POSTER : XVIII SITIP CONGRESSO NAZIONALE

IDENTIFICATION AND ANALYSIS OF CLINICAL RISK FACTORS OF COLONIZATION AND INFECTION SUSTAINED BY ESKAPE PATHOGENS IN A SINGLE-CENTRE PEDIATRIC COHORT

Alessandra C. F. Ferrari [(1)], Liana Signorini [(2)], Cesare Tomasi [(3)], Ramona Pezzotta [(4)], Barbara Saccani [(2)], Simona Fiorentini [(4)], Alessandro Plebani [(3)], Raffaele Badolato [(3)]

(1) Scuola di Specializzazione in Pediatria - Università degli Studi di Brescia
(2) U.O Malattie Infettive - ASST Spedali Civili di Brescia
(3) Clinica Pediatrica - Università degli Studi di Brescia e ASST Spedali Civili di Brescia
(4) Laboratorio di Microbiologia e Virologia - Università degli Studi di Brescia e ASST Spedali Civili di Brescia

BACKGROUND: Aim of the study is the description of clinical and microbiologic features of a single-centre cohort of pediatric patients with one or more ESKAPE+ surveillance or diagnostic samples.

MATERIALS & METHODS:

- Retrospective observational study
- 01/01/19 - 06/30/20 (18 months)
- 10.800 admissions (Brescia Pediatric Children Hospital): 1988 non-ICU and 8.812 ICU/sub-ICU
- 1.353 patients; 7.090 samples (nasal/pharyngeal, rectal/perianal, fecal)
- Statistics performed SPSS® 26.1; inferential non-parametric analysis, dummy variables
- Pearson's Chi-squared test (p value significant if < 0.05), OR calculated using Chi-squared test

Risk factors of infection sustained by ESKAPE Pathogens [Odds Ratio (95% CI)]

Variables	*Enterobacteriaceae* ESBL+, CR+	*Acinetobacter baumanii*, CR+	*Pseudomonas aeruginosa*, CR+	MRSA	*Enterococcus faecium* VR+
Age < 12 months	0.12 (0.05-0.31) p = 0.0001	0.20 (0.01-3.66) p = 0.28	0.38 (0.17-0.86) p = 0.02	0.10 (0.01-0.77) p = 0.02	0.27 (0.01-5.16) p = 0.38
Male Genre	1.48 (0.76-2.84) p = 0.24	1.17 (0.25-5.42) p = 0.84	0.55 (0.28-1.09) p = 0.08	0.85 (0.34-2.11) p = 0.72	0.86 (0.11-6.33) p = 0.88
Comorbidity	0.97 (0.36-2.60) p = 0.95	0.32 (0.05-1.81) p = 0.20	0.79 (0.29-2.14) p = 0.64	3.30 (0.41-26.20) p = 0.23	1.33 (0.07-25.86) p = 0.85
Preterm birth	0.74 (0.38-1.44) p = 0.38	1.07 (0.23-5.00) p = 0.92	1.25 (0.64-2.44) p = 0.51	1.25 (0.50-3.11) p = 0.63	4.47 (0.45-44.08) p = 0.19
Prior antibiotic treatment on therapy or prophylaxis (previous)12 months	1.09 (0.53-2.22) p = 0.80	0.15 (0.03-0.83) p = 0.03	1.20 (0.58-2.50) p = 0.61	0.90 (0.34-2.39) p = 0.83	4.02 (0.21-76.37) p = 0.35
Prior or current ICU/ sub-ICU hospitalizatio n	17.86 (2.28-139.8) p = 0.0003	0.41 (0.04-3.83) p = 0.43	6.48 (0.81-51.97) p = 0.07	0.38 (0.09-1.59) p = 0.18	1.29 (0.06-25.96) p = 0.86
Prior device positioning or invasive procedures (previous 12 months)	2.36 (0.90-6.18) p = 0.08	0.21 (0.04-1.01) p = 0.05	0.76 (0.3-1.89) p = 0.55	0.76 (0.23-2.52) p = 0.65	1.29 (0.06-25.96) p = 0.86
Prior status of ESKAPE pathogen carrier	0.23 (0.05-1.13) p = 0.005	0.82 (0.04-15.41) p = 0.89	3.89 (0.96-15.71) p = 0.05	2.64 (0.63-11.1) p = 0.18	0.02 (0.00-0.52) p = 0.01
Breast feeding	2.44 (1.13-5.28) p = 0.02	2.17 (0.25 - 18.70) p = 0.48	0.27 (0.12-0.58) p = 0.001	1.23 (0.42-3.61) p = 0.70	0.7 (0.06-7.93) p = 0.77
Use of antimicrobial drugs during the first year of life	1.70 (0.53-5.46) p = 0.36	1.47 (0.08-27.3) p = 0.80	2.09 (0.54-8.07) p = 0.28	0.88 (0.18-4.3) p = 0.87	0.66 (0.03-13.62) p = 0.79
Birth by Caesarean section	1.03 (0.53-2) p = 0.01	1,33 (0,28-6,23) p = 0.71	1.2 (0.61-.36) p = 0.59	1.23 (0.42-3.60) p = 0.70	0.73 (0.06-8.27) p = 0.80
Prior PPI treatment	0.75 (0.37-1.54) p = 0.61	1.54 (0.35-6.75) p = 0.56	3.16 (1.51-6.64) p = 0.002	0.5 (0.16-1.59) p = 0.24	5.15 (0.45-58.39) p = 0.18
Congenital or acquired immuno-deficiency	3.75 (1.18-11.97) p = 0.007	0.41 (0.02-7.56) p = 0.55	1.15 (0.3-4.35) p = 0.83	1.75 (0.52-5.9) p = 0.36	0.96 (0.05-19.52) p = 0.98

