STUDY OF MRSA ISOLATED FROM ULTRASONOGRAPHY PROBES WITH REFERENCE TO ANTIBIOTGRAM.

Dr. Abhijit Awari1, Dr. Tejas Tamhane2 and Dr. Sushil Kachewar3

1Professor and Head, Microbiology, PDVVPFS Medical College, Ahmednagar (MH), India.
2Second Year PG Student, Dept of Radiology, PDVVPFS Medical College, Ahmednagar.
3Professor, Radiology, PDVVPFS Medical College, Ahmednagar.

*Correspondence for Author: Dr. Abhijit Awari
Professor and Head, Microbiology, PDVVPFS Medical College, Ahmednagar (MH), India

ABSTRACT
Ultrasound machines are ideal vectors for cross infections. A busy machine may be used to scan many patients a day. The infection can be transmitted via ultrasound probes and coupling gel. Staphylococcus aureus is a frequent cause of infection in both community and hospital. MRSA isolated from US probe is an important nosocomial pathogen and infections due to it are difficult to manage due to resistance to multiple antibiotics. So this study aimed to determine the percentage of MRSA isolated from US probes and to determine the antibiotic sensitivity pattern.


INTRODUCTION
A busy ultrasonography machines are ideal vectors for cross infections.[1] Many studies has shown that US probes are ideal vector for transmitting pathological organisms from one patient to other patients unless there is effective cleaning methods.[2,3,4,5,6,7,8,9]

Infections can be transmitted by US probes coupling gel. Connection cord comes in contact with patients’ skin and patient’s skin can harbor many bacteria for longer periods.[10,11] Staphylococcus aureus is one of the most commonest human bacterial pathogen capable of causing a wide range of infections. During invasive procedures and in other institutional settings.[12] Emergency MRSA becomes global problem with worse outcomes, increase treatment cost and increase mortality.[13] Present study is therefore carried out to determine the degree of MRSA contamination on ultrasound probes and also to determine the antibiotic sensitivity pattern of the isolates.

MATERIAL AND METHOD
Prospective observational study was carried out in department of microbiology PDVVPFS medical college, Ahmednagar from Aug 2015 to Dec 2015. Total 220 swabs were taken randomly from unclean US probes of patients attending the radio diagnostic department. After ultrasound was carried out specimens were sending to microbiology laboratory. Gram stain of swab was done followed by culture on blood agar, Mannitol salt agar at 37°c for 24 hrs.

All the strains are identified as S.aureus by their colony morphology, Gram staining, catalase and coagulase test (both tube and slide test).[14] Total 60 staphylococcus aureus were isolated from unclean US probes out of 220 specimens. Methicillin resistance was detected by using cefoxitin disc diffusion method (zone size < 21mm was considered cefoxitin resistance and MRSA). Antibiotic sensitivity was done by Kirby bauers disc diffusion method as per CLSI guidelines.[15] The antibiotics used in this study was procured from Himedia company; AK (30ug), ceftriaxone (30ug), cefoxitin (30ug), ciprofloxacin (5ug), cloxacillin (30ug), clindamycin (2ug), cotrimaxazole (25ug), Erythromycin (15ug), Gentamycin (10ug), penicillin (10 unit) Teicoplanin (30ug), vancomycin (30ug) Amoxy+clavulanic acid (20-10ug) Linozolid (30ug).

RESULTS
Table 1 shows Out of 220 specimens taken from unclean US probes 60 (27.7 %) were staphylococcus aureus, amongst them 21 (35%) are turned out to be MRSA.

Table 2 shows amongst 60 isolated staph aureus 21 (35%) were MRSA as detected by resistance to cefoxitin.

Table 3 shows, resistant to penicillin was 71.9% where as all isolates were sensitive to vancomycin and Amikacin, Amongst MRSA isolates 42.9% were resistant to erythromycin and Gentamycin. All MRSA sensitive to teicoplanin, vancomycin, Amikacin.
A significantly higher number of bacteria were identified in this study in the US probe before they were cleaned, highlighting the importance of proper cleaning of the probe before applying to other patient. An unclean ultrasonographic probe may become source of bacteria for next patients and may lead to nosocomal infections.\footnote{16}

**DISCUSSION**

This study detected 60 (27.7%) staph aureus from 220 random specimens from US probe. out of 60 staph aureus 21(35%) were MRSA.

