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COMPLICATION OF MRSA BACTERIEMIA AND M/XDR GRAM -NEGATIVE INFECTION

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ABSTRACT

Bacteremia caused by Staphylococcus aureus is a serious infection associated with high morbidity and mortality and often results in infective endocarditis, abscess of lung, which have a negative impact on patient outcomes. Highly virulent, antibiotic-resistant strains such as methicillin-resistant *S. aureus* (MRSA) are particularly challenging to treat. In *S. aureus*-induced pneumonia, the intense inflammatory response leads to severe lung injury and ARDS. We present a case to highlight the need for prolonged treatment and close monitoring of patients espetially with scomplications associated with S. aureus bacteremia. The patient was transferred from the clinic, where he was admitted for paraplegia of the lower extremities, transverse myelitis was diagnosed. He underwent pulse therapy with methylpredizolone, due to the deterioration of his condition, he was transferred to the intensive care unit of our hospital.The patient underwent repeated examinations and was diagnosed with an epidural abscess at the level of the C5-Th1 vertebrae.

KEYWORDS: Epidural Abscess, ARDS, Endocarditis.

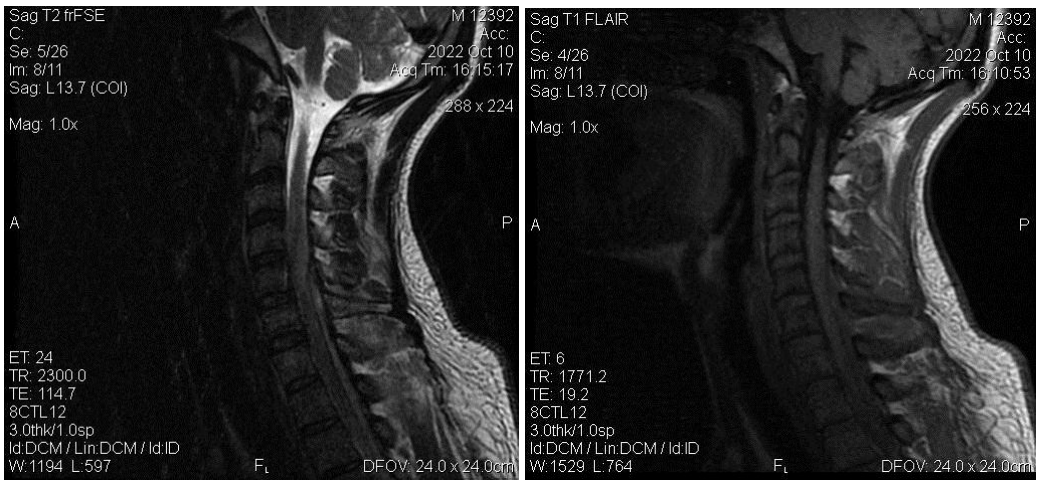
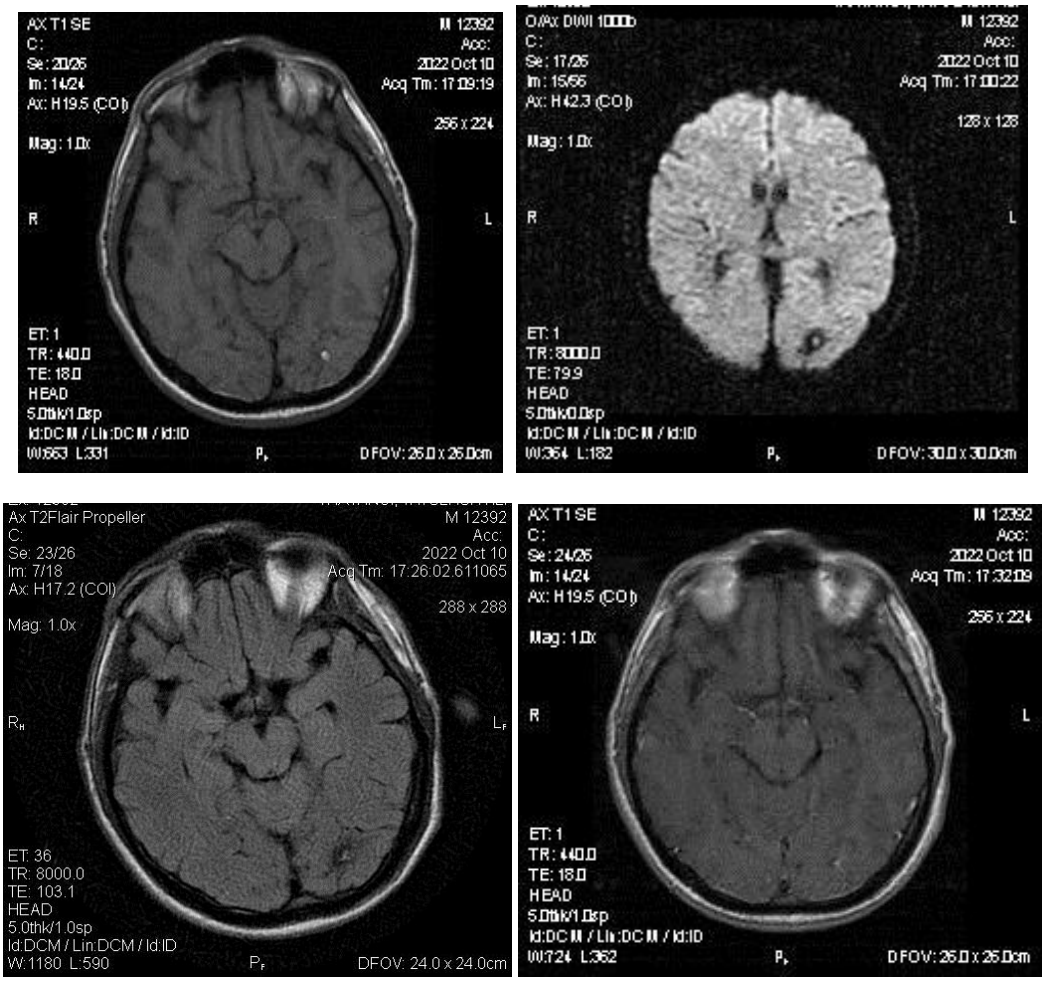


