

Supplementary data

Strain	Ciprofloxacin/ Ofloxacin			Moxifloxacin			Cefuroxime			Gentamicin			Vancomycin/ Teicoplanin			Chloramphenicol		
	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²
1	0.25 / 0.19	S	S	0.023	S	S	1.5	na	S	0.125	S	S	1.0 / 0.38	S	S	3.0	S	S
2	0.19 / 0.38	S	S	0.047	S	S	2.0	na	S	0.5	S	S	1.0 / 0.25	S	S	4.0	B	S
3	0.125 / 0.19	S	S	0.032	S	S	1.5	na	S	0.25	S	S	1.5 / 0.25	S	S	3.0	S	S
4	0.25 / 0.38	S	S	0.047	S	S	0.25	na	S	0.064	S	S	1.5 / 0.25	S	S	2.0	S	S
5	0.19 / 0.38	S	S	0.032	S	S	2.0	na	S	0.38	S	S	1.5 / 0.75	S	S	4.0	B	S
6	0.19 / 0.38	S	S	0.032	S	S	1.5	na	S	0.5	S	S	1.5 / 0.5	S	S	4.0	B	S
7	0.38 / 0.38	S	S	0.023	S	S	1.5	na	S	0.25	S	S	1.0 / 0.25	S	S	4.0	B	S
Total susceptible (%):	100	100		100	100		na	100		100	100		100	100				100

Data are in milligrams per litre (mg/L). S = Susceptible; R = Resistant; B = Borderline (within stated antimicrobial corneal concentration range)

S¹: Susceptibility determined using known antimicrobial 1st quartile corneal concentrations. If the MIC is below the reported 1st quarter corneal concentration for that antimicrobial, then it is reasonable to expect the bacterial to be inhibited by that antimicrobial and the strain is reported as susceptible. Although the reported corneal concentrations of antimicrobials are high, the associated standard deviations are high, meaning that the concentrations are not consistent around the mean. Because the actual data is not available in the listed references, the first quartile concentration has been extrapolated from the reported mean and standard deviation unless the median was available. Data is not available in articles to check normality. The pharmacokinetics of antimicrobials in corneal ulceration is unknown, so caution is needed in extrapolating data. Reported 1st quarter corneal concentrations for the antimicrobials are as follows: ciprofloxacin: 2.40-3.71mg/kg (24), ofloxacin: 4.73-6.79mg/kg (24), moxifloxacin: 5.11-9.62mg/kg (24), cefuroxime: no available information in the literature, gentamicin: 12.71mg/kg (only reported in rabbit eyes (33)), vancomycin: 33.1mg/kg (53), teicoplanin: 7.6mg/L (n=20, 0mg/L in 9 patients) (54); chloramphenicol: 3.5-6.7mg/kg (concentrations only available for aqueous humor and no 1st quartile concentration available (32)).

S²: Susceptibility determined by the breakpoint defined by EUCAST (25). Topical breakpoints are available for ciprofloxacin (1mg/L), ofloxacin (1mg/L) and chloramphenicol (16mg/L). For the other antimicrobials, systemic breakpoints were used: moxifloxacin (0.25mg/L), cefuroxime susceptibility was inferred from ceftioxin disc testing, gentamicin (2mg/L), teicoplanin (2mg/L) and vancomycin (2mg/L).

