DOI 10.26724/2079-8334-2025-4-94-281-287
UDC 616.721.2-002+613.67:617+617.57/.58-001.45-089.81

E.M. Khoroshun[1], V.V. Makarov[1], V.V. Nehoduiko[1], M.S. Zhuzhoma, O.O. Otchyk, S.V. Tertyshnyi[2,3], R.S. Vastyanov[3]
Military Medical Clinical Centre of the Northern Region of the Command of Medical Forces, Armed Forces of Ukraine, Kharkiv
[1]Kharkiv National Medical University, Kharkiv
[2]Military Medical Clinical Centre of the Southern Region of the Command of Medical Forces, Armed Forces of Ukraine, Odesa
[3]Odesa National Medical University, Odesa

A CASE OF NECK LARYNGOGENIC PHLEGMON SURGICAL TREATMENT WITH LEFT OROPHARYNX ANTEROLATERAL WALL PERFORATION COMPLICATED BY MEDIASTINITIS

e-mail: tertyshnyi.sergey@gmail.com

The purpose of the study was to demonstrate the features of diagnosis and surgical treatment in the case of laryngogenic phlegmon of the neck with perforation of the anterolateral wall of the oropharynx on the left, complicated by mediastinitis. Patient K., 42 years old, first felt a sore throat while on vacation. Three days later, he was hospitalized. Surgical treatment, on the day of hospitalization, was performed in the following scope: bilateral colotomy. Opening of neck phlegmon. Drainage of retropharyngeal and retroesophageal spaces, drainage of the postero-superior, antero-superior, and antero-inferior mediastinum. Kader gastrostomy. The final diagnosis was the following: the neck laryngogenic phlegmon with left oropharynx anterolateral wall perforation, abscess of the left retropharyngeal space, total frontal and back upper mediastinitis with severe complications concerning cardiovascular and respiratory systems pathology. Subsequently, staged surgical interventions were performed. Authors attracted attention to the fact that neck laryngogenic phlegmon requires immediate diagnostic intervention and timely treatment, as it can lead to serious complications. Mediastinitis, as a complication of the neck laryngogenic phlegmon, is a hazardous condition with a high risk to the patient's life. The authors concluded that treatment of neck laryngogenic phlegmon complicated by mediastinitis should be comprehensive and include broad-spectrum antibiotic therapy, surgical drainage, and intensive support of the patient's vital functions.

Key words: laryngogenic phlegmon of the neck, total mediastinitis, perforation, surgical intervention, treatment.

Е.М. Хорошун, В.В. Макаров, В.В. Негодуйко, М.С. Жужома, О.О. Отчик, С.В. Тертишний, Р.С. Вастьянов

ВИПАДОК ОПЕРАТИВНОГО ЛІКУВАННЯ ЛАРИНГОГЕННОЇ ФЛЕГМОНИ ШИЇ З ПЕРФОРАЦІЄЮ ПЕРЕДНЬО-БОКОВОЇ СТІНКИ РОТОГЛОТКИ ЗЛІВА, УСКЛАДНЕНОЇ МЕДІАСТЕНІТОМ

Метою дослідження було демонстрація особливостей діагностики та оперативного лікування у випадку ларингогенної флегмони шиї з перфорацією передньо-бокової стінки ротоглотки зліва, ускладненої медіастинітом. Клінічний випадок стосується пацієнта К., 42 років, який вперше відчув біль у горлі, знаходячись у відпустці. Через 3 дні він був шпиталізований. Оперативне лікування в день госпіталізації виконано в такому обсязі: двобічна колотомія. Розкриття флегмони шиї. Дренування заглоткового та ретроезофагеального просторів, дренування задньо-верхнього передньо-верхнього та передньо-нижнього середостіння. Гастростомія за Кадером. Встановлений остаточний діагноз: ларингогенна флегмона шиї з перфорацією передньо-бокової стінки ротоглотки зліва, абсцес заглоткового простору зліва, тотальний та задньо-верхній медіастиніт з тяжкими ускладненнями з боку серцево-судинної та дихальної систем. В подальшому проводились етапні оперативні втручання. Автори відзначають, що ларингогенні флегмони шиї потребують негайного діагностичного втручання та своєчасного лікування, оскільки може призвести до серйозних ускладнень. Медіастиніт, як ускладнення ларингогенних флегмон шиї, є надзвичайно небезпечним станом, який несе високий ризик для життя пацієнта. Автори висловлюють, що лікування ларингогенних флегмон шиї, ускладнених медіастинітом, має бути комплексним і включати антибіотикотерапію широкого спектра, хірургічне дренування, а також інтенсивну терапію для підтримки життєвих функцій пацієнта.

