

Original Research Article

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Speciation of Coagulase Negative Staphylococcal Isolates from Clinically Significant Specimens and their Antibioqram

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ABSTRACT

Coagulase Negative Staphylococci (CONS) are the indigenous flora of the human skin and mucous membrane. They are usually contaminants, when isolated from clinical specimens. CONS have become important nosocomial pathogens, accounting for 9% of all nosocomial infections. These infections are difficult to treat because of the risk factors and the multiple drug resistance of these organisms. A total of 74 clinically significant CONS isolated from pus, urine, blood, sputum, ear swabs. These isolates were initially identified by colony morphology, Gram staining, catalase test, slide coagulase test, tube coagulase test. After confirming the isolates as CONS, species-level identification was performed by simple, non-expensive conventional methods and antibiotic sensitivity testing was also carried out by Kirby-Bauer's disc diffusion method. Among the 74 isolates, *S. epidermidis* was the most common species isolated, seen in 29.7%, followed by *S. hemolyticus* (20.2%), *S. saprophyticus* (14.8%), *S. lugdunensis* (13.5%), *S. capitis* (10.8%), *S. cohnii* (4%), *S. schleiferi* (2.7%), *S. xylosus* and *S. hominis* (1.3% each). Most of the isolates showed resistance to penicillin (83.7%) followed by Ampicillin (77%), Erythromycin (54%), Cotrimoxazole (27%) gentamicin (16%), amikacin (12%) piperacillin/tazobactam and linezolid (3% each). The increased recognition of pathogenic potential in CONS and emergence of drug resistance among them demonstrates the need to adopt simple laboratory methods to identify the species and determine the antibiotic resistant patterns. It will help the clinicians in treating the infections caused by CONS.

Keywords

Specimens,
Antibiogram,
Staphylococcal
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Introduction

Coagulase Negative *Staphylococci* (CONS) are the normal skin flora, have emerged as predominant pathogens in hospital acquired infections (Usha *et al.*, 2013), often associated with implanted devices, such as joint prosthesis, shunts and intravascular catheters especially in very young, old, and immune compromised patients. These infections are difficult to treat because of the risk factors and the multiple drug resistant nature of the organisms. Hence study was undertaken to identify and speciate CONS and their

antibiogram (Sarojgolia *et al.*, 2015). The main objectives of this study include, to speciate CONS isolates from various clinical samples. To determine antibiotic susceptibility pattern of CONS by Kirby Bauer disc diffusion method.

Materials and Methods

The study was carried out in department of Microbiology, VIMS ballari for a period of 6 months from January 2016 to June 2016.

A total of 74 clinically significant CONS isolated from pus, urine, blood, sputum and ear swabs. The isolates were identified as CONS by colony morphology, Gram stain, catalase test and coagulase test (slide and tube coagulase). Bacitracin susceptibility was performed to exclude *Micrococci* and *Stomatococcus* species (Singh *et al.*, 2008).

After confirming the isolates as CONS, species-level identification was performed by simple, non-expensive conventional methods. These include the ornithine decarboxylase test, nitrate reduction test, Voges-Proskauer test, urease test and fermentation of sucrose, lactose, maltose, mannose, mannitol, xylose and trehalose. Susceptibility to novobiocin and polymyxin B was performed as per the standard procedure (Washington *et al.*; Patricia; Collee *et al.*) and antibiotic sensitivity testing was also carried out by Kirby-Bauer's disc diffusion method according to CLSI guidelines (2016).

Identification of CONS by simple scheme (Washington *et al.*; Patricia; Collee *et al.*).

Results and Discussion

Among the 74 isolates, *S. epidermidis* was the most common species isolated, seen in 29.7%, followed by *S. hemolyticus* (20.2%), *S. saprophyticus* (14.8%), *S. lugdunensis* (13.5%), *S. capitis* (10.8%), *S. cohnii* (4%), *S. schleiferi* (2.7%), *S. xylosus* and *S. hominis* (1.3% each).

Most of the isolates showed resistance to penicillin (83.7%) followed by Ampicillin (77%), Erythromycin (54%), Cotrimoxazole (27%), gentamicin (16%), amikacin (12%), piperacillin/tazobactam and linezolid (3% each).

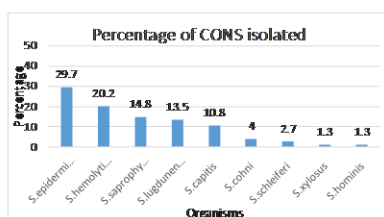
Although the pathogenic role of CONS is now well established, the clinical significance of

the various species is still being defined. We should not disregard any of the organisms until their clinical significance is resolved. In the hospital microbiology laboratory, non-aureus isolates are simply reported as CONS without speciation. Because there is increasing pathogenicity of these organisms, CONS should be identified to the species level by simple, reliable and preferably inexpensive methods (Usha *et al.*, 2013).