Strain	Ciprofloxacin/ Ofloxacin			Moxifloxacin			Cefuroxime			Gentamicin			Vancomycin/ Teicoplanin			Chloramphenicol		
	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²
1	4.0 / 1.5	R / S	R / S	0.19	S	S	0.094	na	na	3.0	S	na	1.0 / 0.38	S	S	1.5	S	S
2	0.38 / 1.0	S	S	0.12 5	S	S	0.19	na	na	4.0	S	na	1.0 / 0.094	S	S	2.0	S	S
3	3.0 / 6.0	B / R	R	4.0	S	R	0.75	na	na	48	R	na	2.0 / 0.38	S	S	6.0	B	S
4	4.0 / 0.25	R / S	R / S	1.5	S	R	6.0	na	na	6.0	S	na	6.0 / 0.125	S	R / S	6.0	B	S
5	4.0 / 6.0	R	R	0.38	S	S	0.25	na	na	24	R	na	1.0 / 0.125	S	S	2.0	S	S
6*	0.25 / 0.25	S	S	0.38	S	S	3.0	na	na	1.0	S	na	256 / 256	R	R	4.0	B	S
7	6.0 / 12.0	R	R	0.5	S	S	1.0	na	na	12	B	na	0.75 / 0.047	S	S	2.0	S	S
8	1.5 / 8.0	S / R	S / R	0.75	S	R	1.0	na	na	1.5	S	na	0.75 / 0.75	S	S	1.0	S	S
Total susceptible (%)	37.5 / 50	37.5 / 50	37.5 / 62.5		100	62.5		na	na		62.5	na		87.5	75.0 / 87.5		62.5	100

Data are in milligrams per litre (mg/L). S = Susceptible; R = Resistant; B = Borderline (within stated antimicrobial corneal concentration range)

S¹: Susceptibility determined using known antimicrobial 1st quartile corneal concentrations. If the MIC is below the reported 1st quarter corneal concentration for that antimicrobial, then it is reasonable to expect the bacterial to be inhibited by that antimicrobial and the strain is reported as susceptible. Although the reported corneal concentrations of antimicrobials are high, the associated standard deviations are high, meaning that the concentrations are not consistent around the mean. Because the actual data is not available in the listed references, the first quartile concentration has been extrapolated from the reported mean and standard deviation unless the median was available. Data is not available in articles to check normality. The pharmacokinetics of antimicrobials in corneal ulceration is unknown, so caution is needed in extrapolating data. Reported 1st quarter corneal concentrations for the antimicrobials are as follows: ciprofloxacin: 2.40-3.71mg/kg (24), ofloxacin: 4.73-6.79mg/kg (24), moxifloxacin: 5.11-9.62mg/kg (24), cefuroxime: no available information in the literature, gentamicin: 12.71mg/kg (only reported in rabbit eyes (33)), vancomycin: 33.1mg/kg (53), teicoplanin: 7.6mg/L (n=20, 0mg/L in 9 patients) (54); chloramphenicol: 3.5-6.7mg/kg (concentrations only available for aqueous humor and no 1st quartile concentration available (32)).

S²: Susceptibility determined by the breakpoint defined by EUCAST (25). Topical breakpoints are available for ciprofloxacin (1mg/L), ofloxacin (1mg/L) and chloramphenicol (16mg/L). For the other antimicrobials, systemic breakpoints were used: moxifloxacin (0.25mg/L), cefuroxime susceptibility was inferred from cefoxitin disc testing, gentamicin (2mg/L), teicoplanin (2mg/L) and vancomycin (2mg/L).

Strain	Ciprofloxacin/ Ofloxacin			Moxifloxacin			Cefuroxime			Gentamicin			Vancomycin/ Teicoplanin			Chloramphenicol		
	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²	MIC	S ¹	S ²
1	32 / 32	R	R	32	R	R	128	na	R	6.0	S	R	256 / 256	R	na	256	R	R
2	0.008 / 0.064	S	S	0.064	S	S	96	na	R	0.75	S	S	256 / 256	R	na	4.0	B	S
3	0.004 / 0.064	S	S	0.094	S	S	12	na	R	0.38	S	S	256 / 256	R	na	8.0	R	S
4	0.19 / 0.25	S	R / S	0.75	S	R	96	na	R	2.0	S	S	256 / 256	R	na	6.0	B	S
5	0.012 / 0.125	S	S	0.125	S	S	6.0	na	S	1.0	S	S	256 / 256	R	na	4.0	B	S
6	0.016 / 0.25	S	S	0.38	S	R	3.0	na	S	0.38	S	S	256 / 256	R	na	4.0	B	S
Total susceptible (%)	83.3	83.3	66.7 / 83.3		83.3	50.0		na	33.3		100	83.3		0	na		0	83.3