Ключові слова: ларингогенна флегмона шиї, тотальний медіастиніт, перфорація, хірургічне втручання, лікування.

The study is a fragment of the research project "Development of modern methods of diagnosis and treatment of purulent-septic complications in combat surgical trauma", state registration No. 0120U101834.

Laryngogenic phlegmons constitute one of the most severe forms of acute infectious and inflammatory processes that involve deep neck cellular spaces. They are characterized by rapid progression, severe intoxication, and high risk of life-threatening complications [3, 4].

Laryngogenic phlegmons account for approximately 12.8 % of all neck purulent-inflammatory diseases. Acute purulent mediastinitis develops as a cervical phlegmon complication with a frequency of 0.3 to 20 % [7, 9] with an average incidence of approximately 8 % [5, 6]. The incidence of mediastinitis

vital diagnosis ranges from 20.5 % to 50 % [7]. Mortality in these conditions is high, and it is associated with late diagnosis and equals 42 % [5, 7, 8].

The infection spreading from the oropharynx to the mediastinum is possible due to the anatomical continuity of neck fascial spaces, which contribute to asymptomatic, rapid disease progression and, in turn, threaten the patient's life due to potentially dangerous complications such as sepsis, pericarditis, or respiratory failure. Mediastinitis, arising as a complication of laryngogenic phlegmon, requires immediate intervention and a comprehensive treatment approach, including antibiotic therapy, surgical drainage, and monitoring of vital organ function [1, 9, 11].

Despite existing modern treatment, the mortality rate reaches 60 % when the inflammatory process extends to the neck and mediastinum, and it increases to 90 % when the infection becomes generalized and septic shock develops [3]. Given the importance of timely diagnosis and adequate treatment, the current clinical case aims to systematically clarify the diagnostic and surgical features of neck laryngogenic phlegmon with perforation of the left oropharyngeal anterolateral wall, complicated by mediastinitis.

The purpose of the study was to demonstrate the peculiarities of neck laryngogenic phlegmon diagnosis and surgical treatment in cases of perforation of the left oropharyngeal anterolateral wall, complicated by mediastinitis.

Materials and methods. To describe a specific clinical case, written consent was obtained from the patient upon admission to the medical facility. At the same time, he was conscious and granted permission to use data from his clinical examination, diagnosis, and treatment, as well as a photograph, without identifying the individual, for scientific purposes.

The Commission on Ethics of Kharkiv National Medical University (No. 16-C, 17, December 2024) approved this clinical case research protocol in compliance. The investigation was conducted in compliance with the Declaration of Helsinki and subsequent additions.

Patient K., 42 years old, first noticed a sore throat while on vacation. He did not seek help. He consulted a therapeutic at his place of residence 4 days after, where he received recommendations in the form of following antibacterial drugs oral administration and oral cavity rinsing with antiseptic solutions: azithromycin (azithromycin dihydrate, “AstraPharm”, Ukraine) 500 mg 1 time per day for 3 days and Helpex (benzydamine hydrochloride and chlorhexidine bigluconate, “Deva Holding AS”, Turkey) 15 ml 3 times per day for 7 days. The next day, he noted his general condition worsening, body temperature increasing to 38.7 oC in the morning and 39.8 oC in the evening, neck frontal surface swelling increasing, and pain in the lateral part of the chest. He did not seek help either. Three days later, he went to the emergency department of the Military Medical Clinical Centre of the Northern Region of the Command of Medical Forces of the Armed Forces of Ukraine (MMCC NR CMF AFU), Kharkiv, where he underwent a comprehensive examination. On the same day (the 13th of August, 2024), he was hospitalized in the department of maxillofacial surgery and dentistry.

The patients’ condition was seriously stable. He was conscious and in satisfactory nutritional condition.

Circulatory organs: blood pressure equals 120/75 mm Hg (measured by Mechanical tonometer “Microlife BP AG 1-30”, “Microlife”, Switzerland), pulse 80 per min, rhythmic, satisfactory properties. Percussion borders of relative cardiac dullness are normal. Heart tones are rhythmic and precise. There were no murmurs.

Respiratory organs: respiratory rate is 18 per minute. The chest cage is not deformed, symmetrically participates in respiration, and is painless on palpation. Percussion – clear sound. Auscultation: vesicular breathing, no wheezing.