Fig 1: MRI of the cervical vertebrae. Sagittal section.

In the posterior epidural space at the level of C5-Th1 vertebrae, there is an area of viscous-fluid intensity (an epidural abscess is possible), which causes compression of the posterior cerebrospinal fluid space and the spinal cord in these segments, intervertebral discs are characterized with normal intensity signal (October 10, 2022).



Pict 2: (10.10.22) MRI of the brain. Diffusion limited imaging.

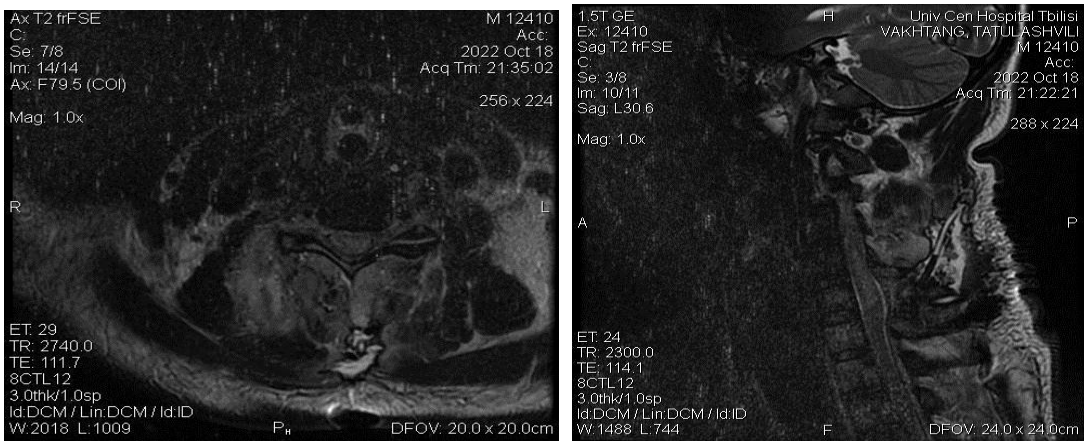
T1 in. T2 weighted image. dT1-weighted image with contrast enhancement. In the left occiput, subcortical Irregular, oval-shaped small high-intensity anomalous focus (SE T1, FLAIR T2) and hypointense (FRFSE T2) with a calcified area. After the introduction of a contrast agent (Magnevist 0.5 mmol/ml, 20 ml IV), the MRI picture of the brain does not change, the inclusion of contrast is not fixed. An MRI revealed an acute microhemorrhagic focus in the left and occipital part of the brain.

