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A case report: acute sinusitis turned into shockingly rapid sepsis at young male adult

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Abstract:

Sinusitis is a disease of usually mild course - however, sometimes secondary diseases might develop such as pneumonia which might have moderate to severe course. Pneumonia is usually treated ambulatory, regardless some patients' state worsens and they are in need of hospital treatment, sometimes even in Intensive Care Unit. In this article is presented a case of a patient with such history - a young adult with no medical history of chronic diseases, whose state worsened and required ICU treatment.

Keywords: sinusitis; sepsis; pneumonia; ICU; rapid onset; *Streptococcus pyogenes*; ECMO; hemodiafiltration; prone position

Highlights:

1. Sepsis might have a rapid onset, even when it develops from a mild disease.
2. Proper medical imaging is essential to recognize progressing sepsis.
3. Venovenous ECMO, which is a method to treat severe respiratory distress, has been developing and gaining its attention in ICU for the past 20 years.
4. Prone position might be effective treatment of poor ventilation.

Introduction:

Sinusitis is a commonly present disease amongst patients and its etiology is usually viral - the most commonly responsible for sinusitis are rhinovirus, influenza virus, adenovirus, less commonly *S. pneumoniae*, *H. influenzae*. Clinically sinusitis might be divided into acute (shorter than 12 weeks) and chronic (symptoms persist above 12 weeks). The course is usually mild and the symptoms subside itself after 7-10 days. If there is no improvement after 5 days, it suggests bacterial etiology - circa 65% of cases recover after 14 days. In this article we would like to report a case of a patient with rapid sepsis onset, who suffered from sinusitis 2 weeks prior to admission.

Case presentation:

A 24 years old male visited the Emergency Department (ER) of the hospital A due to sudden shortness of breath and chest pain located on the right side. He denied injury. 2 weeks prior he suffered from sinusitis treated with antibiotics. At admission the patient presented fever, muscle pain, cough, low blood pressure, saturation of 80%. At ER blood tests were taken and the patient was consulted by pulmonologist, cardiologist and anesthesiologist. Blood tests revealed elevated inflammatory markers and symptoms of kidney failure. Chest X-ray, CT angiography of chest, lungs and heart ultrasound were performed. These examinations

allowed to exclude pulmonary thromboembolism and revealed inflammatory-atelectatic lesions in a right lung and some volume of fluid in right pleural cavity. Heart ultrasound showed enlarged heart chambers and compromised systolic function with EF of 30-40%. After that the diagnosis of septic shock was made and the patient was directed to the Intensive Care Unit (ICU) of the hospital A on the same day.

At ICU doctors administered high flow oxygen therapy, broad spectrum antibiotics and continuous infusion of vasoconstrictors such as noradrenaline and later argipressin. The same day patient was in need of intubation and mechanical ventilation with increasing oxygen concentration. Blood culture was taken. Quick test of nasal cavity swab revealed RSV and a PCR of blood revealed *Streptococcus pyogenes*. The patient's ventilation deteriorated and because of that the patient was put in a prone position. He needed diuresis stimulation and inflammatory markers were continually increasing.

On the next day, day 2 of admission, the patient was transported to ICU of the hospital B due to fulminant sepsis and severe respiratory distress syndrome with the purpose of ECMO implantation. At admission the patient's state was critically severe, under analgo-sedation (midazolam, dexmedetomidine, fentanyl) with a RASS score of -5, unresponsive and asymmetric pupils (D>S). He was in a severe respiratory distress, ventilated mechanically with a 100% concentration of oxygen, resulting in a saturation of 76%. Massive crepitations and dry rales were present at auscultation. He was in a circulatory failure stabilized with noradrenaline infusion (0,95 mcg per min per kg) resulting in a BP of 80/30 mmHg and a HR of 116 BPM. Stomach was slightly tense, peristalsis was inaudible and diuresis was very limited. Skin mottling was present on pelvic limbs. Blood gas analysis showed severe acidosis of mixed etiology, high level of lactates and hypoglycemia. Laboratory tests presented massive blood coagulation disorders, kidney and liver failure and thrombopenia. Due to presented symptoms the patient was qualified into emergency vvECMO (veno-venous ExtraCorporeal Membrane Oxygenation) implantation, which was performed via cannulation of left femoral vein and right jugular vein in the Operating Room.

Antibiotics were administered: clindamycin, vancomycin, meropenem and ceftriaxone and clarythromycin were continued. Dialysis catheter was inserted into right femoral vein and continuous veno-venous hemodiafiltration (CVVHDF) with citrate-calcium anticoagulation using Cytosorb filter. Pulse index Continuous Cardiac Output (PICCO) was set up in order to monitor hemodynamic parameters. Crystalloids, albumin solution, bicarbonate, IPP and heparin were infused. Antithrombin was supplemented, steroids, bronchodilators, vit. C and B1 were administered. Chest X-ray excluded pneumothorax. Positive fluid balance was maintained. In order to maintain blood pressure infusion of adrenaline was added.

