Vancomycin-resistant *Staphylococcus aureus* (VRSA) in hepatic cirrhosis patient: a case report

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Abstract. The irrational use of vancomycin in methicillin-resistant *Staphylococcus aureus* (MRSA) infections result in the emergence of vancomycin-resistant *Staphylococcus aureus* (VRSA) pathogen, which can pose a threat to the world healthcare. A 32-year-old male with hepatic cirrhosis patient admitted with recurrent gastrointestinal bleeding with a wound in his left leg since 6 months ago; the result microbiological culture showed a VRSA with minimum inhibitory concentration (MIC) vancomycin ≥32μg/mL. The patient was treated with trimethoprim/sulfamethoxazole combination according to cultural sensitivity. The second microbiological culture showed the same result. VRSA is a rare and difficult condition to handle. The success of therapy for this VRSA case warn us how important to cut the *S. aureus* distribution chain with a high level of resistance.

1. Introduction
Since 1990, the penicillin resistance increased in the world due to the irrational use of antibiotics as an empirical therapy in infections caused by *Staphylococci*. This situation has resulted in dependence on vancomycin as first-line therapy for methicillin-resistant *Staphylococcus aureus* (MRSA) infection.[1] The mechanism of resistance time by time diminished the sensitivity of *Staphylococcus aureus* to vancomycin thought to be associated with changes in bacterial cell walls.[2] In 1996 based on data from the center for disease control and Prevention(CDC), vancomycin-resistant *Staphylococcus aureus* (VRSA) considerable as a serious threat to the world health care.[3,4]

In 2015, 14 cases of VRSA were reported in the United States. All VRSA are described as resistant vanA gene vancomycin, which is commonly found in vancomycin-resistant enterococci (VRE). The prevalence of VRSA is an important concern, especially in its management.[1,5,6]

2. Case Report
An Acehnese male aged 32 years, admitted to dr. Zainoel Abidin Hospital with recurrent upper gastrointestinal bleedings within 3 days, the patients already diagnosed with hepatic cirrhosis since 2 years ago. The patient also complains a wound with purulent pus in his left lower extremity and no diabetic history according to the patient.

The routine examination found full consciousness, blood pressure 110/70mmHg, pulse frequency 94beat/minute regular rhythm, respiratory rate 22breath/minute and the temperature was 36.6°C. On
physical examination found a pale conjunctiva palpebra inferior, icteric sclera, heart and lung found no abnormal finding, splenomegaly, ascites, collateral vein, palmar erythema, flapping tremor and pitting edema. A lesion with purulent pus in his left leg size 3x4cm.

![Figure 1](image.png)

Figure 1. Left leg lesion size 3x4 cm with purulent pus.

Laboratory studies revealed a hemoglobin level of 4.7g/dl, hematocrit: 14%, erythrocyte: 1.6x10^6/mm^3, leukocyte: 9800/mm^3, platelet 127,000/mm^3, albumin serum 2.20g/dL, globulin serum 4g/dL and HbsAg positive, other hematological parameters were within normal limits. Chest X-ray found no cardiomegaly and lung normally, abdominal ultrasound found an ascites fluid and hear represent as cirrhotic.

On his third hospital day, the wound culture showed S. aureus resistance to almost all antibiotics, including penicillin, cephalosporine, fluoroquinolone, and vancomycin, lead us to conclude that this patient had a VRSA pathogen (vancomycin MIC ≥32µg/mL). The only antibiotics found sensitive according to the culture was quinupristin/dalfopristin (MIC 0.5µg/mL), tigecycline (MIC 0.5µg/mL) and trimethoprim/sulfamethoxazole (MIC ≤10µg/mL).

The patient diagnosed with decompensated hepatic cirrhosis related to hepatitis B (Child-Pugh C) with VRSA wound. The treatment in this case used trimethoprim/sulfamethoxazole 160/800mg bid.

3. Discussion
In this case, the results of wound culture showed a VRSA pathogen with MIC vancomycin ≥32µg/mL. Central for disease control and Prevention (CDC) define S.aureus for its sensitivity to vancomycin based on the laboratory limits set by the clinical laboratory standards institute (CLSI), the resistance level of S. aureus becomes [1,4,6]:

- Vancomycin-susceptible S. aureus (VSSA), vancomycin MIC ≤2µg/ml
- Vancomycin-intermediate S. aureus (VISA), vancomycin MIC 4-8µg/ml
- Vancomycin-resistant S. aureus (VRSA), vancomycin MIC ≥16µg/ml

Based on CLSI, this is a VRSA case (MIC vancomycin ≥32µg/mL).[1,3] Recommendation therapy based on culture result was tigecycline (MIC 0.5µg/mL). However, since there is no Tigecycline preparation in our hospital, the patient was treated with trimethoprim/sulfamethoxazole. Administration of the therapy following the first wound culture result on third hospital day, results from the second wound culture on his nine hospital day indicating a successful treatment. The result from second wound culture showed quinupristin/dalfopristin with MIC ≤0.25µg/mL, linezolid with MIC 1µg/mL, vancomycin with MIC ≤0.5µg/mL, nitrofurantoin with MIC ≤16µg/mL, tigecycline with MIC 0.25µg/mL, trimethoprim/sulfamethoxazole with MIC ≤10µg/mL. This result shows a good response to antibiotic therapy.[4,5,7]
The third wound culture results not show *S. aureus* but found *Klebsiella pneumonia*. From the results of this culture, antibiotic therapy suggested ceftazidime with MIC ≤1μg/mL. From the last wound culture result, the conclude of antibiotics therapy with trimethoprim/sulfamethoxazole as a successful therapy against VRSA. New pathogen finding in the third culture, *Klebsiella pneumonia*, indicate that the patient has a new infection, stateofhospital-acquired infection.[8,9]

Patients with the immunocompromised condition are easily infected with *S. aureus*. [10,11] In the end, the patient died with a massive upper gastrointestinal bleeding suspected rupture of the esophageal vein, one of the bleeding conditions is very difficult to manage.

4. Conclusion

Vancomycin-resistant *Staphylococcus aureus* (VRSA) is a rare condition and difficult to manage. The successful therapy for this VRSA case warns us how important to cut the *S. aureus* distribution chain with a high level of resistance.

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