Digestive organs: tongue of standard colour, moist. The abdomen is not deformed; it symmetrically participates in breathing. The abdomen is soft and painless during palpation. Symptoms of peritoneal irritation are negative. Urination is independent, free.

Objectively local: neck, frontal surface soft tissues oedema and hyperaemia. Intraorally: laryngeal mucosa oedema and hyperaemia. Pharynx: neither hyperaemia nor asymmetry was detected.

The neck spiral CT scan (“HiSpeed Zx/i”, “General Electric”, USA) revealed an enlarged left submandibular tonsil without clear borders and an ambiguous structure due to gas bubbles and hypodense inclusions. The infiltrative process, which includes fluid, extends into the subcutaneous fat along the neck's frontal surface. Significant regional cervical lymphadenopathy (numerous nodes up to 11 mm wide) is present. Degenerative changes in the cervical spine are present.

The chest organs' spiral CT scan revealed a fatty tissue infiltration with a fluid-hypodense component, beginning in the neck soft tissues, behind the sternum, and extending along the entire frontal

mediastinum – evident signs of mediastinitis. An interstitial component was identified in the right lung S3 and S5. Pneumofibrosis and pneumodiaphragmatic squamous spaces were present in the basal regions of both lungs. Fluid was present in both pleural cavities. A bilateral small hydrothorax was present.

The following surgical treatment was performed on the day of hospitalization: bilateral colostomy and the cervical phlegmon opening. Drainage of both retropharyngeal and retroesophageal spaces was performed, as well as drainage of the postero-superior, antero-superior, and antero-inferior mediastinum. Kader's gastrostomy was carried out. Subsequent staged surgical interventions were performed.

Results of the study and their discussion. The final diagnosis was the following: the neck laryngogenic phlegmon with left oropharynx anterolateral wall perforation, abscess of the left retropharyngeal space, total frontal and back upper mediastinitis. Subacute diffuse myocarditis of moderate severity. Paroxysm. Metabolic cardiomyopathy. Heart failure of the 1st degree. Syndrome of systemic inflammatory response. Early hospital-acquired bilateral polysegmental pneumonia, severe manifestation. Bilateral hydrothorax. Distant-compressive segmental atelectasis of the lower lobes of the lungs. Respiratory failure of the 3rd degree. Acute surgical sepsis associated with Klebsiella Pneumoniae. Severe acute respiratory distress syndrome of the 3rd degree. Acute kidney injury by AKIN classification – stage F on the Rifle scale (significantly elevated serum creatinine, glomerular filtration rate at 25 % of normal, oliguria). Thrombosis of the right internal jugular vein.

The following surgical interventions were carried out.

Surgical intervention on the day of hospitalization (Day 1): Bilateral colotomy. The cervical phlegmon opened. Drainage of retropharyngeal and extrapharyngeal spaces, drainage of the postero-superior, antero-superior, and antero-inferior mediastinum. Kader gastrostomy.

Description. The operation was performed under general anaesthesia, after the three-times surgical field processing.

The first stage involved a bilateral colotomy: the skin and subcutaneous tissue of the frontal cervical fascia were incised. Greyish pus was released, and a bacterial culture was performed. The tissues were swollen, gray, and fluid-filled. The cervical fascia was partially sharply and partially bluntly separated; 30 ml of foul-smelling, gray pus was released. A bacterial culture was performed. The m. sternohyoideus fascia was opened, up to 5 ml of gray pus was released, and the left submandibular retropharyngeal space was bluntly opened. Purulent effusion was noted to be extended into the back and upper mediastinum. The pus was evacuated. The cavity was debrided.

Drainage was performed along the esophageal space, and the posterior mediastinum was drained using a silicone tube. Drainage of both retropharyngeal and retroesophageal spaces, drainage of the postero-superior, antero-superior, and antero-inferior mediastinum (Fig. 1A).

The second stage of the surgery consisted of making a 5-cm incision along the frontal abdominal wall below the xiphoid process, bluntly and sharply opening the frontal mediastinum, and draining the frontal mediastinum using a perforated silicone tube. The cavities were sanitized with 3 % hydrogen peroxide and Decasan. Hemostasis was monitored. The wound cavity was loosely packed with 3 % hydrogen peroxide wipes, iodine, and aseptic dressings. Bacterial cultures were performed (Fig. 1 B).

A

B

Fig. 1. Stages of patient K., 42 years, surgical treatment. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. A – the first stage of the surgery; B – The second stage of the surgery.

