Epidemiological Survey of Skin Flora in Hospitalised Patient in a Tertiary Care Center

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ABSTRACT:
Background: The hospital environment is not only thronged by the HCW, PATIENTS, their attenders, visitors, but also their bacterial flora including the transient & resident flora. The commonest resident flora is the gram positive bacteria that include Staphylococcus & Micrococcus. These are occasionally isolated from pathogenic infections & seen as commensals & rarely seen as the cause of infection especially in an immune compromised patient.
Aims: To evaluate the skin flora of the inpatient at the time of admission, to check whether there was any alteration after the hospitalization of the patient, to correlate this skin flora with any infection that occurred during the hospital stay. To analyse & interpret the data synthesized from the above mentioned measures, to report the association of nosocomial infection in relation to the skin flora of the patient. Suggestion of remedial measures to treat & prevent the hospital acquired infections, in association with the skin flora.
Methods and Material: The willing patients were included in the study. Thus we had sixty patients for a period of one month. The bacterial colonies were interpreted, identified and tabulated. From each patient on a given day we collected three specimens. Subsequently on day II & V three swabs individually. So a total of 540 swabs were collected, from the 60 patients who participated in this study.
Results: 42 cultures of all the Palm swabs showed the presence of Micrococcii, 18 samples had a mixed growth of Micrococcii & Diphtheroides on the day of admission. On the V day the swabs were found to be sterile. Nasal Swabs (180 swabs) 30 swabs were positive for Staphylococcus aureus. On the V day 1 E.Coli persisted in 1 case there was no growth in the remaining samples. 44 cultures of the cubital fossa swabs grew Micrococcii, 8 was positive for Diphtheroides, 4 specimens had GNB, on day one on V day only one sample had a persisting E.coli. There was no nosocomial infections.
Conclusions: The study reveals the importance of microbial monitoring in relation to patients, community & hospital environment.

Keywords: Commensals, nosocomial infections, micrococcii

INTRODUCTION:
The hospital environment is not only thronged by the HCW, PATIENTS, their attenders, visitors, but also their bacterial flora including the transient & resident flora (1)
The skin is a milieu for controlled bacterial growth, it supports the growth of the commensal which protects the host from getting colonized from pathogenic bacteria, environmental factors, organism adherence. These factors help the host to have resident flora, which cannot be removed permanently, while the transient flora, vary from time to time & temporary (2)
The commonest resident flora is the gram positive bacteria that include Staphylococcus & Micrococcus (3)

These are occasionally isolated from pathogenic infections & seen as commensals & rarely seen as the cause of infection especially in an immunocompromised patient (4).

Therefore we undertook a study on the survey of the skin flora in hospitalized patients in our patients. The study was done with a view to analyse & interpret the incidence of nosocomial infections in our hospitalized patients with respect to their skin flora.

SUBJECTS AND METHODS:
The project was submitted to Institutional ethical committee & its approval was obtained. The patient’s consent was obtained after explaining the project. The willing patients were included in the study. Thus we had sixty patients for a period of one month, made up of 36 males & 24 females, with a ratio of 3:2. Patients were admitted in the various departments of the hospital: General Medicine:20, General Surgery:16, TBCD:12, Obstetrics & Gynecology:8, Orthopaedics:4.
Table 1: Distribution of cases with their clinical diagnosis and departments

<table>
<thead>
<tr>
<th>General Medicine(20)</th>
<th>General surgery(16)</th>
<th>Ortho(4)</th>
<th>OG(8)</th>
<th>TBCD(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myocardial infarction-2</td>
<td>Hernia-5</td>
<td>Fracture femur-2</td>
<td>ANC-2</td>
<td>PTB-4</td>
</tr>
<tr>
<td>Alcoholic cirrhosis-6</td>
<td>Appendicitis-6</td>
<td>Fracture Right both bones forearm-1</td>
<td>PID-3</td>
<td>COPD-4</td>
</tr>
<tr>
<td>T2DM-6</td>
<td>Acute tonsillitis-2</td>
<td>Rheumatoid arthritis-1</td>
<td>Hysterectomy-3</td>
<td>Pleural effusion-4</td>
</tr>
<tr>
<td>AGE with dehydration-2</td>
<td>Gastritis-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchial asthma-2</td>
<td>Balanitis-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUO-2</td>
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</tbody>
</table>

Three samples were taken from each individual patient on 3 days: the day of admission, II & v day of admission. The sites for swabbing were: palms, anterior nares & cubital fossa. These swabs were collected separately & enclosed in sterile test tube, duly labelled & transported to the Microbiology lab with a requisition form with patient’s details for further processing.

In the Microbiology lab the three swabs were inoculated separately in Macconkey agar, Blood agar & Chocolate agar, incubated at 37°C, 24hrs. If there was no growth, it was further incubated for the next 24 hrs, if no growth found, at the end of 48 hrs, the culture was reported negative. Otherwise depending on the nature of the growth, the necessary biochemicals & sensitivity was done as per NCCLS guidelines. (5).

The bacterial colonies were interpreted, identified and tabulated. From each patient on a given day we collected three specimens. Subsequently on day II & V three swabs individually. So a total of 540 swabs were collected, from the 60 patients who participated in this study.

Results:

The cultures of all the Palm swabs (180 in no) 42 showed the presence of Micrococci, 18 samples had a mixed growth of Micrococci & Diphtheroides on the day of admission. On the second day of admission, there was the positive growth in the palm in 34 patients with Micrococci; on the V day the swabs found to be sterile.