Conducted surgical treatment - drainage of the epidural abscess. Bacteriological investigation of the sputum,blood and wound, was revealed Staphylococcus aureus (MRSA). The presence of *S. aureus* in the bloodstream (bacteremia) was lead to the development of sepsis, *S. aureus* sepsis and later endocarditis. Patient is on mechanical ventilation, in coma state, with unstable hemodynamic and under pressors support, fever. CSF results revealed meningitis, and treatment of staphylococcal infection in the blood continues, as well as antibacterial treatment of meningitis.

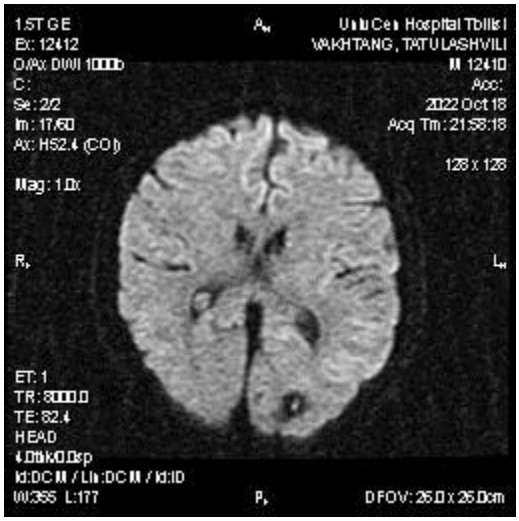
CSF analysis (table 1) revealed high level of protein and cytosis

Table 1

CSF 10.10.22	
CMV IgM	neg
CMV IgG	7.6 iu/ml (pos> 0.5 arbU/ ml)
EBV—VCA IgM	neg
EBV-VCA IgG	96 arbU/ml (pos >5arbU/ml)
CSF (10.10 22)	
Protein	5930 mg/l
Leicocyte	0.512 X 10^3/mkl
Erithrocyte	0.001X10^6/mkl
TC-BF	0.512 X 10^3/mkl



On the obtained MRI scans: compared to the previous study (October 10, 2020), viscous fluid is no longer fixed in the posterior epidural space at the level of C5-Th1 vertebrae. A postoperative bone (arcoflavotomy) defect was found in both C6-C7 arches. In the operated area - a drainage tube. Both right paravertebral soft tissues were damaged at the level of C4-C7 vertebrae (10/18/2022).



Pict 4: MRI of the brain.

On MRI, the picture is not changed, no acute intracerebral process has been detected. (10/18/2022)

CSF analysis revealed changes (table2)

Table 2.

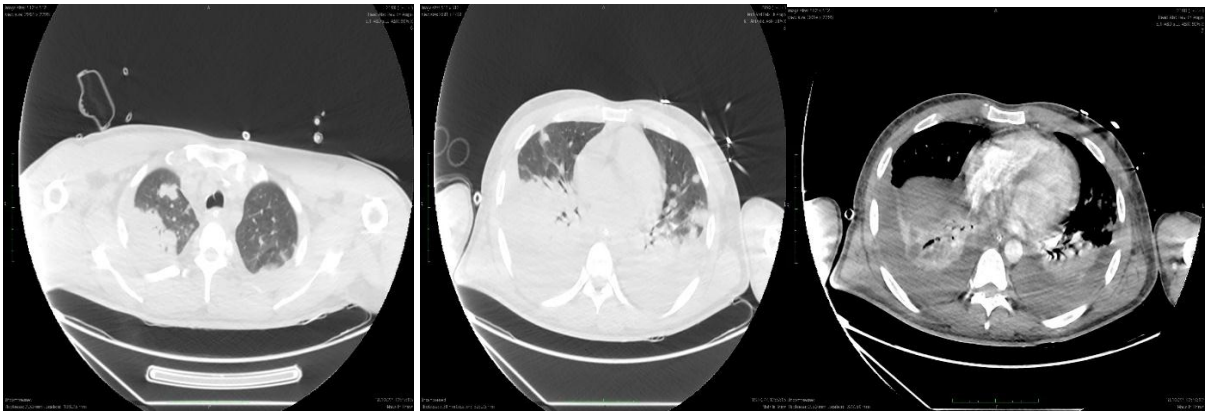
CSF (18.10 .22)	
Protein	10773 mg/l
WbC _BF	0.045 $X10^3$/mkl (n <0.005)
TC-BF	0.045$X10^3$/mkl
glucose	3.89mmol/l
MN%	23%
PMN%	85%