Surgical interventions were performed on days 2–5. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum (Fig. 2A).

Surgery on day 6. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. Laparocentesis, drainage of the abdominal cavity with drainage being brought out through the diaphragmatic esophageal hole and through the frontal abdominal wall (Fig. 2 B).

Surgery on days 7–8. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum.

Surgery on day 9. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. The active flushing system removal.

Surgery on day 13. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. Partial suturing of the oropharynx left anterolateral wall mucosal defect.

Surgery on day 14. Median transverse-longitudinal tracheostomy.

Surgery on day 15. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. Partial suturing of the oropharynx left anterolateral wall mucosal defect.

A

C

B

D

Fig. 2. The results of patient K., 42 years, surgical treatment. A – the patient's appearance after surgery; B – the patient's appearance after the postoperative wounds revision and debridement; C – the patient's appearance after the postoperative wounds revision and debridement. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum; D – patient's appearance during his stay at “Feofaniya” Clinical Hospital.

Surgery on day 16. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. Complete suturing of the oropharynx left anterolateral wall mucosal defect. The postoperative wound suturing on the right frontal surface. Revision of the postoperative wound, the superficial vein on the neck, frontal surface ligation, and final haemostasis.

Surgery on day 18. Revision and debridement of postoperative wounds. Revision and debridement of the retropharyngeal and retroesophageal spaces, postero-superior, antero-superior, and antero-inferior mediastinum. Repeated suturing of the oropharynx left an anterolateral wall mucosal defect. The right posterosuperior mediastinal drainage is removed.

Surgery on day 22. Revision and sanitation of both right postero-superior and left antero-superior mediastinum. Repeated complete suturing of the postoperative wound on the right frontal surface. Installation of the right side posterior superior mediastinal drains and the left side anterior superior mediastinal drains. The tracheostomy block replacement.

Surgery on day 23. Revision and sanitation of both right postero-superior and left antero-superior mediastinum. The artificial duct of the oropharynx, the anterolateral wall, and the neck left frontal surface formation. Neck left frontal surface muscles and skin close to the postoperative wound suturing, oropharyngeal tamponade replacement.

Surgery on day 25. Removal of the guiding sutures of the neck left frontal surface postoperative wound. Revision and sanitation of both right postero-superior and left antero-superior mediastinum. The artificial duct of the oropharynx, the anterolateral wall, and the neck left frontal surface formation. Installation of drainage of the left frontal surface. Neck left frontal surface muscles and skin close to the postoperative wound suturing. Oropharyngeal tamponade replacement.

Surgery on day 28. The left anterolateral wall of the oropharynx requires active drainage removal.

Surgery on day 29. Thoracocentesis, the right pleural cavity drainage by Buelau (Fig. 2C). Daily dressings were performed in the operating room (Fig. 2D).

On the 31st day of the patient's stay at the MMCC NR CMF AFU, he was transferred to the next stage of treatment at “Feofaniya” Clinical Hospital (Kyiv), where he remained for three months. At that time, the patient's body weight, due to the acute inflammatory process and endotoxemia, was 35 kg. (Fig. 3A).

After the patient was transferred to MMCC NR CMF AFU, Department of Maxillofacial Surgery and Dentistry, for further rehabilitation (Fig. 3B and 3C).

A B C

Fig. 3. The patient K.'s appearance at the stage of rehabilitation. A – the patient's appearance at the beginning of rehabilitation. Body weight equal to 35 kg; B – the patient's appearance at the moment of rehabilitation finish. Right view; C – the patient's appearance at the moment of rehabilitation finish. Left view.

We consider it appropriate to discuss the positive result achieved in a patient with mediastinitis as a complication of laryngogenic phlegmon. We note that this positive outcome was achieved due to timely and adequate diagnosis and a properly chosen multi-stage surgical treatment strategy.

Firstly, it should be noted that mediastinitis, as a sequela of laryngogenic infection, is a serious, life-threatening complication. This underscores the importance of early detection of diseases that can spread from the pharynx to the deep neck tissues and mediastinum [9, 14, 15], which we successfully treated in this clinical case. We also emphasize that successful diagnosis facilitated the selection of the correct treatment strategy – surgical intervention, as it is known that conservative therapeutic measures are

ineffective and, if unsuccessful, can lead to increased severity and excessive further spread of the purulent process throughout the interorgan spaces [10].

