

# 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  $\geq 32\mu\text{g/mL}$ . 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 Acehese 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, respiratoryrate 22breath/minute and thetemperature was 36.6°C. On



physical examination found a pale conjunctiva palpebra inferior, icteric sclera, heart and lung found no abnormal finding, splenomegaly Schuffner2, ascites, collateral vein, palmar erythema, flapping tremor and pitting edema. A lesion with purulent pus in his left leg size 3x4cm.



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

Laboratory studies revealed a hemoglobin level of 4.7g/dl, hematocrit: 14%, erythrocyte  $1.6 \times 10^6/\text{mm}^3$ , leukocyte:  $9800/\text{mm}^3$ , platelet  $127,000/\text{mm}^3$ , 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 show *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  $\geq 32\mu\text{g/mL}$ ). The only antibiotics found sensitive according to the culture was quinupristin/dalfopristin (MIC  $0.5\mu\text{g/mL}$ ), tigecycline (MIC  $0.5\mu\text{g/mL}$ ) and trimethoprim/sulfamethoxazole (MIC  $\leq 10\mu\text{g/mL}$ ).

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  $\geq 32\mu\text{g/mL}$ . 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  $\leq 2\mu\text{g/ml}$
- Vancomycin-intermediate *S. aureus* (VISA), vancomycin MIC 4-8 $\mu\text{g/ml}$
- Vancomycin-resistant *S. aureus* (VRSA), vancomycin MIC  $\geq 16\mu\text{g/ml}$

Based on CLSI, this is a VRSA case (MIC vancomycin  $\geq 32\mu\text{g/mL}$ ). [1,3] Recommendation therapy based on culture result was tigecycline (MIC  $0.5\mu\text{g/mL}$ ). 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  $\leq 0.25\mu\text{g/mL}$ , linezolid with MIC  $1\mu\text{g/mL}$ , vancomycin with MIC  $\leq 0.5\mu\text{g/mL}$ , nitrofurantoin with MIC  $\leq 16\mu\text{g/mL}$ , tigecycline with MIC  $0.25\mu\text{g/mL}$ , trimethoprim/sulfamethoxazole with MIC  $\leq 10\mu\text{g/mL}$ . This result shows a good response to antibiotic therapy. [4,5,7]

The third wound culture results not show *S. aureus* but found *Klebsiella pneumoniae*. From the results of this culture, antibiotic therapy suggested ceftazidime with MIC  $\leq 1\mu\text{g/mL}$ . 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 pneumoniae*, indicate that the patient has a new infection, state of hospital-acquired infection.[8,9]

Patients with their 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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