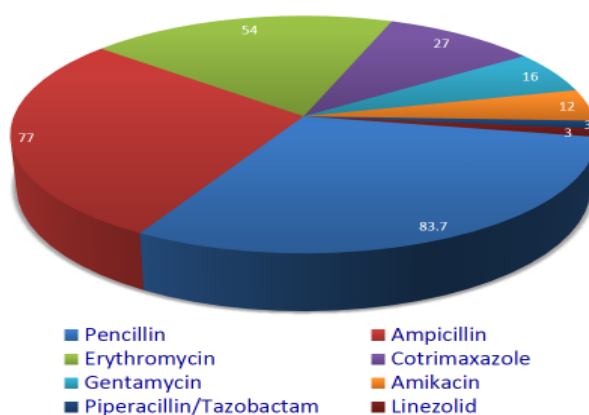
In our study among 74 isolates of CONS, *S. epidermidis* is the most frequent isolate (29.7%), followed by *S. hemolyticus* (20.2%), *S. saprophyticus* (14.8%), *S. lugdunensis* (13.5%), *S. capitis* (10.8%), *S. cohnii* (4%), *S. schleiferi* (2.7%), *S. xylosus* and *S. hominis* (1.3% each), this study correlates with various other studies. In our study, most commonly isolated species is *S. epidermidis* (29.7%) which is similar to other studies as shown by Usha *et al.*, (2013) (32%), Golia *et al.*, (2015) (46.3%) and Rajyalakshmi Gunti *et al.*, (2016) (42%). The next common species in our study was *S. hemolyticus* (20.2%) similar results were seen in Usha *et al.*, (2013) (18%) and Rajyalakshmi Gunti *et al.*, (2016) (28%). But in other studies, it was *S. saprophyticus* that was the second most common species.

In present study the CONS infection was more common in males (48%) than females (36%), which is similar to other studies as well, as males (59%) and females (41%) as shown by Usha *et al.*, (2013) and males (64.9%), females (47%) shown by Golia *et al.*, (2015). When the different age groups were compared most common age group affected was between 30 and 50 years.

In this study, out of 74 isolates of CONS, 29 (39%) isolates from pus, 22 (29.7%) isolates from urine samples, 18 (24.3%) from sputum samples, 9 (12%) from blood samples, (6%) etc.



Percentage of antibiotic resistance from isolated CONS



Our study reported out of 22 *S. epidermidis* 8(36.3%) were isolated from sputum samples followed by 6(27.2%) from urine and 5(22.7%) from pus samples, but in a study by Shubhrasingh, Gopa Banaerjee *et al.*, out of 60 *S. epidermidis* isolates, 30(50%), were isolated from blood samples by 12(20%) from pus samples (Singh *et al.*, 2008).

In the present study, most of CONS showed resistance to penicillin (83.7%), followed by Ampicillin (77%), Erythromycin (54%), Cotrimoxazole (27%) gentamicin (16%), amikacin (12%) piperacillin/tazobactam and linezolid (3% each), no resistance to Vancomycin was seen in this study, most of CONS showed resistance to penicillin (83.7%), which is correlating with the studies by Golia *et al.*, (2015) (95.5%) and Rajyalakshmi Gunti *et al.*, (2016) (90%). As

well our study correlating with a study by Shubhrasingh, Gopa Banaerjee *et al.*, where antibiotic susceptibility testing showed maximum resistance to penicillin and ampicillin 80% and 38% strains showed resistance to oxacillin (Singh *et al.*, 2008). CONS, primarily *S. epidermidis* and *S. hemolyticus* are often resistant to multiple antibiotics and glycopeptides have been considered the drugs of choice for management of infections caused by these organisms (Silvia *et al.*, 1992) and in a study by Del's Alamo, Cereda *et al.*, (1999) showed that glycopeptide resistance is emerging among CONS isolate.

CONS have become the major cause of nosocomial blood stream infections as a result of combination of increased use of intravascular devices and an increase number

of hospitalised immune compromised patients. *S. epidermidis* and *S. hemolyticus* are the common isolates identified and CONS are often resistant to multiple antibiotics (penicillin, ampicillin, oxacillin and etc.) and glycopeptides have been considered as the drugs of choice for management of infections caused by these organisms.

The increased pathogenic potential and multiple drug resistance demonstrate the need to adopt simple, reliable and non-expensive methods to identify the species and determine the antibiotic resistant patterns. It will help the clinicians in treating the infections caused by CONS.

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