On the axial section in the left occipital lobe, the contours are indistinct, a small hyperdense focus. midstructures are not displaced(09/10/2022)

Pict 5: CT scan of the brain.

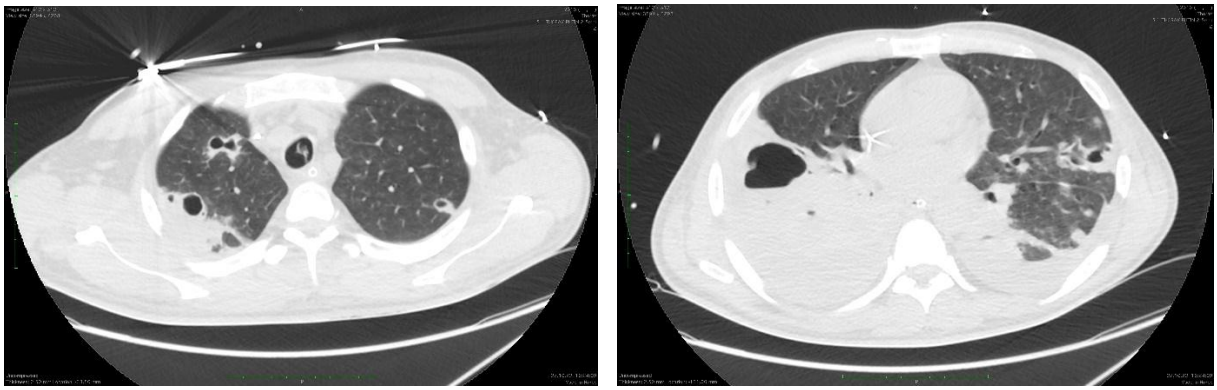
Pict 6: CT scans of the brain.

Sputum (17.10) bacteriological analysis revealed Staphylococcus aureus (MRSA). The patient's condition worsened due to the development of severe respiratory distress syndrome. In the lung parenchyma, extensive infiltration changes of the consolidation type with subtotal distribution are detected on both sides, against which there are also different localization foci of density, in the right lower lobe, against the background of consolidation, there are also areas of liquid density. There is free fluid in both pleural cavities, stratification on the right 3.4 cm, on the left 3.7 cm. Free air was not detected.(10/18/2022 . pict 7)



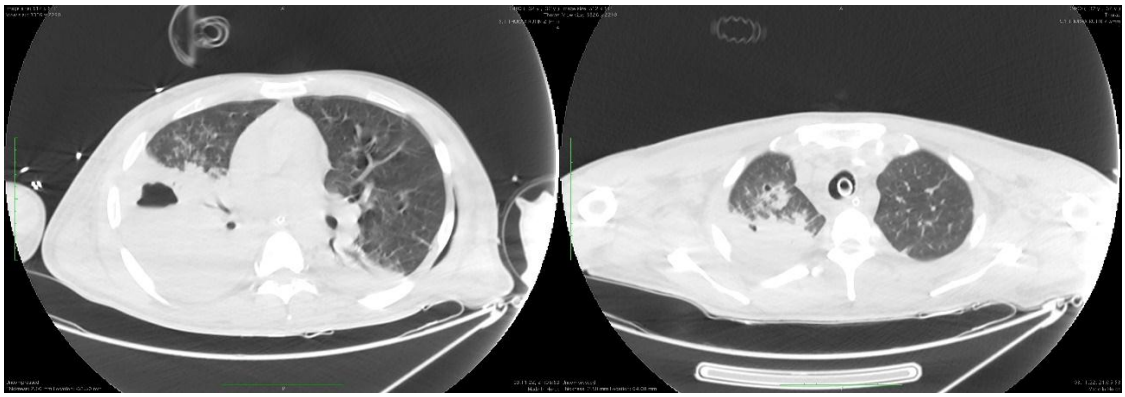
Pict.7 CT scan of the chest, with contrast enhancement.

