.62***	12.6 $\pm$ 0.74	15.7 $\pm$ 0.88**	134.0 $\pm$ 10.2	192.0 $\pm$ 14.7**
6.	15th day	10.2 $\pm$ 0.72	17.6 $\pm$ 0.84**	8.5 $\pm$ 0.46	12.3 $\pm$ 0.74***	82.0 $\pm$ 5.4	134.0 $\pm$ 8.1***

Note. 1. \* -  $p < 0.05$  the difference is significant in comparison with the data of the group of patients who did not use drugs. 2. \*\* -  $p < 0.01$  difference is significant in comparison with the data of the group of patients who did not use drugs. 3. \*\*\* -  $p < 0.001$  difference was significant in comparison with the group of patients who did not use drugs.

In the main group of patients on the 9th day of the study, they were significantly higher ( $p < 0.05$ ) than the indicators in the comparison group (CRP – 30.3 $\pm$ 1.82 mg/l, IL-6 was 18.9 $\pm$ 1.02 pg/l, TNF- $\alpha$  – of 251.0 $\pm$ 17.1 pg/l), being above the norm at the time of discharge.

Despite the treatment in the main group, the average duration of hospitalization was 20.6 $\pm$ 3.2 bed-days, with 15 patients (35.7%) having developed destructive processes in the lungs and 10 patients (23.8%) having died.

In the study of pathogens of CAP in drug-addicted patients, a total of 51 strains of microorganisms was isolated, among which *S. aureus* prevailed – 19 (37.3%) strains and fungi of the genus *Candida* – 16 (31.4%), *Kl. pneumoniae* – 7 (13.7%) strains and *S. epidermidis* – 3 (5.9%), *S. pneumoniae* was isolated in 6 patients (11.7%). In the form of monoculture bacteria were sown in 15 (48.4%) cases. In other 16 (51.6%) cases, bacteria and fungi were sown as associations of microorganisms with fungi of the genus *Candida*. Thus, in 7 (22.6%) cases *S. aureus* was combined with *Candida albicans*, *S. epidermidis* with *Candida albicans* in 3 (9.7%) cases, in 2 (6.5%) cases *S. aureus* with *Kl. pneumoniae*, in 4 (12.9%) cases, *Candida albicans* was sown in combination with *S. pneumoniae*.

The study of the sensitivity of isolated microorganisms to the main groups of antibiotics showed their high resistance. Decamethoxin had the highest activity against all tested strains. The second place as to their antibacterial activity belonged to miramistin and ethonium. The lowest activity was observed in chlorhexidine bigluconate and was significantly lower ( $p < 0.05$ ) than in all antiseptics studied. In addition, all antiseptics had antifungal activity.

The analysis of drug addicted patients treatment showed the need for more detailed study of changes in the internal organs, which arise as a result of the use of opium surrogates. The data obtained allowed to conclude that in drug-dependent patients due to injectioning opium surrogates one can observe brain damage in 9.4% of patients; heart damage in 84.5%: lung damage in 84.5%: liver damage in 96.9% and kidneys damage in 89.4% of cases, indicating the presence of hidden multiple organ pathology (fig.1).

In studying the morphological changes of the lungs pathological processes were found in 27 out of 32 patients. In almost all cases, group edematous alveoli with admixture of neutrophilic leukocytes were discovered.

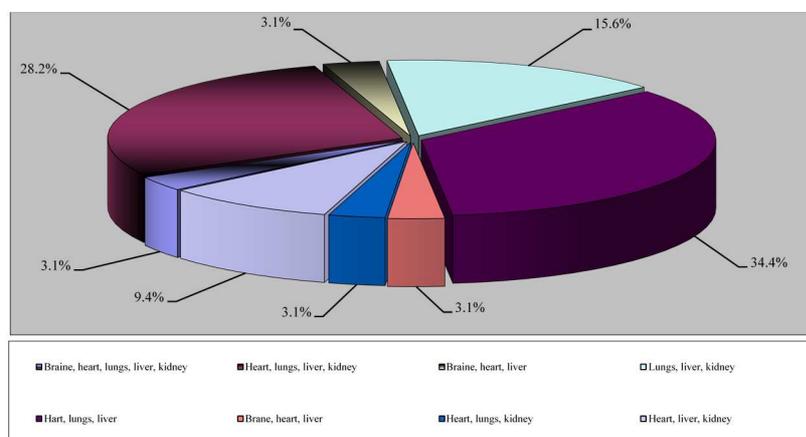


Fig. 1. Structure of internal organ damage in drug addicted patients.

In these areas there was a large number of alveolocytes and macrophages, which indicated the presence of small pneumonic lung lesions and in one case on the background of the small pneumonic foci areas with abscesses were detected. The united impression of internal organs is thus marked, that testifies to the presence of the hidden polyorgan insufficiency, and which complicates motion of diseases of internal organs of such, as CAP and other.