Data are in milligrams per litre (mg/L). S = Susceptible; R = Resistant; B = Borderline (within stated antimicrobial corneal concentration range)

S¹: Susceptibility determined using known antimicrobial 1st quartile corneal concentrations. If the MIC is below the reported 1st quarter corneal concentration for that antimicrobial, then it is reasonable to expect the bacterial to be inhibited by that antimicrobial and the strain is reported as susceptible. Although the reported corneal concentrations of antimicrobials are high, the associated standard deviations are high, meaning that the concentrations are not consistent around the mean. Because the actual data is not available in the listed references, the first quartile concentration has been extrapolated from the reported mean and standard deviation unless the median was available. Data is not available in articles to check normality. The pharmacokinetics of antimicrobials in corneal ulceration is unknown, so caution is needed in extrapolating data. Reported 1st quarter corneal concentrations for the antimicrobials are as follows: ciprofloxacin: 2.40-3.71mg/kg (24), ofloxacin: 4.73-6.79mg/kg (24), moxifloxacin: 5.11-9.62mg/kg (24), cefuroxime: no available information in the literature, gentamicin: 12.71mg/kg (only reported in rabbit eyes (33)), vancomycin: 33.1mg/kg (53), teicoplanin: 7.6mg/L (n=20, 0mg/L in 9 patients) (54); chloramphenicol: 3.5-6.7mg/kg (concentrations only available for aqueous humor and no 1st quartile concentration available (32)).

S²: Susceptibility determined by the breakpoint defined by EUCAST (25). Topical breakpoints are available for ciprofloxacin (1mg/L), ofloxacin (1mg/L) and chloramphenicol (16mg/L). For the other antimicrobials, systemic breakpoints were used: moxifloxacin (0.25mg/L), cefuroxime susceptibility was inferred from ceftioxin disc testing, gentamicin (2mg/L), teicoplanin (2mg/L) and vancomycin (2mg/L).

Table S4: Class, gene identity, function, reference genome and GeneID of the <i>S. aureus</i> virulence factor database used in this study					
Functional class	Gene	Description	<i>S. aureus</i> reference genome	GeneID	Length
	<i>mecA</i>	Confers resistance to methicillin	7292 reference <i>Staphylococcus</i> sequences	WP_001801873.1	669 AA
Adherence	<i>clfA</i> *	Clumping factor A, fibrinogen binding protein	MW2	Q8NXJ1	946 AA
	<i>fnpA</i> * ^s	Fibronectin-binding protein A	MW2	Q8NUU7	1015 AA
	<i>eap/map</i> *	Truncated map-W protein	Mu50	BAB58100.1	476 AA
	<i>sasG</i> ^s	Cell wall surface anchor family protein	COL	A0A0H2WXE4	1243 AA
	<i>sraP</i> ^s	LPXTG Cell wall surface anchor family protein	COL	Q5HCP3	2261 AA
Evasion	<i>scpA</i> *	Cysteine protease Staphopain A	Mu50	P65825	388 AA
	<i>sspB</i> *	Cysteine proteinase Staphopain B	MW2	Q8NX99	393 AA
	<i>sspA</i> *	Glutamyl endopeptidase V8	MW2	Q8NX98.1	327 AA
	<i>coa</i> *	Staphylocoagulase precursor	N315	BAB41444.1	658 AA
	<i>seb</i> *	Staphylococcal enterotoxin B	S6	AAA88550.1	266 AA
	<i>hla/hly</i> *	Alpha-hemolysin precursor	MW2	BAB94909.1	319 AA
	<i>ψent1</i> [#]	Enterotoxin <i>ψent1</i>	N315	BAB42913.1	133AA
	<i>ψent2</i> [#]	Enterotoxin <i>ψent2</i>	N315	BAB42912.1	136 AA
	<i>selo</i> [#]	<i>Staphylococcal</i> enterotoxin O	RF122	CAI81390.1	254 AA
	<i>seln</i> [#]	<i>Staphylococcal</i> enterotoxin N	RF122	CAI81386.1	251 AA
	<i>selm</i> [#]	<i>Staphylococcal</i> enterotoxin M	N315	WP_000821658.1	239 AA
<i>sei</i> [#]	<i>Staphylococcal</i> enterotoxin I	RF122	CAI81388.1	242 AA	