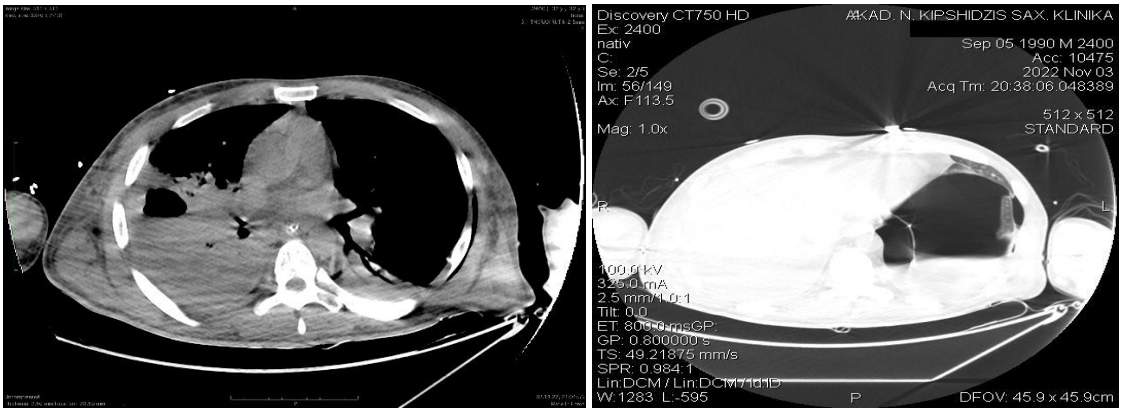
Focal infiltrative changes with a central destruction are observed in the upper lobes of bilateral lungs. In the lower lobes there are extensive consolidated infiltrative changes, on the right in the background there are several areas of low density and a 4.5 cm cavity containing gas and liquid (horizontal liquid level). In the pleural cavity on both sides of the free fluid, bundle 5.2 cm on the right. 3.2 cm to the left (10/27/2022-pict 8).



Pict 8: CT scan of the chest cavity.

In the left pleural cavity was detected free air. Focal infiltrative changes with central tissue damage are observed in the upper lobes of the lungs. In the lower lobes, consolidated infiltrative changes are expressed with several areas of reduced density, on the right cavitation containing air and liquid, revealed a horizontal level of a liquid. There is free fluid in the pleural cavity on both sides, separation 3.7 cm on the right. 2.5cm –left (pict. 9)





Pict 9 CT chest.

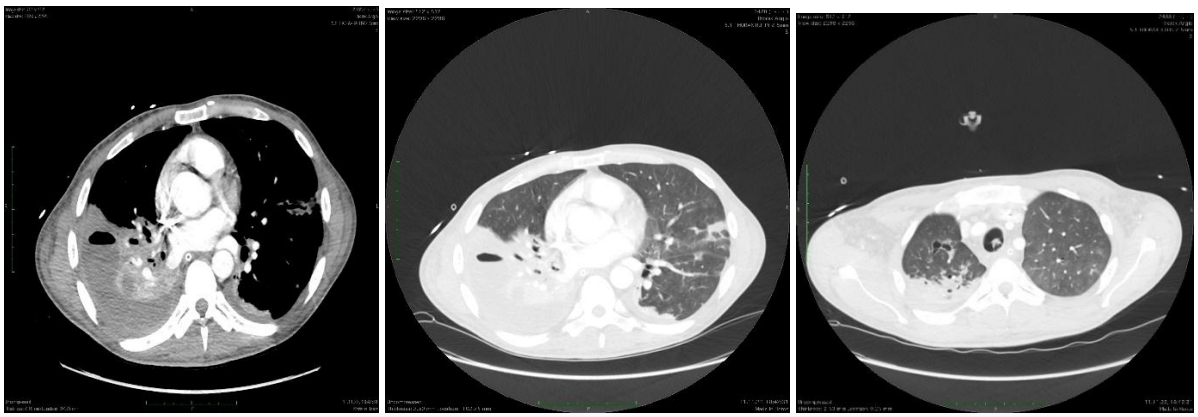
The pleural cavity of patient was drained. Patient is on mechanical ventilation PaO_2/ FiO_2 < 100 mm.Hg. CSF changes is presented in table. 3.

