Genotypic and Phenotypic characterization of Methicillin Resistant Staphylococcus aureus from ocular isolates and its clinical correlation

INTRODUCTION:

MRSA,a versatile and dangerous pathogen,first identified in the 1960s, was traditionally associated withhealthcare facilities.Now it is also a dominant pathogen incommunity-associated infections. It has a high rate of morbidity and mortalitybecause of its multiple drug resistance resulting in limited treatmentoptions and its increasing prevalence. Colonizing staph can cause serious conditions such as abscesses, osteomyelitis, staphylococcal pneumonia, septicemia, toxic shock syndrome and endocarditis. In the eye, *it can* cause preseptal and orbital cellulitis, lid abscess, conjunctivitis, corneal ulcers, endophthalmitis and blebitis.MRSA can be either hospital acquired(HA) or community acquired(CA). The *mecA* gene in these strains encodes the altered protein PBP2A which shows resistance to methicillin.This gene resides on the Staphylococcal cassette chromosome(*SCCmec*). Differences in virulence factors between HA-MRSA and CA-MRSA organisms may allow the community strains to spread more easily compared with the traditional hospital-based MRSA strains.

Aim:

To analyze clinical features, prevalence, molecular typing and antibiotic susceptibility of MRSA in ocular infections.

Materials & Methods:

MRSA isolates were collected over a period of one year from patients presenting with various ocular infections.Antibiotic susceptibility was done by disc diffusion method. Staphylococcal cassette chromosome (SCC) mec typing was done by PCR.The phenotypic and genotypic charecteristics were correlated with the clinical manifestations.

Results:

Of 136 staphylococcus aureus isolated, 34(25.3%) were MRSA. SCC mec typing was done for all 34 strains. 30(88.2%) belonged to community acquired strains (type IV and V) ,2 were hospital acquired strains and 2 were not typeable. Orbital infections were caused by both types IV and V while corneal and scleral infections were mainly caused by type V. All were sensitive to vancomycin and chloramphenicol , 70% were sensitive to Cefazolin, 28% to gatifloxacin,ofloxacin and levofloxacin ,17% to gentamycin,14% to tobramycin and 6% to Moxifloxacin.None of the isolates were sensitive to ciprofloxacin.

Demographics

Total patients	34	
Age	2 months – 78 years	
	n	%
Male	19	55.81
Female	15	44.19
Laterality		
Unilateral	31	88.24
Bilateral	3	11.76

Clinical diagnosis of patients with MRSA infection

Clinical Details	**No**	**%**
1.Orbit		
Dermis fat graft infection post evisceration	1	2.9%
Suture Infection post DCR	1	2.9%
Orbital cellulitis and corneal inflitration	1	2.9%
Sling infection	1	2.9%
Socket infection post exentration	1	2.9%
Lacrimal Abscess	4	11.7%
Acute dacryocystitis	1	2.9%
2.Lid		
Preseptal Cellulitis	1	2.9%
Lid abscess	9	26.4%
Blepharities	1	2.9%
3.Sclera		
Scleral Abscess	1	2.9%
Necrotizing scleritis	1	2.9%

Infectious Nodular Scleritis	1	2.9%
4.Cornea		
Corneal inflitration	1	2.9%
Suture infection	1	2.9%
Exposure keratitis due to lagophthalmos	1	2.9%
Neurotropic keratitis	1	2.9%
Graft infection	1	2.9%
Corneal ulcer	2	5.8%
Moorens ulcer	1	2.9%
Corneal graft	1	2.9%
5.Endophthalmitis	1	2.9%
Total	34	100%

Identification of MRSA	Sensitive (n)	Resistant (n)
Oxacillin disc diffusion	0	34
Cefoxitin disc diffusion	0	34
Confirmation of MRSA	Positive (n)	Negative(n)
PCR for MecA	34	0

Charecterization of MRSA:		n	%
SCC Mec typing	Type 1	0	0
	Type 2	0	0
	Type 3	2	11.76
	Type 4	10	29.3
	Type 5	20	58.8
Not typeable		2	11.76

Antibiotic susceptibility

Antibiotic	Sensitivity
Moxifloxacin	6%
Levofloxacin	28%

Gatifloxacin		28%
Ofloxacin		28%\
Cefazolin		70%
Chloramphenicol		100%
Vancomycin		100%
Gentamycin		17%
Tobramycin		14%
Surgical Intervention	n	%
Keratoplasty	2	6.67
Tarsorraphy	2	6.67
Vitrectomy	1	3.45
Incision&Drainage	17	77.27
Scleral debridement	1	3.45
Dacryocystorhinostomy	2	6.67
Suture removal	1	3.45%
Visual outcome		
Improved	23	69.7
Same	7	21.21
Worsened	3	9.09

Cause for defective vision

Anophthalmos	1
Central retinal vein occlusion	1
Graft failure	1
Media opacity	1
Traumatic optic neuropathy	1

Conclusion:

Ocular infections are predominantly caused by Community acquired strains.

They are resistant to commonly used fluroquinolones.

Vancomycin and chloramphenicol remain the drugs of choice.

Appropriate surgical intervention adds to better prognosis.