Nasal Swabs (180 swabs) 30 swabs were positive for Staphylococcus aureus (MSSA), 25 samples showed the presence of Micrococci, 2 samples had Enterococcus species, 3 swabs grew Diphtheroides, on the first day. The second day swab of the anterior nares showed the growth of Staphylococcus aureus (MSSA) in 17 cases. Persistence of Enterococcus was seen in 2 cases. The third swab collected on V day proved to be negative.

Growth of the Cubital fossa from another 180 specimens exhibited the following bacterial profile: 44 cultures grew Micrococci, 8 samples had Diphtheroides, 4 samples had Enterococcus species and 4 samples had GNB (2 E.coli and 2 Klebsiella pneumoniae) on the first day. The second day specimen sampling showed the presence of Enterococcus alone in 3 cases, 2 E.coli persisted, the rest becoming sterile. On the V day 1 E.Coli persisted in 1 case there was no growth in the remaining samples.

Table 2: Depiction of the bacterial profile on the three day sampling of the inpatients

<table>
<thead>
<tr>
<th>PALM SWABS (N=180)</th>
<th>NASAL SWABS (N=180)</th>
<th>CUBITAL FOSSA(N=180)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I day (n=60)</td>
<td>II day (n=60)</td>
<td>V day (n=60)</td>
</tr>
<tr>
<td>42 Micrococci</td>
<td>34 Micrococci</td>
<td>No Growth</td>
</tr>
<tr>
<td>18 Micrococci</td>
<td>26 Micrococci</td>
<td>No Growth</td>
</tr>
<tr>
<td>and Diphtheroides</td>
<td>2 Enterococcus</td>
<td>No Growth</td>
</tr>
</tbody>
</table>

The palm isolates which had Micrococci in 70% of the samples on day one became culture sterile on the fifth day, the anterior nares showed the presence of Staphylococcus aureus in 50% of samples, 41% showed
the detection of Micrococi. negligible growths were Enterococci & Diptheroides. The Cubital fossa specimens had 73.3% of Micrococi, 13% of Diptheroides, 6.5% of Enterococci & 6.5% of GNR.

DISCUSSION:

Swabs were taken from the cubital fossa, anterior nares & palms, as these were the areas which are highly colonized with microbes & come in contact with the environment more commonly.

The analysis showed that commonest isolate was Micrococi -61.66%, Staphylococcus aureus 16.6%, Diptheroides -6.1% , Enterococcus, -3.3%, Gram negative bacilli-2.2%, Mixed growth:10%.

The study shows that the commonest bacteria was Micrococi, present in the Palms & cubital fossa of the patients not only on the day of admission but also on the II day after admission (34 cases), these patients did not have any nosocomial infections as proved by the careful clinical & laboratory examination by the clinician concerned. Hence it was proved to be a commensal & not a pathogen. These organisms were differentiated by the standard lab techniques from Staphylococcus (6).

All the 30 isolates of Staphylococcus aureus were MSSA. Enterococcal isolates were sensitive to Aminoglycosides, Ampicillin, Vancomycin. E.coli & K. pneumoniae were sensitive to the third generation cephalosporins, Imipenem.

The presence of Micrococi in our study did not pose any threat to us, as it proved to be a commensal/ contaminant. It is more closely related to gram positive genus Arthobacter than to Staphylococcus (7). They are found in environment & mammals as transient flora.(8). Occasionally isolated from human clinical specimen as pathogen /opportunistic agents in immunocompromised patients,as they are reported as causes of pneumonia, meningitis, septic arthritis, peritonitis.(9).

The second post admission day sampling of the patients revealed the persistence of the same microbe: Micrococi, not associated with any infections. The other associated isolates were Diptheroides, the other common skin flora. The presence of Enterococci, E.coli & K. pneumonia was corobarative with their personal hygienic habits. As these are commensals of the large bowel of the human beings.

The third analysis which had samples taken on V day of admission, showed 99% no growth, this is due to the antibiotic therapy given to the patients to which they were sensitive. only one case had E.coli, this was attributed to the faulty hygienic habits of the patient.

The microbial monitoring of the patients has several advantages:(1) to understand the microbial flora of the patient at the time of admission –to correlate with community acquired infections,(2) after admission to have a close monitoring on the bacterial flora pattern , for its alteration/ deletion/addition, which can become a forerunner for nosocomial infections.

Our study was not associated with any of the nosocomial infections & added bacterial flora. This can be explained by the location & nature of the services rendered by our hospital!! Our hospital is situated in a rural area & never permits over the counter drug dispensing; there is an effectively functioning Infection control committee, Pharmacy Drug committee, regular teaching programmes on health education.

CONCLUSION:

The study reveals the importance of microbial monitoring in relation to patients, community & hospital environment. Though we came across sensitive organisms & commensals, such monitoring is a must for preventing any hospital acquired infections, upgrading of infection control practices & reducing the mortality & morbidity of the hospitalized inpatients!! All divisions of health care area should enforce their optimum rules & regulations & explicit knowledge in bringing out zero % nosocomial infection rate!!!

As prudent Microbiologists we should remember: not only bacteria but also happiness multiplies by dividing!!

A HEALTHY MIND IS A HAPPY MIND!!!!

REFERENCES:

