

Electronic supplemental material

The development of bacterial antimicrobial resistance in critically ill patients admitted to a COVID 19 unit : a monocentric retrospective study.

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Table S1: Comparison between MDRB + and - patients including COVID-19 and SAH patients, matched on mechanical ventilation and ICU length of stay

	MDRB - (N=104)	MDRB + (N=40)	p-value#
COVID 19 (vs SAH), n (%)	48 (46)	24 (60)	0.19
Age; years, mean ($\pm$ SD)	56 ($\pm$ 16)	58 ($\pm$ 13)	0.53
Male gender, n (%)	55 (53)	24 (60)	0.46
Charlson comorbidity index, median (IQR)	1 (0-3)	1 (0-3)	0.71
Hospitalization in the previous 6 months, n (%)	12 (12)	2 (39)	0.35
Transfer from other hospitals, n (%)	11 (11)	9 (23)	0.10
Patients MDRB + at admission, n (%)	7 (7)	2 (5)	0.99
SAPS 3 score, median (IQR)	41 (31-54)	47 (36-60)	0.17
SOFA score, median (IQR)	5 (2-9)	8 (4-10)	0.03
Central venous catheter*, n (%)	76 (73)	36 (90)	0.03
Urinary tract catheter*, n (%)	72 (69)	34 (85)	0.06
Mechanical ventilation*, n (%)	55 (53)	28 (70)	0.09
Length of MV*; days, median (IQR)	1 (0-8)	9 (0-15)	0.005
Vasopressor, n (%)	59 (57)	35 (88)	0.001
Acute kidney injury, n (%)	21 (20)	14 (35)	0.08
Renal replacement therapy, n (%)	11 (11)	7 (18)	0.27
ECMO, n (%)	8 (8)	4 (10)	0.74
Surgery*, n (%)	40 (38)	13 (32.5)	0.57
Antimicrobial therapy*, n (%)	58 (56)	35 (88)	0.001
Length of antimicrobial therapy*; days, median (IQR)	2 (0-5)	6 (4-7)	0.001
Length of exposure; days, median (IQR)	6 (3-20)	13 (9-20)	0.003
ICU LOS; days, median (IQR)	6 (3-20)	27 (21-34)	<0.001
ICU LOS of survivors; days, median (IQR)	4 (2-21)	28 (25-34)	<0.001
Hospital LOS; days, median (IQR)	19 (11-33)	38 (24-62)	<0.001
Hospital LOS of survivors; days, median (IQR)	23 (12-39)	52 (33-64)	<0.001
ICU mortality, n (%)	28 (27)	10 (25)	0.99
Hospital mortality, n (%)	31 (30)	10 (25)	0.68

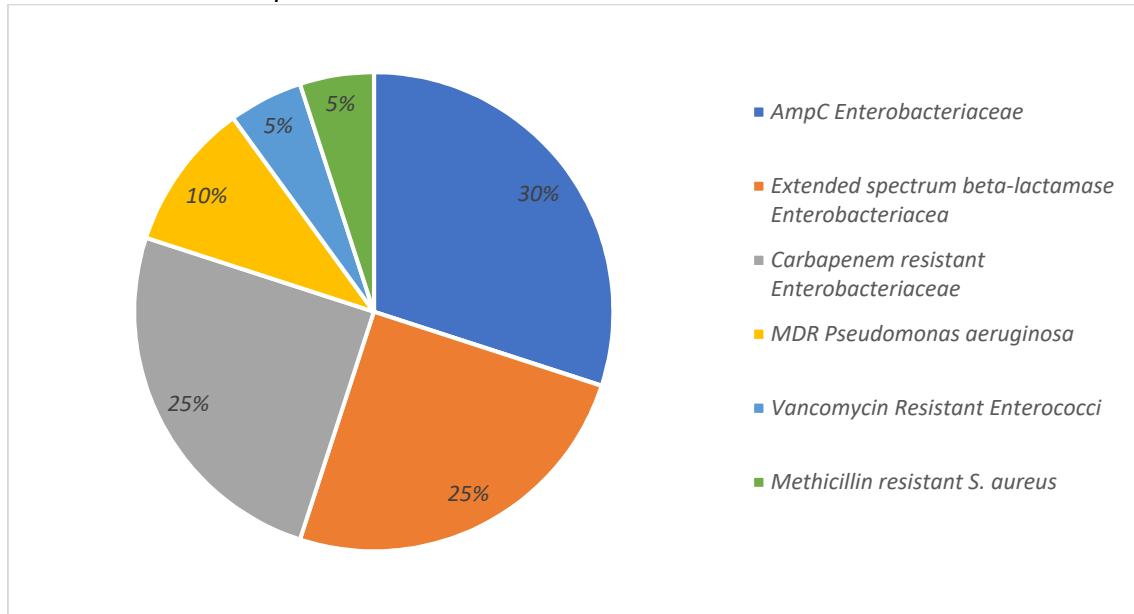
*Variables collected before MDRB acquisition.

#p value was obtained using Chi square or Fisher exact test, T-Student or Mann-Whitney test as appropriate.