On the day 3 of admission the patient state remained critically severe. PICCO monitoring was technically difficult and revealed decreased: cardiac index, ejection volume, end-diastolic volume with increased ELWI (extravascular lung water index) and SVV (stroke volume variation). Dobutamine was added. Another chest X-ray revealed significant volume of fluid in right pleural cavity. Consulting cardiothoracic surgeon performed pleuraecotomy which allowed to evacuate 2000 mL of seropurulent fluid. At the same time the hospital A delivered blood culture result - *S.pyogenes* positive. That day 3 units of of blood pack, 3 units of fresh frozen plasma, 2 units of whole blood, 100 ml of 20% albumin solution and 2000 units of antithrombin III were transfused. 35 grams of immunoglobulins were administered. Massive ischemia of thoracic and pelvic limbs was observed - vascular surgeon claimed no indication for surgical treatment. Acidosis, elevated lactates and hyperkalemia remained. Pupils remained unresponsive and assymeteical. In the evening in CVVHDF occurred clotting, which was immediately changed. Despite intensive and aggressive treatment vasoplegia and multiple organs failure progressed. The patient died in the morning of day 4 after admission. direct cause of death: sepsis caused by *S.pyogenes*, primary cause of death: pneumonia, secondary cause of death: acute respiratory distress syndrome (ARDS).

Tab. 1 The patient's laboratory blood tests results of day 2 and 3 of admission

lab test	result on day 2 of admission	result on day 3 of admission	reference
ALAT	603 IU/L	N/A	<40 IU/L
AspAT	770 IU/L	N/A	>40 IU/L
CK	14526 U/L	59869 U/L	<370 U/L
CRP	343 mg/L	159 mg/L	<10 mg/L
procalcitonine	361 ng/mL	230 ng/mL	0-0,5 ng/mL
pH of blood	7,019	7,07	7,34-7,45
lactates	16 mmol/L	23 mmol/L	0,5-1,6
[K+]	5,8 mmol/L	6 mmol/L	3,5-4,5 mmol/L
creatinine	5.37 mg/dL	4,03 mg/dL	0,7-1,3 mg/dL
urea	118 mg/dL	75 mg/dL	17-43 mg/dL
EGFR	14	20	>60
LDH	2113 IU/L	N/A	125-220 IU/L
albumin	2,5 g/dL	N/A	3,5-5,5 g/dl

Tab. 1 The patient's laboratory blood tests results of day 2 and 3 of admission

lab test	result on day 2 of admission	result on day 3 of admission	reference
leukocytes	8,07 x 10 ³ /μL	9,72 x 10 ³ /μL	8-10 x 10 ³ /μL
platelets	57 x 10 ³ /μL	19 x 10 ³ /μL	140-440 x 10 ³ /μL
troponine	2350 pg/mL	1670 pg/mL	0-34 pg/mL
APTT	89 s	108 s	26-40 s
INR	2,19 INR	4,14 INR	0,8-1,2
PT	24,3 s	45,7 s	10-13 s
antithrombin	17%	<10%	80-120%
D-dimers	17 μg/mL	20 μg/mL	0-0,5 μg/mL
NT-proBNP	N/A	59506 U/L	0-171 U/L

Discussion:

This case is a rare example of a very quickly progressing sepsis originating from pneumonia secondary to sinusitis, leading the patient into ICU where he could be treated with ECMO - which is a device that oxygenates blood and removes carbon dioxide from it. The benefit of ECMO application include lowering mortality [1]. The decision whether to apply ECMO or not is based on the criteria that patient must meet. The main criteria include:

- severe, potentially reversible respiratory failure resistant to mechanical ventilation and at least one the below:
 - PaO₂/FiO₂ < 80 for at least 3 hours despite TV (tidal volume) = 6 ml/kg and PEEP above 5 cm of H₂O
 - pH of blood < 7,25 for at least 3 hours

The presented patient met the latter criterium.

Prone position is when a patient is positioned face-down towards the bed. The benefits of prone position include reduction of mortality and improvement in oxygenation [2]. It is recommended for those suffering from severe or moderate progressing into severe ARDS. It

is effective because in supine position of the body the ventilation and perfusion remain uneven (less effective on dorsal side) - while in prone position it distributes evenly [3]. Positive effects are present when a patient is put in prone position for minimum of 12 hours [4,5].

Conclusion:

Sepsis onset might be rapid and doctors should always remain cautious and alerted while dealing with suddenly deteriorating patient. Even when the patient is young and not suffering from any chronic illnesses, it does not exclude the possibility of serious and permanent complications.

Consent: It was impossible to obtain consent due to patient's death and difficulty to reach family. This article is anonymized and does not contain any data which would allow to recognize the patient's identity. The authors claim that the presentation of this case would highly contribute to medical knowledge.

References:

1. Rosenberger P, Korell L, Haeberle HA, et al. Early vvECMO implantation may be associated with lower mortality in ARDS. *Respir Res.* 2023;24(1):230. Published 2023 Sep 26. doi:10.1186/s12931-023-02541-z
2. Guérin C, Albert RK, Beitler J, et al. Prone position in ARDS patients: why, when, how and for whom. *Intensive Care Med.* 2020;46(12):2385-2396. doi:10.1007/s00134-020-06306-w
3. Rampon GL, Simpson SQ, Agrawal R. Prone Positioning for Acute Hypoxemic Respiratory Failure and ARDS: A Review. *Chest.* 2023;163(2):332-340. doi:10.1016/j.chest.2022.09.020
4. Papazian L, Munshi L, Guérin C. Prone position in mechanically ventilated patients. *Intensive Care Med.* 2022;48(8):1062-1065. doi:10.1007/s00134-022-06731-z
5. Munshi L, Del Sorbo L, Adhikari NKJ, et al. Prone Position for Acute Respiratory Distress Syndrome. A Systematic Review and Meta-Analysis. *Ann Am Thorac Soc.* 2017;14(Supplement_4):S280-S288. doi:10.1513/AnnalsATS.201704-343OT