Table 3.

CSF (22/10.22)	
Protein	3098 mg/l (n 200-400 mg/l)
Glucose	2.17 mmol/l (2.22-3.89)
WBC -BF	0.041
RBc --BF	0.001 X10 ^{3}/mkl
TC--BF	0.041 X10$^{4/}$mkl
PMN %	24.4%
MN %	75.65

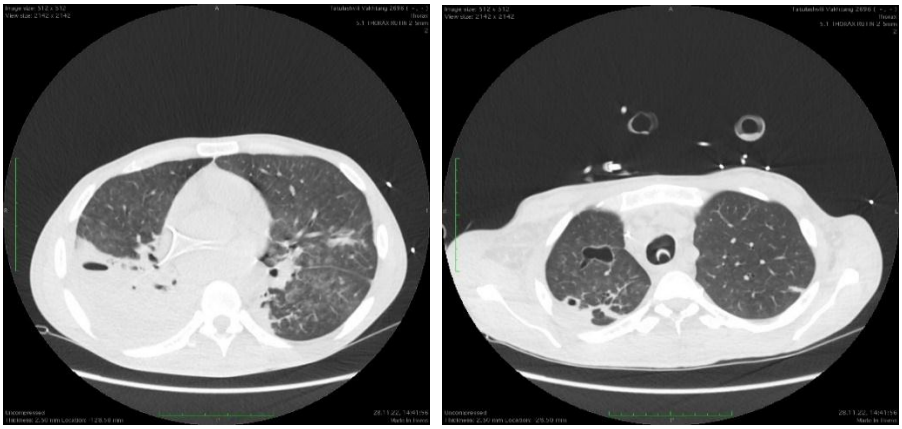
Angiographic examination does not reveal filling defects in the pulmonary trunk and bilateral main, lobar and segmental arteries, there are no reliable signs of thrombosis. Focal infiltrative changes with a central destruction are observed in the upper lobes of the lungs. Consolidated infiltrative changes are determined in the lower lobes, there is free fluid in the pleural cavity on both sides, stratification on the right 2.5 cm. 0.5 cm to the left (11/11/2022—pict 10).

The patient was performed tracheostomy



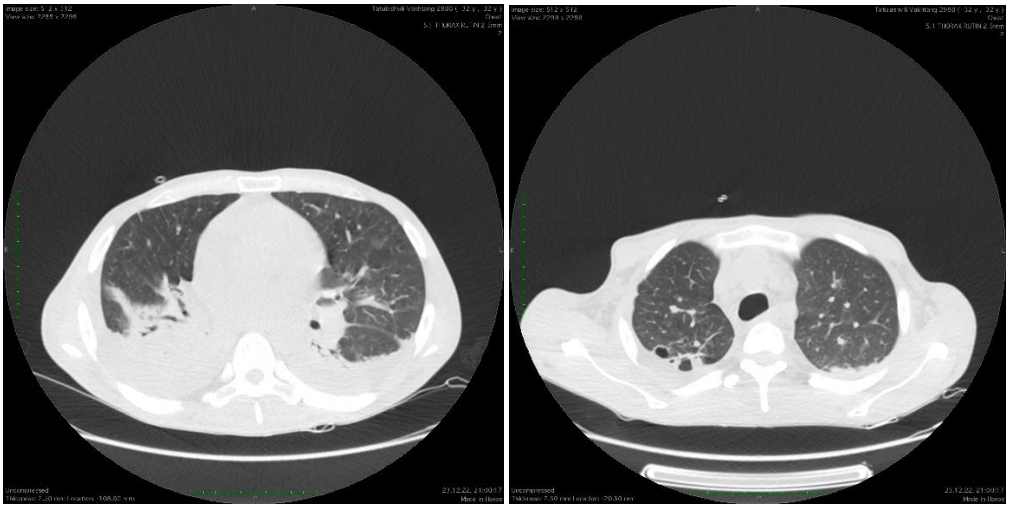
Pict.10: CT scan of the chest. with contrast enhancement.