In a study conducted by Matter\footnote{16} the isolation of staph aureus from US probe and probe holder was (2.7%) . from keyboard was (8.1%). All the strains of staph aureus were fully sensitive to all antibiotics used in our study staph aureus was sensitive to vancomycin, Amikacin, Amongst MRSA 52% were resistant to Erythromycin,41% to Gentamycin. All MRSA were100% sensitive to tecoplanin, Vancomycin, Amikacin. Ultrasound probes can be potential source of nosocomal infections which act as a vectors for transmitting staph aureus which is particularly risky for immunocompromised patients\footnote{13,16}.

A study by shokohi et al\footnote{17} quoted that MRSA is the most prevalent organism in the community and there transmission would have significant impact on patients.

Fraze et al\footnote{18} reported 5 MRSA in his study. On bacterial contamination of US probes. Ohara et al\footnote{10} quoted that staph aureus survived in the transmission medium longer than in water, they further added that staph aureus was most resistant to ultrasonic medium than other bacteria.

Unmit sarvasci et al in their study found that 18 CONS were grown from probe on random sampling: Ohart et al\footnote{11} found that USG probes are potential source of MRSA. Kellu et al\footnote{19} found in their study growth of Gram positive bacteria up to 22.6%. Muradeli et al\footnote{2} in their study also found the growth of staph aureus from US probes.

The prevalence of staph aureus infection vary from place to place and so also the resistant pattern, which depends on antibiotic policy, infection control activities, number of cases \footnote{20,21}

Increase prevalence of MRSA is due to lack of sufficient knowledge on the danger of the wrong use of antibiotics, high number of immunocompromised patients, increase invasive procedures and inadequate infection control measures.

Muradeli et al\footnote{2} concluded that single paper probe cleaning was effective as immersion in chlorhexidine which reduce the bacterial contamination.

Spencer and Spencer et al\footnote{5} also concluded that alcohol wipe can reduce transmission of bacteria from US probe. Similar recommendations were given by yasemin et al\footnote{13}.

**CONCLUSION**

It has been found that MRSA isolated from US probe is an important nosocomal pathogen and infection due to it can be hazardous. MRSA can be transmitted by ultrasonographic probes and coupling gel, it is highly recommended that ultrasound departments must revive their probe cleaning and sterilization procedures to assess whether they are a safe in particular environment. And practitioners should ensure that risk of cross infection should minimize. Applying simple cleaning methods can prevent nosocomal infections from ultrasound probes. Special infection control measures should also be taken in high risk group of patients.

**REFERENCES**


---

**Table 3. Percentage of Staph aureus isolated from specimens.**

<table>
<thead>
<tr>
<th>Specimens</th>
<th>Staphylococcus aureus</th>
<th>Other bacteria</th>
<th>No growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>60(27.7%)</td>
<td>40 (18%)</td>
<td>120 (54.4%)</td>
</tr>
</tbody>
</table>

**Table 2. Percentage of MRSA isolated from specimens.**

<table>
<thead>
<tr>
<th>Staphylococcus aureus</th>
<th>MRSA</th>
<th>MSSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>21 (35%)</td>
<td>39 (65%)</td>
</tr>
</tbody>
</table>

MRSA – Methicillin resistant staphylococcus aureus.
MSSA – Methicillin sensitive staphylococcus aureus.

**Table 3. Antibiotic Resistance pattern of the isolates.**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Staphylococcus aureus</th>
<th>MRSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>71.9%</td>
<td>82%</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>Amikacin</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>56%</td>
<td>52%</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>12%</td>
<td>20%</td>
</tr>
<tr>
<td>Cotrimoxazole</td>
<td>67%</td>
<td>65%</td>
</tr>
<tr>
<td>Amox/Clave</td>
<td>40%</td>
<td>38%</td>
</tr>
<tr>
<td>Linzolid</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Azitromycin</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Cefoxitin</td>
<td>35%</td>
<td>100%</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>65%</td>
<td>70%</td>
</tr>
</tbody>
</table>
15. Clinical & Laboratory standards institute (CLSI). Performance standard for antimicrobial susceptibility testing 21st informational supplement, 2011; 31(1).