Despite advances in the management of severe infectious diseases, CAP remains the major cause of mortality in developed countries [4, 6]. The analysis of the literature has shown that the problem of treatment of CAP in patients with opioid addiction remains studied poorly. In the majority of published

studies, the etiology of CAP has not been identified as a risk factor for mortality. These questions have important implications for clinical care as well as risk adjustment [7, 8, 10, 12].

The obtained data allow us to explain the severity of CAP in these patients. Severity of the disease was caused by the presence of hidden polyorgan pathology in patients with opioid addiction, which is superimposed by intoxication syndrome due to the development of the inflammatory process in the lungs. CAP in this group of patients is caused by highly virulent antibiotic-resistant bacteria and fungi which were sensitive to antiseptics. Therefore, the treatment of community-acquired pneumonia using conventional methods has low efficiency, the CAP progresses rapidly, leads to the development of destructive changes in the lungs and is accompanied by high level of mortality.

### Conclusions

1. CAP in drug addicted patients has a severe complicated course and is accompanied by severe endogenous intoxication and development of systemic inflammatory response syndrome, as evidenced by the high level of MAW, CRP, IL-6 and TNF- $\alpha$  that are significantly ( $p < 0.05$ ) higher than those in the comparison group.

2. CAP in drug-dependent patients is caused by high virulent antibiotic-resistant strains: *S. aureus* – 19 (37.3%), *Kl. pneumonia* – 7 (13.7%), *S. pneumonia* – (11.7%), *S. epidermidis* – 3 (5.9%). and *Candida* - 16 (31.4 %). At the same time as monoculture bacteria were selected in 15 cases (48.4%), and in 16 (51.6%) of cases as an association of microorganisms or associations of microorganisms and fungi. Antiseptics (etonium, miramistin and decamethoxin) have a high antimicrobial activity against selected causative agents of CAP.

3. The severity of CAP in patients with opioid addiction was caused by the presence of hidden polyorgan pathology.

4. The use of traditional approaches to the treatment of CAP in drug addicted patients need significantly ( $p < 0.05$ ) prolonged hospitalisation and is accompanied by a significantly ( $p < 0.05$ ) higher development of destructive changes in the lungs (35.7% vs. 17.0% of patients who do not use drugs) and by significantly ( $p < 0.05$ ) higher mortality (23.8% versus 4.3% accordingly).

### Reference

1. Brilis VI, Brilene TA, Levkov LA. Metodicheskie vozmozhnosti izucheniya roli adgezii v koloniziruyushey sposobnosti mikroorganizmov. Moskva: 1986. 206-211 s. [in Russian]
2. Gabrielyan NI, Lipatova VI. Opyt ispolzovaniya pokazateley srednikh molekul v krovi dlya diagnostiki nefrologicheskikh zabolevaniy u detey. Laboratornoye delo: 1984; 3: 138-140. [in Russian]
3. Golubev AM, Smelaya TV, Moroz VV, Popov AA, Tolbatov AA, Medunetskaya SV. Negospitalnaya i nozokomialnaya pnevmoniya: kliniko-morfologicheskie osobennosti. Obshchaya reanimatologiya. 2010; 6(3):5. [in Russian]
4. Karpischnenko AI. Meditsinskie laboratornyye tehnologii. Geotar-Media: 1part : 2012; 480 s. [in Russian]
5. Mostovoy YuM. Suchasni klasyfikatsiyi ta standarty likuvannya rozpovsyudzhenykh zakhvoryuvan vnutrishnikh orhaniv. Nevidkladni stany v terapiyi. Analizy: normativni pokazachnyky, traktuvannya zmin. Kyiv : Tsentri DZK; 2018, 792 s. [in Ukrainian]
6. Angus DC, van der Poll T. Severe Sepsis and Septic Shock. N.Engl.J.Med. 2013; 369:840 -885.
7. Ayatollahi-Mousavi SA, Asadikaram G, Nakhaee N. The effects of opium addiction on the immune system function in patients with fungal infection. Addict Health. 2016; 8(4): 218-26.
8. Azdaki N., Zardast M., Anani-Sarab G. Comparison between homocysteine, fibrinogen, PT, PTT, INR and CRP in male smokers with / without addiction to opium. Addict Health. 2017; 9(1): 17-23.
9. Vacci MR, Leme RC, Zing NP. IL-6 and TNF- $\alpha$  serum levels are associated with early death in community-acquired pneumonia Braz J Med Biol Res. 2015; 48(5): 427-432.
10. Barnett K, Mercer SW, Norbury. Epidemiology of multimorbidity and implications for health care, research and medical education: A cross-sectional study. Lancet Lond. Engl. 2012, 7, 37-43.
11. Edelman JE, Kirsha SG, Crothers K. Association of prescribed opioids with increased risk of community-acquired pneumonia among patients with and without HIV. JAMA Int. Med. 2019; 179(3):297-304.
12. Florence CS, Zhou C, Luo F. The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. Med Care. 2016; 54(10):901-906.
13. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death 2013 a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2015; 385:117-171.