A tracheostomy tube is visible in the trachea, In the lungs on both sides, there is a decrease in transparency, against the background of which there are areas of medium- and small-focal infiltration, in the lower lobe on the right there is an extensive consolidation against which there are cavities with an air and small volume of liquid. In the upper lobe there are cavities with air of central localization. On the left, there are consolidation at the level of the basal segments.(28/11/2022—pict.11)



Pict 11: CT scan of the chest.

The decrease in transparency in bilateral lungs is less pronounced. The consolidation in the lower lobe on the right is somewhat reduced, the number of air cavities against the background of the consolidation is reduced, a subpleural air cavity is preserved at its upper edge. Air cavities in the upper lobe are no longer visible, fibrous stretch marks appear instead. There is a small fluid effusion in the bilateral pleural cavity, the maximum separation is 2.2 cm on the right and 1.5 cm on the left, no gas is detected in the bilateral pleural cavity.



Pict 12: CT scan of the chest.

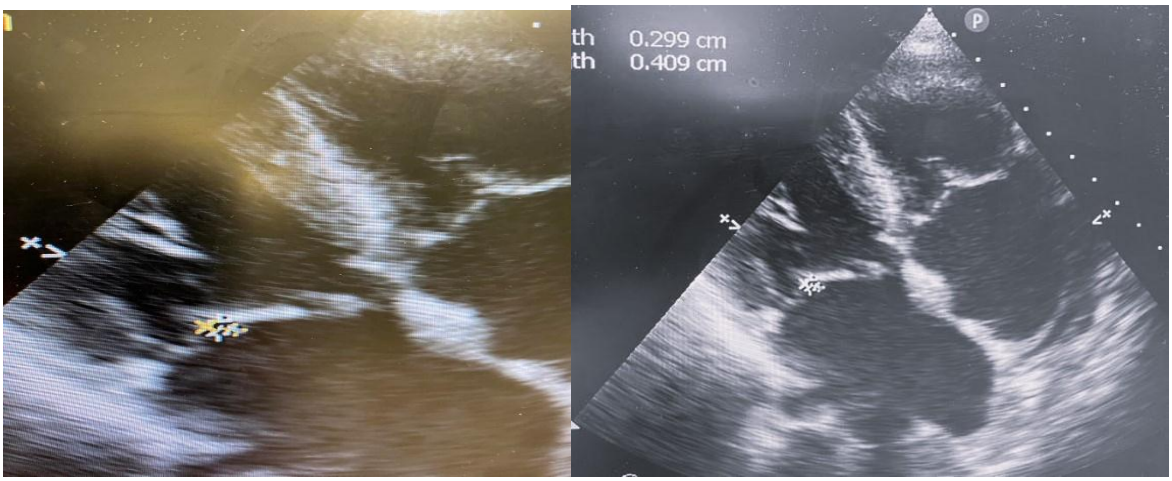
During the course of the disease, different materials were examined, different groups of microbes and different sensitivity to antibiotics were observed (table 4).

Table 4.