Secondly, it should be noted that number of patients with similar purulent-inflammatory neck diseases is gradually increasing which determines the high clinical importance of adequate treatment including at least the purulent focus surgical incision and drainage, antibacterial, detoxifying and anti-inflammatory therapy [12] In our case, the patient was admitted in a severe clinical condition with cardiovascular and respiratory systems dysfunction and severe failure of immune, metabolic, detoxifying and excretory functions which required prompt, effective diagnosis and treatment according to existing standards of purulent surgery. It is noteworthy that the use of a multi-stage surgical approach prevented the purulent process from spreading to adjacent cellular spaces, shortened the time to inflammation onset, and facilitated earlier and more effective rehabilitation.

Thirdly, we note that we used a laparoscopic approach to mediastinal drainage in which exploration, debridement, and the purulent cavity drainage in the postero-superior, anterior-superior, and antero-inferior portions were performed using a minimally invasive approach through the frontal abdominal wall and the diaphragmatic esophageal hole, and transabdominally through the frontal abdominal wall. We consider it essential that this approach preserve the pleural cavities, avoid rib intersections along the chest back surface, and avoid adjacent organs.

Fourthly, from a fundamental and clinical perspective, short surgery times and a minimally invasive approach are crucial, significantly increasing the chances of a favourable outcome. The anatomical structure of the neck and adjacent anatomical structures and functional elements contributes to numerous space-occupying spaces formation – the submandibular space, the submental space, and the parapharyngeal space above the hyoid bone and the pretracheal space, the suprasternal space and the superficial cervical space, the retropharyngeal space, the visceral vascular space, and the prevertebral space below the hyoid bone that communicates with each other [11]. Such a topographic structure of this part of the body ensures rapid generalization and spread from the moment of its initiation, its “immediate” transformation into a purulent process from a clinical point of view, the formation of initially local endogenous intoxication with the prospect of further spread to the entire body with immune defence dysfunction and SIRS development [10].

In foreign scientific literature, such diseases are classified into a special group – deep neck space infections, with their initiation from infections of the teeth, pharynx, tonsils, and lymph nodes [2, 10], rapid and aggressive clinical manifestation, and severe fatal complications such as airway obstruction, mediastinitis, septicaemia, pericarditis, and pneumonia [12]. It should be noted that Ukrainian specialists, in accordance with the 11th International Disease Classification, do not distinguish a separate disease group for “deep neck space infections”. However, neck infections (abscesses, phlegmons) are presented in sections on soft-tissue or pharynx/larynx infections. Most commonly, codes related to location (e.g., soft-tissue abscess of the neck) are used to specify the causative agent.

The general condition of such patients is considered severe or extremely severe, but the treatment procedures performed in our case ensured a minimal time interval between the onset of the disease, its diagnosis, and the start of treatment. The case described above does not contradict the previously described clinical observations [3, 11–13].

In summary, we note that successful treatment of laryngogenic phlegmon complicated by mediastinitis is possible only with early diagnosis using neck-space computed tomography, timely surgical intervention, drainage, and sterile dressings, rational antibacterial therapy, and a multidisciplinary approach [3, 4].

Conclusions

1. The neck laryngogenic phlegmon is a significant clinical problem arising from the infection spreading from the pharynx to adjacent neck tissues. This condition requires immediate diagnostic intervention and timely treatment, as it can lead to serious complications such as mediastinitis.

2. Mediastinitis, as a complication of the neck laryngogenic phlegmon, is a hazardous, life-threatening condition. Early detection is critical for effective treatment and the prevention of even more threatening complications such as sepsis, pericarditis, or respiratory failure.

3. The treatment of neck laryngogenic phlegmon complicated by mediastinitis should be comprehensive and include broad-spectrum antibiotic therapy, surgical drainage, and intensive care to maintain the patient's vital functions.

Prospects for further research include further improvement of diagnostic and therapeutic surgical technologies for similar operations performed in patients with neck purulent-inflammatory diseases, as well

as the extension of experience with similar staged operations performed in related episodes of neck phlegmon of different genesis, for example, odontogenic phlegmon.

