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STUDY OF SPECIATION OF COAGULASE NEGATIVE STAPHYLOCOCCI ISOLATED FROM CLINICAL SAMPLES

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ABSTRACT

Introduction: Staphylococci are one of the major groups of bacteria inhabiting skin, skin glands and mucous membranes of mammals. The genus staphylococcus currently composed of 53 recognised species and 28 sub species most of which are found only in lower mammals. Now the role of CoNS species in causing nosocomial infections has been recognised and well documented, especially for the staphylococcus epidermidis (SE). **Aims And Objectives:** To study speciation of Coagulase Negative Staphylococci (CoNS) isolated from various clinical samples at S.V.R.R.G.G. Hospital and Govt. Maternity Hospital, Tirupati. **Materials And Methods: Inclusion Criteria:** The clinical samples were collected from Pus and wound swabs of the patients, Urine from catheterised patients, Blood from septicaemia, PUO and endocarditis patients, Swabs from ear, conjunctiva, cervix, IV canula tips of the patients. **Exclusion Criteria:** Patients age less than 10 years and also patients who are not willing. **Results:** In this study, 124 strains of CoNS isolated from various clinical samples were analysed. The greater number of CoNS were isolated from the pus and wound swabs (33.9%), followed by urine (32.3%) and blood (21.8%). S. epidermidis was the predominant species (58.9%) among the different species of CoNS isolated followed by S. sapropohyticus (21.8%) and S. hemolyticus (15.3%). S. hominis and S. xylosus were isolated in 2 samples each and S. warneri was isolated from 1 sample. **Conclusion:** In this study, 124 strains of CoNS were isolated from various clinical samples. Among these greater number of isolates were from pus (42), followed by urine (40) and blood (27). S. epidermidis was the predominant species (58.9%), among the different species of CoNS isolated followed by S. saprophyticus (21.8%) and S. hemolyticus (15.3%). From pus and wound swabs (36/42), S. epidermidis was the predominant species.

KEYWORDS : Speciation, Coagulase Negative Staphylococci, Septicaemia, Swabs.

INTRODUCTION:

Staphylococci are one of the major groups of bacteria inhabiting skin, skin glands and mucous membranes of mammals. The genus staphylococcus currently composed of 53 recognised species and 28 sub species most of which are found only in lower mammals. The staphylococci most frequently associated with human infection are S. aureus, S. epidermidis and S. Saprophyticus. Other staphylococcus species may also be associated with human infection. S. aureus causes a wide range of major and minor infections in man and animals and is characterised by its ability to clot blood, by the action of its enzyme coagulase, hence called Coagulase Positive Staphylococcus. There are other species of staphylococci, which lack this enzyme and hence are called Coagulase Negative Staphylococci (CoNS).

CoNS species as a group constitute a major component of the normal microflora of humans[1]. Now the role of CoNS species in causing nosocomial infections has been recognised and well documented, especially for the staphylococcus epidermidis (SE). S. epidermidis has been documented as a pathogen in numerous cases of septicemia[2,3], endocarditis of native and prosthetic valves[4], intravenous catheter infections and CSF shunt infections[5], peritoneal dialysis catheter associated peritonitis, osteomyelitis, wound infections, vascular graft infections, mediastinitis and urinary tract infections. The infection rate has been correlated with the increase in the use of prosthetic and indwelling devices and the growing number of immunocompromised patients in the hospital. CoNS are a major cause of foreign body infections, by adhesion of bacteria to biomaterials.

In the past, CoNS were generally considered to be contaminants having little significance[6]. The need exists for accurate identification of CoNS, so that precise delineation of the clinical disease produced by this group of bacteria and their determination of the etiological agent can be accomplished[7].

AIMS AND OBJECTIVES:

To study speciation of Coagulase Negative Staphylococci (CoNS) isolated from various clinical samples at S.V.R.R.G.G. Hospital and Govt. Maternity Hospital, Tirupati.

MATERIALS AND METHODS:

Inclusion Criteria:

The following clinical samples were collected from the patients of S.V.R.R.G.G. Hospital and Govt. Maternity Hospital, Tirupati.

1. Pus and wound swabs.
2. Urine from catheterised patients.
3. Blood from septicaemia, PUO and endocarditis patients.
4. Swabs from ear, conjunctiva, cervix, IV cannula tips of the patients.

Exclusion Criteria:

1. Patients age less than 10 years.
2. Patients who are not willing.

Based on cultural characteristic features the strains resembling Staphylococcal characteristics were processed further to differentiate from micrococci by following tests.

1. Gram staining
2. Catalase test
3. Oxidation – fermentation test

With these tests micrococci were excluded and the staphylococcal strains were taken for studying, of which

Coagulase negative Staphylococci (CoNS) were confirmed by doing coagulase test.

RESULTS:

In this study, 124 strains of CoNS isolated from various clinical samples were analysed.

