Healthcare Innovations
How practice has changed

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Association between treatment location and outcomes in emergency patients admitted with septic shock

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Purpose: Early recognition and treatment for sepsis is critical in improving patient outcomes. This study sought to examine whether triage location was associated with time to treatment in a cohort of Emergency Department (ED) patients with septic shock.

Methods: Septic shock patients (n=399) were identified from a database of ED patients admitted with infection over a 162-week period. Shock was classified into 3 phenotypes: cardiovascular shock, lactate shock, or combined cardiovascular and lactate shock. Demographic, clinical and outcome data were reported by triage location. Time to event analyses sought to identify the association between triage location and time to antibiotic.

Results: More than half of the patients (54.4%) were initially triaged to the acute section of the ED, with nearly two-thirds (62.2%) of these experiencing clinically deterioration and needing to be transferred to the resuscitation area. Patients triaged to a lower acuity section (acute) had lower severity of illness and a higher prevalence of lactate shock only compared to those triaged to a higher acuity area (resuscitation). Time to antibiotic administration was longer for those patients triaged to lower compared to higher acuity areas.

Table. 1. Baseline characteristics by location for overall cohort

	Total cohort (n=399)	Acute (n=82)	Resuscitation (n=182)	Acute to Resuscitation (n=135)
Age in years, median (IQR)	63 (47-78)	56 (43-75)	66.5 (50-79)	62 (47-73)
Males	230 (57.6%)	40 (48.8%)	108 (59.3%)	82 (60.7%)
Arrival by QAS, n (%)	318 (79.9%)	52 (63.4%)	168 (92.8%)	98 (72.6%)
Do not resuscitate, n (%)	90 (22.6%)	14 (17.1%)	55 (30.2%)	21 (15.6%)
Nursing home resident, n (%)	69 (17.3%)	11 (13.4%)	43 (23.6%)	15 (11.1%)
APACHE II, median (IQR)	19 (13-25)	13 (9-17)	22 (17-29)	18 (13-23)
Charlson Index, median (IQR)	3 (1-4)	2 (1-4)	3 (1-5)	3 (1-4)
Bacteraemia, n (%)	136 (34.1%)	24 (29.3%)	54 (29.7%)	58 (43.0%)
Presumed Source, n (%)				
Respiratory tract	147 (36.8%)	29 (35.4%)	77 (42.3%)	41 (30.4%)
Urinary tract	73 (18.3%)	14 (17.1%)	31 (17.0%)	28 (20.7%)
Abdominal / Pelvic	51 (12.8%)	12 (14.6%)	20 (11.0%)	19 (14.1%)
Soft Tissue	33 (8.3%)	14 (17.1%)	11 (6.0%)	8 (5.9%)
Disposition, n (%)				
ICU admission	149 (37.3%)	6 (7.3%)	86 (47.3%)	57 (42.2%)
Ward admission	240 (60.2%)	76 (92.7%)	88 (48.4%)	76 (56.3%)
Died in ED	10 (2.5%)	0 (0%)	8 (4.4%)	2 (1.5%)
Lactate Measured, n (%)	380 (95.2%)	77 (93.9%)	175 (96.2%)	128 (94.8%)
Noradrenaline infusion, n (%)	90 (22.6%)	2 (2.4%)	46 (25.3%)	42 (31.1%)
Median Lactate, mmol/L(IQR)	4.6 (3.2-6.0)	4.6 (4.1-5.2)	4.8 (3.6-7)	4.2 (2.3-5.8)
Shock Type, n (%)				
Cardiovascular shock	136 (34.1%)	17 (20.7%)	55 (30.2%)	64 (47.4%)
Lactate shock	183 (45.9%)	60 (73.2%)	82 (45.1%)	41 (30.4%)
Cardiovascular + lactate	80 (20.0%)	5 (6.1%)	45 (24.7%)	30 (22.2%)
Median total fluid (IQR), litres	2 (1-3.5)	1 (0.5-2)	2.5 (1-4)	2.5 (1-3.5)

There were missing data for mode of arrival (n=1) and lactate (n=19)
IQR = interquartile range, ED = emergency department, QAS = Queensland Ambulance Service, ICU = Intensive Care Unit

Table.2. Outcomes by patient location

Characteristic	Acute (n=82)	Resuscitation (n=182)	Acute to Resuscitation(n =135)
Median time to antibiotics (IQR), min	242 (151-423)	98 (48-195)	159 (113-245)
Median ED LOS (IQR), hours	9.9 (7.0-14.0)	7.6 (5.3-10.9)	10.1 (8.0-14.2)
Median Hospital LOS (IQR), days	7 (3-11)	8 (4-19)	9 (5-15)
30-day mortality, n (%)	9 (11.0%)	50 (27.5%)	19 (14.1%)
ICU admission	6 (7.3%)	86 (47.3%)	57 (42.2%)

ED = emergency department, LOS = length of stay, IQR= interquartile range

Conclusions: Patients triaged to lower acuity areas within ED have significant delays to antibiotics and receive less volumes of intravenous fluid. Emergency patients with sepsis may present to triage, appear physiologically well but have surreptitious markers such as an elevated blood lactate. Earlier sepsis recognition may be possible if emergency nurses identify those patients with an elevated lactate. Early lactate measurement is recommended in sepsis bundle of care guidelines but is currently not nurse-initiated in the triage process.