### Реферат

#### КЛІНІЧНІ ОСОБЛИВОСТІ ПЕРЕБІГУ ТА РЕЗУЛЬТАТИ ЛІКУВАННЯ НЕГОСПІТАЛЬНОЇ ПНЕВМОНІЇ У ХВОРИХ ІЗ ОПОЇДНОЮ НАРКОМАНІЄЮ

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У статті описані результати дослідження особливостей клініки та ефективності традиційних

#### КЛИНИЧЕСКИЕ ОСОБЕННОСТИ ТЕЧЕНИЯ И РЕЗУЛЬТАТЫ ЛЕЧЕНИЯ НЕГОСПИТАЛЬНОЙ ПНЕВМОНИИ У БОЛЬНЫХ С ОПИОИДНОЙ НАРКОМАНИЕЙ

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В статье описаны результаты исследования особенностей клиники и эффективности традиционных

методів лікування не госпітальної пневмонії з важким перебігом у наркозалежних пацієнтів та осіб, які не вживають наркотики. Було встановлено, що тяжкість захворювання у цієї категорії хворих спричинялася латентною поліорганною патологією, асоціацією антибіотикорезистентних бактерій та грибків роду *Candida*, а також розвитком системної запальної реакції організму. Крім того, було виявлено, що традиційні підходи до лікування важкої пневмонії в цій категорії пацієнтів супроводжуються більш тривалою ( $p < 0,05$ ) госпіталізацією та значно ( $p < 0,05$ ) більш високою смертністю.

**Ключові слова:** негоспітальна пневмонія, опіоїдна наркоманія, прихована поліорганна патологія, результати лікування негоспітальної пневмонії у наркозалежних хворих.

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методов лечения негоспитальной пневмонии, с тяжелым течением у наркозависимых пациентов и лиц, не употребляющих наркотики. Было установлено, что тяжесть заболевания у этой категории больных была обусловлена латентной полиорганной патологией, ассоциацией антибиотико резистентных бактерий и грибков рода *Candida*, а также развитием системной воспалительной реакции организма. Кроме того, было установлено, что традиционные подходы к лечению тяжелой пневмонии, у этой категории пациентов, сопровождались более длительной ( $p < 0,05$ ) госпитализацией и достоверно ( $p < 0,05$ ) более высокой смертностью.

**Ключевые слова:** внебольничная пневмония, опиоидная наркомания, скрытая полиорганная патология, результаты лечения внебольничной пневмонии у наркозависимых больных.

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## IMPROVEMENT OF THE PATIENT CARE PROCESS BASED ON THE PRINCIPLES OF CLINICAL AUDIT

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The purpose of the study was to analyse the possibilities of implementing a clinical audit in the activities of the health care institutions (HCI) and to summarize the steps taken during the audit. The article analyses modern approaches to clinical auditing and existing models based on the principles of the Deming - Shewhart cycle (PDCA). A standardized model of the patient's clinical route based on the principles of clinical audit has been developed. The clinical route of the patient is differentiated into blocks that reflect the principle of optimal distribution of responsibilities among staff, which will improve the quality of patient care.

**Key words:** clinical audit, quality of medical care, Deming - Shewhart cycle, patient-oriented approach, clinical route of the patient.

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At the present stage of important scientific and practical significance and relevance are studies aimed at developing special assessment methods, new approaches to the organization, planning and management of clinical and economic activities of HCIs, aimed at providing quality and safe health care services. The introduction of the concept of health care quality management in the health care practice requires the organization of clinical audit as a tool for assessing the quality of health care services, a mechanism for improving health care, a means of stimulating the professional activities of medical staff. Problems of clinical audit as one of the means of quality control of health care services were considered in the works of domestic researchers, including: Zimenkovskiy A.B., Bagdatsaryan V.E., Biriukov V., Bohomaz V.M., Smiianov V.A., Stepanenko A.V., as well as foreign authors Barry K., Kumar S., Linke R., Dawes E., Miettunen K., Metsala E., Imoh L.C., Mutale M., Parker C.T., Mangla G., Arora V.K., Singh N. and others. Analysis of the literature shows that the term "clinical audit" is interpreted differently by experts [1,2,4,7], which indicates the incompleteness of the process of identification properties of this concept. As for the practical aspects of the functioning of clinical audit in domestic HCI, we can note their insufficient coverage by domestic experts, which indicates, in our opinion, either the limited use of clinical audit in hospitals for various reasons (consequently, little experience and low efficiency), or imperfect legal regulations and undeveloped methodological aspects of audit in the current conditions of reforming the medical sector in Ukraine (the main legal act dates back to 2012 - Order of the Ministry of Health of 28.09.2012 No 752 "On the quality control of health care", recommendations for improving the quality management system of health care in Ukraine - 2009). The lack of compulsory health insurance slows down the process of active introduction of clinical audit in the HCIs.

**The purpose** of the study was to analyse the possibilities of implementing clinical audit in the activities of the HCIs; development of a standardized patient-oriented model of the clinical route based on the principles of clinical audit.