Table. 1. Specimen wise isolation of CoNS

S.No	Specimen	No. of CoNS samples	Percentage (%)
1	Pus and wound swabs	42	33.9
2	Urine	40	32.3
3	Blood	27	21.8
4	IV cannula & Urinary catheter tips	8	6.5
5	Cervical swabs	3	2.4
6	Conjunctival swabs	3	2.4
7	Oral swabs	1	0.8
	Total	124	100

The greater number of CoNS were isolated from the pus and wound swabs (33.9%), followed by urine (32.3%) and blood (21.8%).

Table. 2. Species incidence of CoNS

S.No.	Name of species	Total	Percentage (%)
1	S. epidermidis	73	58.9
2	S. saprophyticus	27	21.8
3	S. hemolyticus	19	15.3
4	S. hominis	2	1.6
5	S. xylosus	2	1.6
6	S. warneri	1	0.8
	Total	124	100

S. epidermidis was the predominant species (58.9%) among the different species of CoNS isolated followed by S. sapropohyticus (21.8%) and S. hemolyticus (15.3%). S. hominis and S. xylosus were isolated in 2 samples each and S. warneri was isolated from 1 sample.

DISCUSSION:

The Coagulase Negative Staphylococcus (CoNS) species as a group constitute a major component of the normal microflora of humans[1]. The infection rate has been correlated with the increase in the use of prosthetic and indwelling devices and the growing number of immunocompromised patients in hospitals.

In this study, all the CoNS isolated from the samples were speciated by doing the following tests.

1. Tests for production of enzymes:
a. Phosphatase test
b. Nitrate reduction test
c. Urease test
2. Tests for carbohydrate fermentation:
Lactose, Maltose, Sucrose, Mannitol, Mannose, Xylose, Trehalose.
3. Tests for slime production by:
Congo red agar medium

In this study, 124 strains of CoNS were isolated from various clinical specimens and analysed results were discussed below in detail and correlated with other studies.

Table. 1 show, in the present study majority of strains isolated were from Pus and Wound swabs (33.9%), followed by Urine (32.3%) and Blood (21.8%). The remaining were from IV cannula and Urinary catheter tips (6.5%), Cervical swabs (2.4%), Conjunctival swabs (2.4%) and oral swabs (0.8%).

Table. 2 shows that S.epidermidis (58.9%) was the predominant species isolated from all the specimens, followed by S. saprophyticus (21.8%) mainly isolated from urine samples and S. hemolyticus (15.3%) from blood samples. S. hominis and S. xylosus were isolated in 2 samples and S. warneri was isolated from one sample.

Rosana B.R. Ferreira et.al. in Brazil in 2003, studies 152 CoNS isolated from blood (47.4%), nostril (15.8%), surgical wounds (10.5%), urine (7.9%), catheter tips (2.6%) and other sites (15.8%). Species isolated were S. epidermidis (51.3%), S. hemolyticus (23%), S. hominis (5.9%) and S. saprophyticus (5.2%)[8].

U. Mohan and N. Jindhal et.al. at Amritsar in 2001, isolated 192 CoNS from urine (48.4%), pus (17.7%), drain tips / catheter tips/ IV cannulas (14.5%), blood (4.7%), Skin and conjunctival swabs (2.1%). Predominant species in their study were S.epidermidis (82.3%). S. saprophyticus was the second important species (15.6%) isolated mostly from urine specimens. Only 2 other species of CoNS were identified as S. cohini (1) and S. hemolyticus[9].

In this study specimen collection and species isolation were in close relation with studies of Rosana B.R.Ferreira et.al and U. Mohan et.al.

In the present study of 124 strains, 40 strains were isolated from urinary samples. Of them 26 (65%) were identifies as S. saprophyticus and 11 (27.5%) as S. epidermidis.

Jayanthi Pathak (1994) studied 106 strains. Out of which 20 strains were from urine samples, 18 strains (90%) were identified as S. saprophyticus and 2 as S. epidermidis [10].

U. Mohan et.al (2001) studied 192 strains. S. saprophyticus (15.6%) was the second important species isolated from urine specimens[9].

The present study correlated well with the studies of Jayanthi Pathak et.al and U. Mohan et.al.

The precise reason for UTI by S. saprophyticus remains obscure. Special predilection of S. Saprophyticus for production of urinary tract infection has been attributed to its urease positivity[10].

CONCLUSION:

In this study, 124 strains of CoNS were isolated from various clinical samples. Among these greater number of isolates were from pus (42), followed by urine (40) and blood (27). S. epidermidis was the predominant species (58.9%), among the different species of CONS isolated followed by S. saprophyticus (21.8%) and S. hemolyticus (15.3%). From pus and wound swabs (36/42), S. epidermidis was the predominant species. In urine sample S.Saprophyticus was the predominant species (26/40). From blood samples S. epidermidis and S. hemolyticus were the major species.

As a result of medical progress, mainly due to the use of invasive and indwelling medical devices, CoNS are now a major cause of nosocomial and health-care related infections. It is found globally that CoNS strains were increasingly becoming as the cause of hospital borne infections. So, there is increase need for study of speciation of CoNS to prevent and treat the hospital borne infections.

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