Risk Factors (Variables)	Infection n = 22 (%)	Colonization n = 124 (%)	OR (95% - CI) of Infection	p-value
Males	15 (68%)	63 (51%)	2.07 (0.79-5.44)	0.13
Females	7 (32%)	61 (49%)	1	
Comorbidity	19 (86%)	109 (88%)	0.87 (0.23-3.30)	0.84
No comorbidity	3 (14%)	15 (12%)	1	
Infant	2 (9%)	34 (27%)	0.26 (0.06-1.19)	0.08
Child	20 (91%)	90 (73%)	1	
Preterm birth	8 (36%)	52 (42%)	0.79 (0.31-2.02)	0.62
No preterm birth	14 (64%)	72 (58%)	1	
Prior status of ESKAPE pathogen carrier	3 (13%)	7 (6%)	2.64 (0.63-11.1)	0.18
No prior status of ESKAPE pathogen carrier	19 (87%)	117 (94%)	1	
Prior device positioning or invasive procedures	17 (77%)	107 (86%)	0.54 (0.18-1.66)	0.28
No prior device positioning or invasive procedures	5 (13%)	17 (14%)	1	
Prior antibiotic prophylaxis/therapy (previous 12 months)	15 (68%)	87 (70%)	0.91 (0.34-2.42)	0.85
No prior antibiotic prophylaxis/therapy (previous 12 months)	7 (32%)	37 (30%)	1	
Prior or actual ICU / sub-ICU hospital admission	15 (68%)	111 (90%)	0.25 (0.09-0.73)	0.01
No prior or actual ICU / sub-ICU hospital admission	7 (32%)	13 (10%)	1	
Congenital or acquired immunodeficiency	3 (14%)	15 (12%)	1.15 (0.30-4.35)	0.83
No congenital or acquired immunodeficiency	19 (86%)	109 (88%)	1	
Breast feeding	20 (86%)	88 (71%)	4.09 (0.91-18.41)	0.06
Formula feeding	2 (14%)	36 (29%)	1	
Caesarean section	7 (32%)	52 (42%)	0.65 (0.25-1.70)	0,37
Vaginal delivery	15 (68%)	72 (58%)	1	
Prior use of PPI	8 (36%)	37 (30%)	1.34 (0.52-3.47)	0.54
No prior use of PPI	14 (64%)	87 (70%)	1	
Antibiotic prophylaxis/therapy during the first year of life	19 (86%)	115 (93%)	0.50 (0.12-2.00)	0.32
No antibiotic prophylaxis/therapy during the first year of life	3 (14%)	9 (7%)	1	

RESULTS:

- 136/146 (93%) hospitalized in the previous 12 months
- 126/146 (86%) admitted in ICU/sub-ICU wards
- 102/146 (70%) received antibiotic during 12 months before
- 10/146 patients (7%) previous ESKAPE carrier
- 124/146 (85%) invasive procedures or device placement
- 60/146 (41%) anamnesis of preterm birth
- 87/146 (60%) born by vaginal delivery and 59/146 (40%) by Caesarean section
- 108/146 (74%) breastfed and 38/146 (26%) formula-fed
- 42/146 (29%) used PPI in their first year of life
- 134/146 (92%) received antimicrobial therapy in their first year of life.
- 18/146 (12%) had immunodeficiency or comorbidities
- 131/146 (90%) 1 ESKAPE+ pathogen, 15/146 (10%) 2 or more ESKAPE+

CONCLUSIONS: identified clinical and anamnestic factors (prior or current ICU/sub-ICU hospitalization, prior status ESKAPE pathogen carrier, birth by Caesarean section, breast feeding, congenital or acquired immunodeficiency, prior device positioning/carriage or execution of invasive procedures, prior PPI treatment) associated with increased risk or protection for ESKAPE infection in pediatric age, in particular sustained by *Enterobacter* spp and *Pseudomonas aeruginosa*, which are the most identified pathogens in this cohort of study.