INVASIVE STAPHYLOCOCCUS AUREUS INFECTIONS IN CHILDREN IN CRETE

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Introduction

Invasive infections caused by *Staphylococcus aureus* (*S. aureus*) are uncommon in children. We review the epidemiology, clinical features and outcomes of children with culture-proven invasive *S. aureus* infections in a referral paediatric center over a 10-year period.

Methods

We conducted a retrospective review for all cases of *S. aureus* invasive infections, for children under 16 years in Crete from January 2008 to December 2017.

Invasive infection was defined as isolation of *S. aureus* from a normally sterile site (blood, cerebrospinal fluid, pleura, bone, joint). Specimens from skin and soft tissue infections were not included.

S. aureus isolates were identified using standard microbiology methods and susceptibility testing was performed.

Cases were classified as hospital-acquired (HA), if the index isolate was taken more than 48 hours after hospital admission, community-acquired (CA) if it was taken less than 48 hours and community-onset healthcare associated (COHA) if patients had been exposed to healthcare settings in the previous 12 months or had an indwelling catheter.

Table 1. Characteristics of invasive infections

	Total	MRSA N(%)	MSSA N(%)	p value
Episodes	42	19 (45)	23 (55)	
Male	20	8 (42)	12 (52)	0.55
Female	22	11 (58)	11 (48)	
Age				
<0-4 yr	23	11 (58)	12 (52)	0.76
>5yr	19	8 (42)	11 (48)	
Comorbidities	14	5 (26)	9 (39)	0.51
Season				
Oct-March	15	9 (47)	6 (26)	0.20
April-Sept	27	10 (53)	17 (74)	
Type of infection				
CA	22	10 (53)	12 (52)	0.99
HA	14	6 (31)	8 (35)	0.57
COHA	6	3 (16)	3 (13)	0.60
LOS* (mean)				
CA	25.7	23.2	27.9	0.46
HA	32.3	36.6	28	
COHA	11.3	7.67	15	

*LOS: Length of hospital stay (days)

Results

A total of 42 invasive infections (22 CA, 14 HA and 6 COHA) were identified from 39 patients. No gender predominance was noted, no clustering of cases. Invasive infections were more common among children aged less than 5 years and adolescents. Septicaemia, pneumonia, osteomyelitis and CNS infection were noted in 20, 9, 9, and 2 episodes respectively. Thirty-three percent of patients (14/42, 33%) had underlying comorbidities including previous operations, indwelling catheters and ventriculoperitoneal shunt procedures. Thirty percent of septicaemic patients (6/20) had indwelling catheters or had undergone surgical operations.

Pneumonia was more common among children with congenital malformations or cystic fibrosis (6/9). Methicillin-resistant *S. aureus* (MRSA) was found in 19/42 episodes (45.2%). Incidence was estimated at 7.8 infections per 100,000 hospitalized children. Length of hospital stay did not differ significantly between MRSA and MSSA strains and was similar for community and healthcare acquired infections. There was no mortality associated with invasive *S. aureus* infections.

Figure 1. Age Distribution

Table 2. Types of invasive *S. aureus* infection

	N	Comorbidities N (%)	Median age (yr)	CA N (%)	HA N (%)	COHA N (%)
Septicaemia	20	5 (25)	5.44	12 (60)	7 (35)	1 (5)
Pneumonia	9	6 (66)	6.60	4 (44)	2 (22)	3 (33)
Osteomyelitis/ Septic arthritis	9	2 (22)	6.27	4 (44)	4 (44)	1 (11)
CNS infection	2	1 (50)	7.45	0 (0)	1 (50)	1 (50)
Other	2	0 (0)	10.57	2 (100)	0 (0)	0 (0)

Figure 2. Incidence per 100,000 hospitalized children per year

Conclusions

Clinical characteristics and outcomes in invasive *S. aureus* infection are similar among MRSA and MSSA infections. They often affect children with comorbidities and are commonly healthcare-associated.