

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Mona Z Zaghloul*

Microbiology Unit, Department of Clinical Pathology, Ain Shams University Hospitals, Cairo, Egypt

*Corresponding author: Zaghloul MZ, Microbiology Unit, Department of Clinical Pathology, Ain Shams University Hospitals, Cairo, Egypt, Tel: 02-24023494; E-mail: monazaki_810@hotmail.com

Rec date: Apr 07, 2016; Acc date: Apr 08, 2016; Pub date: Apr 16, 2016

Copyright: © 2016 Zaghloul MZ, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Zaghloul MZ (2016) Methicillin-resistant *Staphylococcus aureus* (MRSA). J Med Microb Diagn 5: e131. doi:10.4172/2161-0703.1000e131

Editorial

Methicillin-resistant *Staphylococcus aureus* (MRSA) infections have become a global health problem particularly in hospital setup causing simple skin infections to life-threatening infections. It may lead to serious complications, such as pneumonia, septicemia, arthritis and osteomyelitis [1].

MRSA was isolated from pus, urine, breast discharge, blood culture, cerebrospinal fluid, and ascetic fluid [2]. The extensive use of antibiotics over the last 50 years has led to the emergence of bacterial resistance and to the dissemination of resistance genes among pathogenic organisms [3]. In addition, since few cells in a population might actually express resistance, these heterogeneous strains can evade detection in standard susceptibility test systems [4,5].

During the 1980s, MRSA started to constitute a wide spread human health concern [6] besides its importance as a nosocomial pathogen [7-9].

MRSA is primarily mediated by the over production of penicillin-binding protein 2a (PBP2a) with low affinity for beta-lactam antibiotics [10]. The *mecA* gene is part of a 21 kb to 60 kb staphylococcal chromosome cassette *mec* (SCCmec), a mobile genetic element that may also contain genetic structures as *Tn554*, *pUB110*, and *pT181* which encode resistance to non- β -lactam antibiotics [11]. The *mecA* gene which encodes PBP2a is considered a useful molecular marker of putative methicillin resistance in *S. aureus*. *S. aureus* strains have a tendency to accumulate additional resistance determinants, resulting in the formation of multiple-antibiotic resistant MRSA strains which are creating therapeutic problems and limiting the choice of therapeutic options [12].

Accurate and rapid identification of MRSA is essential for effective antimicrobial chemotherapy. Numerous approaches that improve turnaround time for the identification of MRSA have been described such as: fluorescence tests [13], PCR assays [14], or penicillin-binding protein 2a (PBP2a) antibody agglutination tests [15]. Molecular methods for detecting resistance valuable infection-control tools by rapid and accurate identification of Staphylococci and their resistant types. Thus help in confirming patients infected by resistant bacteria. Clearly rapid detection of a specific resistance mechanism in a molecular test would allow clinicians initially to avoid potentially inappropriate treatment options [16]. In recent years, detection of *mecA* by PCR is considered the gold standard for identification of MRSA [17].

References

- Mohammad RS, Javad A, Alireza S (2013) Antibiotic Susceptibility of *Staphylococcus aureus* in isolates of the patients with World. J Med Sci 9: 180-183.
- Green-top Guideline No.64b-The Royal College of Obstetricians and Gynecologists. Bacterial sepsis following pregnancy, April 2012.
- Álvarez MS, Hernández PX, Martín CF (2000) Glycopeptide resistance in Enterococci. Int Microbiol 3:71-80.
- Matthews PR, Stewart P R (1984) Resistance heterogeneity in methicillin-resistant *Staphylococcus aureus*. FEMS Microbiol Lett 22: 161-166.
- Skulnick M, Simor AE, Gregson D, Patel M, Small GW, et al. (1992) Evaluation of commercial and standard methodology for determination of oxacillin susceptibility in *Staphylococcus aureus*. J Clin Microbiol 30: 1985-1988.
- Brakstad OG, Aasbakk K, Maeland JA (1992) Detection of *Staphylococcus aureus* by polymerase chain reaction amplification of the *nuc* gene. J Clin Microbiol 30:1654-1660.
- Brumfitt W, Hamilton-Miller JM T (1989) Methicillin-resistant *Staphylococcus aureus*. New Engl J Med 320:1188-1196.
- Hackbarth C J, Chambers H F (1989) Methicillin – resistant Staphylococci : Detection methods and treatment of infections. Antimicrobe Agents chemother 33: 995-999.
- Jones RN, Barry AL, Gardiner RV, Packer RR (1989) The prevalence of staphylococcal resistance to penicillinase-resistant penicillins. A retrospective and prospective national surveillance trial of isolates from 40 medical centers. Diagn Microbiol Infect Dis 12: 385-394.
- Wielders CLC, Fluit AC, Brisse S, Verhoef J, Schmitz FJ (2002) *mecA* Gene Is Widely Disseminated in *Staphylococcus aureus* Population. J Clin Microbiol 40: 3970-3975.
- Ito T, Hiramatsu K (1998) Acquisition of methicillin resistance and progression of multiantibiotic resistance in methicillin-resistant *Staphylococcus aureus*. Yonsei Med J 39:526-533.
- Perez-Roth E, Claverie-Martin F, Villar J, Mendez-Alvarez S (2001) Multiplex PCR for Simultaneous Identification of *Staphylococcus aureus* and Detection of Methicillin and Mupirocin Resistance. J Clin Microbiol 39: 4037-4041.
- Qadri SM, Ueno Y, Imambaccus H, Almodovar E (1994) Rapid detection of methicillin-resistant *Staphylococcus aureus* by Crystal MRSA ID System. J Clin Microbiol 32:1830-1832.
- Deplano A, Struelens MJ (1998) Nosocomial infections caused by staphylococci. Methods Mol Med 15:431-68.
- Nakatomi Y, Sugiyama J (1998) A rapid latex agglutination assay for the detection of penicillin-binding protein 2. Microbiol Immunol 42:739-743.
- Woodford N, Sundsfjord A (2005) Molecular detection of antibiotic resistance. when and where? J Antimicrob Chemother 56:259-261.
- Bhutia KO, Singh ST, Biswas S, Adhikari L (2012) Evaluation of phenotypic with genotypic methods for species identification and detection of methicillin resistant in *Staphylococcus aureus*. Int J App Basic Med Res 2: 84-91.