References

1. Avetikov DS, Kaydashev IP, Skikevych MG, Kravchenko SB. Vdoskonalennya konservatyvnoho likuvannya khvorykh z odontohennymym flehmonamy dna porozhnyny rota. Poltava, 2016. 132. [in Ukrainian].
2. Varzhapetyan SD, Kopchak AV. Kontseptsiya kompleksnoho likuvannya odontohennykh flehmon shchelepno-lytsevoyi lokalizatsiyi. Ukrayinskyy stomatolohichnyy almanakh. 2023; 1: 17-20. [in Ukrainian].
3. Makarov VV, Shipilov SA, Viun IA, Negoduyko VV. Vypadok khirurhichnoho likuvannya flehmony shyyi pislya vohnepalnoho poranennya, uskladnenoyi totalnym zadnim mediastynitom, z vykorystannyam laparoskopichnykh khirurhichnykh tekhnolohiy. Emergency Medicine (Ukraine). 2024;20(2):131-136. doi: 10.22141/2224-0586.20.2.2024.1676 [in Ukrainian].
4. Nastanovy z voyenno-polovoyi khirurhiyi. Pid. red. K.V. Humenyuk, S.O. Korol, R.V. Hybalo. Kyyiv: Vydavnytstvo Lyudmyla, 2024. 572 [in Ukrainian].
5. Svirepo PV. Khirurhichne likuvannya nekrotyzuyuchoyi infektsiyi myakykh tkanyn shyyi. Kharkivska khirurhichna shkola. 2020; 2(101): 7-10. doi: 10.37699/2308-7005.2.2020.01 [in Ukrainian].
6. Snizhko SS. Poperedzhennya poshyrennya flehmon shyyi u klitkovynu seredostinnya ta rozvytku hostroho nyzkhidnoho mediastynitu. Naukovyy visnyk Uzhhorodskoho universytetu, seriya «Medytsyna». 2018; 2(58): 66-69. doi: 10.24144/2415-8127.2018.58.66-69 [in Ukrainian].
7. Suleymanova VG, Shaprynskyi VO, Kryvetskyi VF, Najib NZ, Khmelevska TA. Likuvannya hnylnoyi flehmony shyyi, uskladnenoyi mediastynitom, u khvoroho z hipoerhichnoyu imunnoyu vidpoviddyu. Shpytalna Khirurhiya. Zhurnal imeni L. YA. Kovalchuka. 2017; 1: 101-105. doi: 10.11603/2414-4533.2017.1.6731 [in Ukrainian].
8. Shaprynskyi VO, Kryvetskyi VF, Suleymanova VG, Mityuk BO, Hussein MB, Kedyk OA. Osoblyvosti perebihu ta khirurhichnoho likuvannya flehmon shyyi ta mediastynitiv tonzylohennoho pokhodzhennya. Ukrayinskyy zhurnal khirurhiyi. 2018; 2(37): 66-73. doi: 10.22141/1997-2938.2.37.2018.147852. [in Ukrainian].
9. Shevchuk IM, Snizhko SS. Analiz uskladnen hostroho hniynoho mediastynitu. Klinichna khirurhiia. 2018; 85(2): 22-25. doi: 10.26779/2522-1396.2018.02.22 [in Ukrainian].
10. Farrell AN, Raol NP, Goudy SL, Evans SS. Atypical Head and Neck Phlegmons as an Early Indicator to MIS-C in the Pediatric Population. Otolaryngol Head Neck Surg. 2023; 169(2): 444-446. doi: 10.1002/ohn.235.
11. Jin L, Chang Y, Zhao Y, Fan K, Lu J, Wang Y. et al. Clinical Features of Severe Deep Neck Space Infection: Five Clinical Cases and Our Experience in Their Management. Open Access Emerg Med. 2024; 16: 257-266. doi: 10.2147/OAEM.S476737.
12. Kauffmann P, Cordesmeyer R, Tröltzsch M, Sömmer C, Laskawi R. Deep neck infections: a single-center analysis of 63 cases. Med Oral Patol Oral Cir Bucal. 2017; 22(5): 536–541. doi:10.4317/medoral.21799.
13. Khomenko IP, Tertyshnyi SV, Vastyanov RS, Talalayev KO. Soft tissues gunshot defects ultrasound investigation use in reconstructive-restorative surgery. World of Medicine and Biology. 2021; 3(77): 169-174. doi: 10.26724/2079-8334-2021-3-77-169-174.
14. Li RM, Kiemeney M. Infections of the Neck. Emerg Med Clin North Am. 2019; 37(1): 95-107. doi: 10.1016/j.emc.2018.09.003.
15. Sheiko VD, Ohanezian AH, Dolzhkovyi SV, Nebaba SV, Cherkun OYu., Kryzhanovskyi OA. Et al. The course of descending necrotizing mediastinitis depending on the etiology of the disease. World of Medicine and Biology. 2023; 4(86): 175–180. doi: 10.26724/2079-8334-2023-4-86-175-180.

Стаття надійшла 4.12.2024 р.