Multi-drug Resistant Gram Negative Bacteria In Major Paediatric Burns Transferred From Overseas Hospitals

F Lin[1], R Jayakar[1], P Baker[1]

1 National Burns Centre, Middlemore Hospital, Counties Manukau District Health Board, New Zealand

Introduction

The presence of multi-drug resistant Gram negative bacteria (MDRGNB) in burn patients may result in poorer outcomes. Infection or sepsis is difficult to treat and often results in delayed healing. We suspect that patients transferred from overseas hospitals have a high rate of MDRGNB due to a delay in surgical debridement and use of broad-spectrum antibiotics.

Aim

To review paediatric burn admissions transferred from overseas hospitals, document the prevalence of MDRGNB and their outcomes; and identify any risk factors

Method

Design	Single centre retrospective review
Period	Jan 2008 to Dec 2018
Location	Middlemore Hospital, Auckland, New Zealand.
Inclusion Criteria	❖ All patients under 16 years old ❖ Total body surface area (TBSA) burn >10% ❖ Length of stay >5 days ❖ Patients admitted from overseas

Patients

Total Paediatric Patients >10% TBSA	198
Overseas Paediatric Patients >10% TBSA	16
Those Patients with MDRGNB Isolated during Admission	5
MDRGNB Patients which was Isolated in the first 72 hours	3

Results

	Total (16)	MDRGNB (5)	No MDRGNB (11)
Gender			
- Male	- 12 (75%)	- 4 (80%)	- 8 (73%)
- Female	- 4 (25%)	- 1 (20%)	- 3 (27%)
Age (median, range)	1.5 (0 – 11)	5 (0 – 11)	1 (0 – 11)
Country			
- French Polynesia	- 12 (75%)	- 1 (20%)	- 11 (100%)
- Samoa	- 2 (13%)	- 2 (40%)	- 0
- Fiji	- 1 (6%)	- 1 (20%)	- 0
- Tuvalu	- 1 (6%)	- 1 (20%)	- 0
TBSA (mean, range)	39% (12-79%)	38% (20-55%)	39% (12-79%)
Aetiology			
- Scald	- 10 (62%)	- 2 (40%)	- 8 (73%)
- Flame	- 6 (38%)	- 3 (60%)	- 3 (27%)
Time to Admission (median, range)	4 days (2-100)	10 days (3-100)	4 days (2-11)
Time to Debridement (median, range)	3 days (0-11)	6 days (0-10)	2.5 days (2-11)
Antibiotics prior to Admission	3 (19%)	1 (20%)	2 (18%)
Dressing Choice			
- Bactigra	- 3 (19%)	- 2 (40%)	- 1 (9%)
- Acticoat	- 7 (44%)	- 1 (20%)	- 6 (55%)
- Mepilex Ag	- 5 (31%)	- 1 (20%)	- 4 (36%)
- Mafenide acetate	- 1 (6%)	- 1 (20%)	- 0
Graft Loss	- 7 (no grafts)		
- Yes	- 4 (44%)	- 1 (25%)	- 3 (60%)
- No	- 5 (56%)	- 3 (75%)	- 2 (40%)
Number of Theatre Visits (median, range)	3 trips (2-25)	7 trips (2-17)	3 trips (2-25)
Length of Stay (mean, range)	26.9 days (7-93)	32.6 days (13-50)	24.3 days (7-93)
Deaths	3 (19%)	0	3

Discussion

Paediatric admissions to the National Burns Centre with >10% TBSA burns total 198 in the 10 years between January 2008 and December 2018. Of which 16 (8%) were from overseas. In this group, Five patients (31%) were isolated with MDRGNB during their admission. Three patients were likely colonised prior to admission given the samples were taken within 72 hours of presentation.

Patient demographic and burn characteristics appeared similar in the MDRGNB isolated and the no MDRGNB groups.

Time to admission from date of injury, time to first debridement in NZ from their admission, length of stay, and number of trips to theatre appeared to be greater in patients with MDRGNB. However the data sample is too small to identify any statistically significant differences. A total of three deaths and a overall higher rate of graft loss occurred in the no MDRGNB group but were associated with high burn severity (TBSA >70%) and not MDRGNB wound sepsis.

Antibiotic use prior to admission in NZ was poorly documented, but occurred in three patients. Only one MDRGNB isolate patient was on antibiotics, which included a course of flucloxacillin, meropenem, and imipenem for wound sepsis. The other two had amoxicillin/clavulanic acid for concurrent respiratory infections prior to transfer.

Use of dressings can be variable depending on mechanism, depth of burn and surgeon preference. In the case of severe wound infection, the opted dressing of choice was mafenide acetate soaked gauze.

Globally the presence of MDRGNB are on the rise and in particular, commonly seen in patients with severe wounds in the case of burns given inadequate initial debridement and subsequent broad-spectrum antibiotic coverage. Our patient sample appears to be too small to capture any significant risk factors or related adverse outcomes despite evidence in other literature.

Conclusion

Up to one third of paediatric patients transferred from overseas were colonised with MDRGNB. This likely resulted from delays to adequate primary debridement, although our data was unable to demonstrate contribution from use of early broad spectrum antibiotics prior to transfer. Furthermore, our data was insufficient to demonstrate any statistically significant increased rates of graft failure or trips to theatre in the MDRGNB group. Future review should aim to review a wider paediatric population to measure impact of MDRGNB in the local community.

Email: bobby.fangbo.lin@gmail.com