



**STUDY OF MRSA ISOLATED FROM ULTRASONOGRAPHY PROBES WITH
REFERENCE TO ANTIBIOGRAM.**

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ABSTRACT

Ultrasonography 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.

KEYWORDS: Ultrasonography, US probes, MRSA, Antibiogram.

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 37⁰c 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 bauer's 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) Linzolid (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.

Table 3. Percentage of Staph aureus isolated from specimens.

Total specimens	staphylococcus aureus	Other bacteria	No growth
220	60(27.7%)	40 (18%)	120 (54.4%)

Table 2. Percentage of MRSA isolated from specimens.

Total staphylococcus aureus	MRSA	MSSA
60	21 (35 %)	39(65%)

MRSA –Methicillin resistant staphylococcus aureus.

MSSA –Methicillin sensitive staphylococcus aureus.

Table 3. Antibiotic Resistance pattern of the isolates.

Drug	Staphylococcus aureus	MRSA
Penicillin	71.9%	82%
Gentamycin	42	41
Amikacin	20%	0%
Erythromycin	56%	52%
Clindamycin	12%	20%
Cotrimoxazole	67%	65%
Amox/Clave	40%	38%
Linolid	2%	3%
Vancomycin	0%	0%
Azithromycin	25%	20%
Teicoplanin	0%	0%
Cefoxitin	35%	100%
Ciprofloxacin	65%	70%

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.^[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 nosocomial infections which act as a vectors for transmitting staph aureus which is particularly risky for immunocompromised patients.^[13,16]

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 sonographic probe may become source of bacteria for next patients and may lead to nosocomial infections.^[16]

Study by shokohi et al ^[17] quoted that MRSA is the most prevalent organism in the community and there transmission would have significant impact on patients.

Fraze et al ^[18] reported 5 MRSA in his study. On bacterial contamination of US probes. Ohara et al ^[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.

Umit sarvasci et al in their study found that 18 CONS were grown from probe on random sampling; Ohart et al ^[11] found that USG probes are potential source of MRSA. Kellu et al ^[19] found in their study growth of Gram positive bacteria up to 22.6 %. Muradeli et al ^[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 .^[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 ^[2] concluded that single paper probe cleaning was effective as immersion in chlorhexidine which reduce the bacterial contamination.

Spencer and Spencer et al ^[5] also concluded that alcohol wipe can reduce transmission of bacteria from US probe. Similar recommendations were given by yasemin et al.^[13]

CONCLUSION

It has been found that MRSA isolated from US probe is an important nosocomial 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 nosocomial infections from ultrasound probes. Special infection control measures should also be taken in high risk group of patients.

REFERENCES

1. Chariotte Fowler, Diane McCracken, US probes risk of cross infection and ways to reduce it-comparison of cleaning methods of radiology, 1999; 213; 299-300.

2. Muradali D, Gold WL, Phillips A, Wilson S, Can ultrasound probes & coupling gel is a source of nosocomial infection in patients undergoing sonography? An in vivo & in vitro study. *AJR Am J Roentgenol*, 1995; 164: 1521-4.
3. Gaillot O, Maruejols C, Abachin E, Lecuru F, Arlet G, Simonet M, Et al. Nosocomial outbreak of *Klebsiella Pneumoniae* producing ESBL originating from contaminated Sonography coupling gel. *Journal clin Micro.*, 1998; 36: 1357-60.
4. Kartaginer R, Pupko A, Tepler C. Do Sonographers practice proper infection techniques. *J. Diagn Med. Sonogr*, 1997; 13: 282-7.
5. Spencer P, Spencer RC. Ultrasound scanning of post operative wounds risk of cross infections. *clin Radio* 1988; 39: 245-6.
6. Tesch C, Froschle G, Sonography machines as a source of infections *AJR Am J Roentgenol*, 1997; 168; 567-8.
7. Rutala WA, Gergen MF, Weber DJ. Disinfection of probe used in Ultrasound guided prosted biopsy. *Infect control Hosp Epidemiol*, 2007; 28: 916 – 9.
8. Gillespie JL, Arnold KE, Noble-Wang J., Jensen B, Arduino M, Hageman J, et al. Outbreak *pseudomonas aeruginosa* infection after transrectal ultrasound – guided prostate biopsy. *Urology*, 2007; 69: 912-4.
9. Aylirffe G, Babb J, Taylor L. Cleaning, Disinfection or sterilization? *Hospital acquired infections*. 3rd ed Arnold, 2001; 1448.
10. Ohara T, Itoh Y. Ultrasound Instruments as possible vectors of staphylococcal infections. 40(1); 73. *Journal of Hospital infection*, 1998; 40(1): 73-7.
11. Ohara T, Itoh Y. Contaminated ultrasound probes possible source of nosocomial infections of hospital infection, 1999; 43(1): 73.
12. Foster T J The staphylococcus aureus superbug. *J. Clinical invest*, 2004; 114: 1693-1696.
13. Yasemin MK, Karadeniz MD, Dilek KSimay KA, Deniz A, Sefik G. Evaluation of the role of ultrasound machine as a source of nosocomial and cross infections, *Investigative radiology*, 2001; 36(9): 554-559.
14. Mackie and McCartney, *Textbook of practical medical microbiology*, 14th Edition, Elsevier publication, 2006; 131-150.
15. Clinical & Laboratory standards institute (CLSI). Performance standard for antimicrobial susceptibility testing 21st informational supplement, 2011; 31(1).
16. Matter E H, Hamed L F, Ahmed D, El kersh.an investigation of bacterial contamination of ultrasound equipment at university hospital in Southy areabia. *JCDR*, 2010; 4: 2685-2690.
17. Shokoo, Armstrong P, Tansek R. Emergency department us probe infection control challenges and solution. *Open access emergency medicine*, 2015; 7: 1-9.
18. Frazee B W, Fahimi J, Lambert L, Nagdev A. Emergency department, ultrasonographic probe contamination and experimental model of probe disinfection, *Ann Emerg Med.*, 2011; 58(1): 56-63.
19. Kelly Chu, Harod obeid, Paul Babyn, Joseph Blondeau. Bacterial contamination of US probes at tertiary referral university medical center. *AJR*, Nov 2014; 203; 928-932.
20. Mallick S K, Basak S, MRSA too many hardels to overcome; a study from central India, *Trop Doct*, 2010; 40: 108-10.
21. Asghar A H, Momemenah AM .Methicillin resistance among staphylococcus aureus isolates from Saudi hospitals. *Med.*, princ 2006.