Bacteriopgical analyses	Sputem /	Blood/	Wound/
09. 10. 22	St. aureus(MRSA)/ TEicoplanin, vancomycin , tigecycline, moxiflocxacin	St. aureus(MRSA)/ Vancomycin, clindamycine, Teicoplanin	St. aureus(MRSA)/ TEicoplanin, vancomycin , tigecycline, moxiflocxacin, erythromycin
17. 10. 22	St aureus / (TEicoplanin, vancomycin, tigecycline, moxiflocxacin) Candida spp		
24. 11. 22	KLebsiella pneumonia/ (zavicefta, gentamicin, tigecyclin)	St. aureus/MRSA	
27. 11. 22	KLebsiella pneumonia		
07. 11. 22	pseudomonas aeruginosa / (colistin -fosfomyscin)		
18. 11. 22	pseudomonas aeruginosa /		

	(colistin -fosfomyscin)		
04. 12. 22	pseudomonas aeruginosa / (colisti n)		
19. 12. 22	KLebsiella pneumonia// pseudomonas aeruginosa / colistin, meropenem, tgecyclin		sterile
07. 12. 22		negative	

Heart valves were evaluated periodically. After one episode of fever, the presence of vegetation on the mitral valve leaflet was revealed.



CDI, *Clostridium difficile* infections presenting with fever, abdominal pain, and diarrhea for several days and was complicated with toxic megacolon, with unstable hemodynamic status, with septic shock.

Table 5.

Clostridium defficile	CDH,A toxin, B toxin
29.11	Negative
20.12	Positive

The scheme of antibacterial treatment implied the impact primarily on the gram-positive flora. Changing the combination of antibiotics occurred as clinical, radiological, or laboratory parameters worsened.

09/10	10/10	13/x	19/x-20/x	23/x-08/XI	09//XI—24/XI	25/XI --06/XII	07/XII-19/XII	19/XII-24/XII
Pip/tazo	meropenem	meronem	meronem	meronem	meropemen	Tigecyclin	Tigecyclin	Colomycin
vancomycin	vancomycin	aciklovir	aciklovir	aciclovir	vancomycin	Zavicefta	Vancomycin	Vancomycin
			vancomicin	Vancomicin	kolomycin	Colomycin	Colomycin	Tigecyclin
			Colistin	linezolid	fosfomycin	Vancomycin	Meronem	Meropenem
			Moxifloxacin	Moxifloxacin	Moxiflocacin	Meropenem	Metronidazol	
			fluconazol	meronem				
			meropenem	Fluconazole				

In severely critically ill patients, empiric antibiotic treatment is usually a combination of antibiotics to increase the likelihood that the bacteria causing the infection will be reliably suppressed and adequate antimicrobial therapy will not be delayed. As already mentioned, inadequate antibiotic therapy is associated with high mortality. Potential causative agents may be enterobacteria, producing ESBL, gram-negative rods resistant to carbapenems (enterobacteria, Pseudomonas, acineto bacteria).

Methicillin-resistant Staphylococcus aureus (MRSA), has also been found in blood, in sputum and in the wound. Tigecycline improved the treatment regimen for ESBL and carbapenem-resistant gram-negative rods, as well as for a number of multidrug-resistant gram-positive pathogens (MRSA, VRSA, VRE).

With the appointment of Zavicefta (ceftazidime/avibactam), the regimen was strengthened for ESBL, carbapenem-resistant gram-negative

organisms, and to expand coverage of multidrug-resistant strains of Pseudomonas.

A systematic review and meta-analysis of three cohort or case–control studies evaluated patients and found a lower mortality rate with DCT (dual carbapenem therapy) when compared to the control treatment (colistin, tigecycline and aminoglycoside monotherapies, or combined regimens). Synergistic drug therapy combinations that include penicillin plus cephalosporins, as well as carbapenems plus cephalosporins, have been shown to decrease the microbial counts and improve clinical outcomes in infections caused by Gram-positive bacteria. Against multidrug-resistant Gram-negative microorganisms, the use of therapeutic regimens combining beta-lactam/beta-lactam inhibitors with carbapenems has resulted in the resolution of bacterial infections. Antimicrobial resistance associated increase in mortality. Beta-lactams have a safe profile and are bactericidal against most Gram-positive and Gram-negative microorganisms. It is used of dual beta-lactam therapy to overcome multidrug-resistant pathogens, Long-course (>18 days)therapy has the obvious benefit of maximizing the chance of infection resolution. Patient discharged from hospital, with spontaneous breathing, stable parameters.

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