COVID-19: Coronavirus disease 19; MDRB: multidrug resistant bacteria; SAPS 3: Simplified acute physiology score 3; SOFA: Sequential organ failure assessment; MV: mechanical ventilation; LOS: length of stay

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Figure S1: Distribution of MDRB bacteria acquired during ICU according to mechanism of resistance in SAH patients



AmpC beta- lactamase (AmpC) *Enterobacteriaceae* (N=6):

Morganella morganii (N=1); *Enterobacter aerogenes* (N=2); *E. cloacae* (N=3)

Extended spectrum -lactamase (ESBL) *Enterobacteriaceae* (N=5):

Klebsiella oxytoca (N=1), *Escherichia coli* (N=3), *K. pneumoniae* (N=1)

Carbapenem resistant *Enterobacteriaceae* (CRE) (N=5):

E. cloacae (N=1), *K. pneumoniae* (N=3), *E. coli* (N=1),

Vancomycin resistant enterococci (VRE) N=1:

Enterococcus faecium (N=1)

Methicillin resistant *Staphylococcus aureus* (MRSA) (N=1)

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Table S2: Type of antibiotics used in COVID- 19 patients (N=56/72).

	All patients (N=56)	MDRB - (N=34)	MDRB + (N=22)
Amoxicillin – clavulanic acid, n (%)	13 (23)	8 (24)	5 (23)
Cephalosporin 1 st and 2 nd generations, n (%)	1 (2)	1 (3)	0
Cephalosporin 3 rd and 4 th generation, n (%)	10 (18)	7 (21)	3 (14)
Piperacillin -tazobactam, n (%)	24 (43)	12 (35)	12 (55)
Vancomycin, n (%)	2 (4)	2 (6)	0
Carbapenems, n (%)	6 (11)	4 (12)	2 (9)

Overall p-value=0.62 There were no statistically significant differences between columns as calculated by the Bonferroni method.

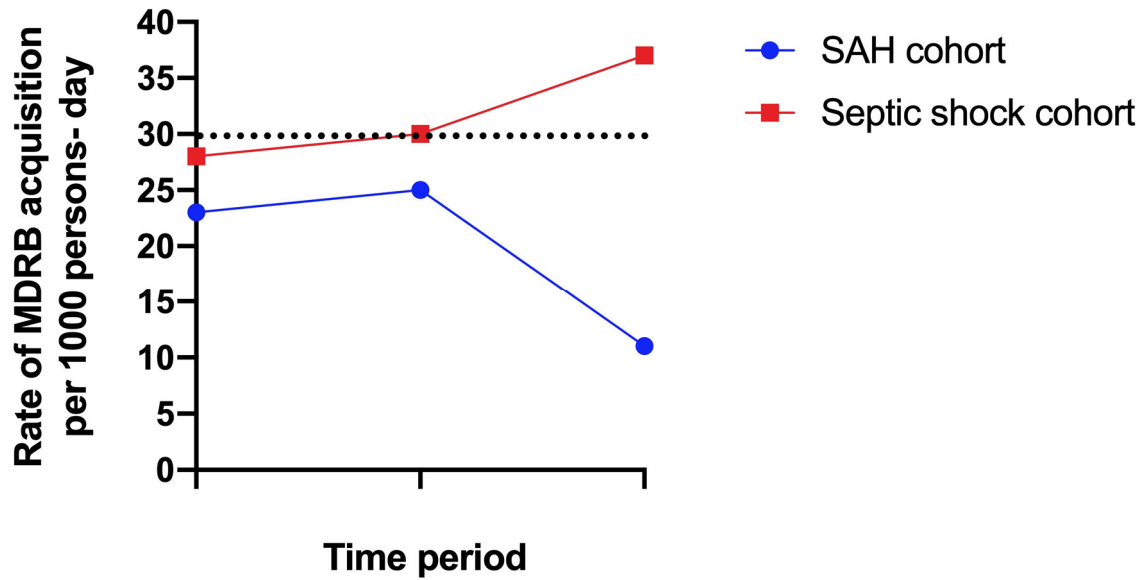
Table S3: Characteristic of the septic shock cohort

	Septic shock patients (N=60)
Age, median (IQR)	63 (51-72)
Gender, n (%)	40 (67)
Charlson Comorbidity Index, median (IQR)	5 (3-6)
SOFA score, n (%)	11 (8-13)
MV, n (%)	41 (68)
Vasopressors, n (%)	59 (98)
ECMO, n (%)	8 (13)
RRT, n (%)	18 (30)
Previous surgery, n (%)	21 (35)
Previous hospitalization, n (%)	30 (50)
MV before MDR, n (%)	38 (63)
Central venous catheter, n (%)	59 (98)
Antibiotic before MDR, n (%)	59 (98)
Time at risk, median (IQR)	6 (3-12)
ICU LOS, median (IQR)	8 (3-20)
Hospital LOS, median (IQR)	19 (12-41)
ICU mortality, n (%)	21 (35)
Hospital mortality, n (%)	21 (35)

LOS: Length of stay; IQR: interquartile range; SOFA: sequential organ failure assessment; MV: mechanical ventilation; ECMO: extra corporeal membrane oxygenation; RRT: renal replacement therapy; MDR: multidrug resistance; LOS: Length of stay. We identified 203 patients admitted to our ICU from 2016-2019 due to septic shock. Of these we were able to match 60 patients to the patients admitted to the COVID- 19 units based on the use of mechanical ventilation and ICU length of stay. This table shows the characteristics of the selected 60 patients.

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Figure S2: MDRB acquisition rate from 2016 to 2019 in the SAH and septic shock cohorts



MDRB: multidrug resistant bacteria; SAH: subarachnoid hemorrhage

The dotted line represents the rate of MDRB acquisition in patients admitted to COVID-19 units. The cohorts were divided according to tertile starting from the left to the right: earliest tertile (2016-2017), middle tertile (2017-2018) and latest tertile (2018-2019).