	<i>seg#</i>	<i>Staphylococcal</i> enterotoxin G	RF122	CAI81385.1	205 AA
	<i>selv#</i>	<i>Staphylococcal</i> enterotoxin V	A900624	WP_043859283.1	239 AA
	<i>seu#</i>	<i>Staphylococcal</i> enterotoxin U	RF122	WP_000764692	261 AA
	<i>sed#</i>	<i>Staphylococcal</i> enterotoxin D precursor	RN4220	AAB06195.1	258 AA
	<i>sej#</i>	<i>Staphylococcal</i> enterotoxin J	2144 identical sequences	WP_000750881.1	268 AA
	<i>ser#</i>	<i>Staphylococcal</i> enterotoxin R	2018 identical sequences	WP_000932627.1	259 AA
	<i>ssl8[§]</i>	Superantigen-like protein 8	MW2	AUU67599.1	232 AA
Invasion	<i>hlgA*</i>	Gamma-hemolysin chain II precursor	MW2	BAB96207.1	309 AA
	<i>hlgB*</i>	Gamma-hemolysin component B	MW2	BAB96209.1	325 AA
	<i>hlgC*</i>	Gamma-hemolysin component C	MW2	BAB96208.1	315 AA
	<i>hld*</i>	Delta-hemolysin	MW2	BAB95824.1	44 AA
	<i>lukF-PV*</i>	Panton-Valentine leukocidin precursor chain F	MW2	BAB95243.1	325 AA
	<i>lukS*</i>	Panton-Valentine leukocidin precursor chain S	MW2	BAB95244.1	312 AA

*Virulence genes used by Afzal et al (23).

#Virulence genes associated with ocular *S. aureus* isolates (22)

§Virulence genes associated with non-ocular *S. aureus* isolates (22).

Table S5: Baseline demographics, predisposing factors and examination findings of the seven patients with MK who had <i>S. aureus</i> isolated.							
	1	2	3	4	5	6	7
Baseline demographics and predisposing factors:							
Sex	F	F	F	M	M	M	M
HIV positive	Yes	Unknown	No	Unknown	Yes	Unknown	Yes
Previous history of MK	Yes	No	No	No	No	No	No
Topical eyedrop treatment prior to presentation	No	Yes - tetracycline	No	No	No	No	Yes - dexamethasone
Traditional medicine use	no	Yes	No	No	No	No	Yes
Examination findings:							
Snellen VA on presentation	HM	6/60	6/60	6/6	HM	NM	HM
Location of ulcer	Central	Central	Peripheral	Peripheral	Central	Peripheral	Central
Major diameter of ulcer (mm)	1	NM	1	0.5	6	NM	11
Minor diameter of ulcer (mm)	1	NM	1	0.5	5	NM	11
Ulcer depth	1	1	2	1	NM	2	2
Hypopyon	No	No	No	No	Yes	No	No
Other examination findings:	-	-	-	-	HZO	-	HZO
Mixed culture growth	Yes*	Yes**	No	No	No	Yes***	No

NM: not measured.

HZO: Herpes Zoster Ophthalmicus

*Mixed growth with *Enterococcus faecium*, *Corynebacterium striatum*, *Serratia marcescens* and *S. epidermidis*

**Mixed growth with *S. oralis*.

***Mixed growth with HSV-1

	1	2	3	4	5	6	7
Total length (bp)	3,198,350	2,884,721	2,796,874	2,832,020	2,850,395	2,925,823	2,808,597
Contigs	6	1	6	2	3	1	1
Largest contig	2,932,126	2,884,721	2,369,645	2,806,382	2,800,994	2,925,823	2,808,597
N50 (bp)	2,932,126	2,884,721	2,369,645	2,806,382	2,800,994	2,925,823	2,808,597
GC (%)	32.59	32.79	32.72	32.82	32.68	32.81	32.88
Prophage Regions	5	5	2	3	2	4	3
Plasmids	3	3	4	1	4	3	0
MLST	Unknown* 59 nearest STs	?ST-34*	Unknown Nearest ST-1940 [#]	Unknown Nearest ST-4803 ^{&}	?ST-1940 [%]	Unknown [§] 8 nearest STs	?ST-152
Spa type	t1130	t136	t3772	t064	t2554	t136	t355
agr-type	III	III	I	I	I	III	I

