

## Vancomycin Resistance in *Staphylococcus aureus* Strains

### Short Communication

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### **Summary**

14 (18.4%) of 76 *Staphylococcus aureus* strains were isolated from patients who referred to central pathobiology laboratory in Kashan found to be resistance to vancomycin. The resistance pattern was carried out using the agar screen plate according to NCCLS procedure. The resistance rates to other antibiotics were oxacillin 96.1%, penicillin 92.1%, cloxacillin 63.2%, cephalothin 23.7% and gentamicin 4.5%. The *S.aureus* strains isolated in our laboratory have been found to be multiple resistant. Since the resistance of *S.aureus* to vancomycin is emerging and increasing, which are particularly important in nosocomial infections, it is very important to carry out a drug susceptibility test before attempting to treat

**Key words:** *Staphylococcus aureus*, antibiotic resistance, vancomycin

### **Introduction**

In recent studies carried out over a number years, there has been an increase in the isolation of vancomycin resistance *Staphylococcus aureus* (VRSA) (Marlowe & Cohen 2001, Dunne Jr *et al* 2001, Wong & Ho 1999, Bathesada 2000). This presents a serious problem in hospitals where there is opportunity for spread and a great number of patients with low resistance. This is particularly important in view of the fact that the VRSA are not only intrinsically resistant to vancomycin and beta lactamase antibiotics, but also resistant to great many other antibiotics (McDougal &

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Thornsbery 1986, Rahbar *et al* 2001, Eperson 1998, Zandi *et al* 2001, Sattari *et al* 1999).

Recently, there has been an increase in the isolation of VRSA in Iran and other parts of the world. To determine the rate of vancomycin resistance in various specimens taken from patients, this study was carried out in central pathobiology laboratory in Kashan University of Medical Sciences in the first half of 2001.

### **Materials and Methods**

**Bacteria and identification.** 76 *S. aureus* strains were isolated from different patients referred to our laboratory in the first half of 2001. The types of the most frequently isolated specimens were as follows: 23 head and neck wounds, 21 throat swabs, 13 eye wounds and infections, 11 body wounds and 8 sputum specimens. At first the tube coagulase test was carried out on all of the isolates. The coagulase positive bacteria were further identified using the biochemical tests such as catalase and growth on Manitol Salt Agar (Merck, Germany).

**Antibiotic activity.** Broth suspensions of the 0.5 McFarland standard were prepared and smeared on Muller-Hinton screen plate according to the NCCLS procedure (NCCLS 1991). The valid antibiotic disks (PadTan Teb Co.) including oxacillin (1µg), cloxacillin (5µg), cephalothin (30µg), vancomycin (30µg), penicillin (10µg) and gentamicin (10µg) were put on each plate. The plates were incubated at 37°C for 24h and examined for evidence of growth.

### **Results and Discussion**

Out of 76 strains of *S. aureus* 14 (14.8%) were resistant to vancomycin that non of them were grown on the agar screen plates. The remaining 62 (81.6%) strains found to be vancomycin sensitive *staphylococcus aureus* (VSSA) with this panel. There was a very high rate of beta lactamase positivity. Out of 76 strains of *S. aureus*, 73 (96.1%) were beta lactamase positive and only 3 (3.9%) were negative. The detection rates of VRSA and VSSA are showed in table 1.

Table 1. The rates of antibiotic resistance and sensitivity of isolated *Staphylococcus aureus*

Antibiotic Drugs	No. of Resistant (%)	No. of Sensitive (%)
Oxacillin	73 (96.1)	3 (3.9)
Penicillin	69 (92.1)	7 (9.2)
Cloxacillin	48 (63.2)	28 (36.8)
Cephalothin	18 (23.7)	58 (76.3)
Vancomycin	14 (18.4)	62 (81.6)
Gentamicin	11 (14.5)	65 (85.5)

The rate of resistance of *S. aureus* to vancomycin in our research was 18.4%. A very high rate of resistance to oxacillin (96.1%), penicillin (92.1%) and cloxacillin (63.2%) was seen, however, the number of VRSA which can not be treated by these antibiotics is even higher since a number of VRSA strains are intermediately sensitive to these antibiotics (Aksungur & Yaman 1997). The Wong and Ho study (1999) indicate that the rate of sensitivity to vancomycine was 9%. Similar studies on *S. aureus* nasal hospital carriers and, on coagulase positive and coagulase negative staphylococci in Iran showed that the rate was 12.6% (Rahbar *et al* 2001) and 22.4% (Sattari *et al* 1999), respectively.

The emergence and increasing rate of resistance of *S. aureus* to vancomycin are an alarming to medication cares; particularly in hospital setting causing life threatening infections that respond poorly to most commonly used antibiotics. This makes it necessary to determine whether or not the *S. aureus* isolated from a patient is VRSA and to perform a drug susceptibility test before an attempting to treat the patient.

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