*Imperfect hit with *aroE* (identity 99.8%, coverage 99.8%)

[#]Imperfect hit with *arcC* (identity 99.8%, coverage 99.8%) and *gmk* (identity 99.8%, coverage 99.8%)

[&]Imperfect hit with *gmk* (identity 99.5%, coverage 99.5%)

[%]Imperfect hit with *arcC* (identity 99.3%, coverage 99.3%) and *gmk* (identity 99.8%, coverage 99.8%)

[§]Imperfect hit with *arcC* (identity 99.6%, coverage 9.8%)

[^]Imperfect hit with *arcC* (identity 99.8%, coverage 99.8%), *aroE* (identity: 99.8%, coverage 99.8%) and *gmk* (identity 99.8%, coverage 99.8%)

Table S7: Presence or absence of known virulence genes associated with ocular <i>S. aureus</i> strains									
Functional class	Gene	<i>S. aureus</i> genome							Total
		1	2	3	4	5	6	7	
	<i>mecA</i>	0	0	0	0	0	0	0	0
Adherence	<i>clfA</i> *	1	1	1	1	1	1	1	7
	<i>fnpA</i> * [§]	1	1	1	1	1	1	1	7
	<i>eap/map</i> *	0	0	1	0	1	0	0	2
	<i>sasG</i> [§]	0	0	0	1	0	0	0	1
	<i>srap</i> [§]	1	1	1	1	1	1	1	7
	Total	3	3	3	4	4	3	3	
Evasion	<i>scpA</i> *	1	1	1	1	1	1	1	7
	<i>sspB</i> *	1	1	1	1	1	1	1	7
	<i>sspA</i> *	1	1	1	1	1	1	1	7
	<i>coa</i> *	0	0	1	0	1	0	0	2
	<i>seb</i> *	0	0	0	1	1	0	0	2
	<i>hla/hly</i> *	1	1	1	1	1	1	1	7
	<i>ψent1</i> [#]	1	1	1	0	1	1	0	5
	<i>ψent2</i> [#]	1	1	1	0	1	1	0	5
	<i>selo</i> [#]	1	1	0	0	0	1	0	3
	<i>seln</i> [#]	1	1	1	0	1	1	0	5
	<i>selm</i> [#]	1	1	1	0	1	1	0	5
	<i>sei</i> [#]	1	1	1	0	1	1	0	5
	<i>seg</i> [#]	1	1	1	0	1	1	0	5
	<i>selv</i> [#]	0	0	0	0	1	0	0	1
	<i>seu</i> [#]	1	1	1	0	1	1	0	5
	<i>sed</i> [#]	0	0	0	0	0	0	0	0
	<i>sej</i> [#]	0	0	0	0	0	0	0	0
	<i>ser</i> [#]	0	0	0	0	0	0	0	0
	<i>ssl8</i> [§]	0	0	1	1	1	0	0	3
	Total	12	12	13	6	15	12	4	
Invasion	<i>hlgA</i> *	1	1	1	1	1	1	1	7
	<i>hlgB</i> *	1	1	1	1	1	1	1	7
	<i>hlgC</i> *	1	1	1	1	1	1	0	6
	<i>hld</i> *	1	1	1	1	1	1	1	7

	<i>lukF-PV*</i>	1	0	1	0	0	0	1	3
	<i>lukS*</i>	1	0	0	0	0	0	1	2
	Total	6	4	5	4	4	4	5	
Total number of virulence genes:		21	19	21	14	23	19	12	

*Virulence genes used by Afzal et al (23)

#Virulence genes associated with ocular *S. aureus* isolates (22)

[§]Virulence genes associated with non-ocular *S. aureus* isolates (22).