Skin and gut colonisation with *Staphylococcus haemolyticus* in term and preterm neonates

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Background

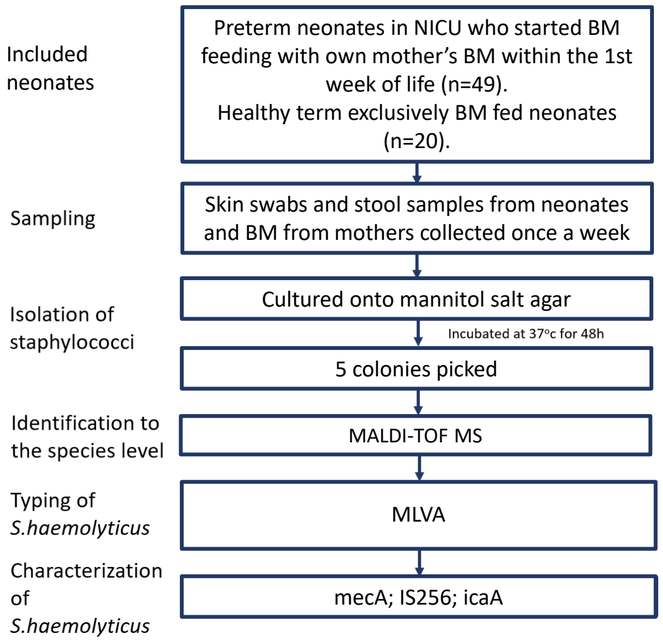
- Among coagulase-negative staphylococci *Staphylococcus haemolyticus (SH)* is the second commonest cause of late-onset sepsis (LOS) in preterm neonates. Clones spread in NICUs has been described.
- SH colonisation is poorly described. Understanding the mechanisms of SH colonisation may hold potential to develop strategies for prevention of invasive infection

Aim

To compare SH colonisation of healthy term and hospitalized preterm neonates in terms of:

- the prevalence and multilocus variable-number tandem-repeats analysis (MLVA) type distribution
- the prevalence of virulence factors

Material and Methods



Results

- Median (range) gestational age and birthweight of included term and preterm neonates was 40 (39-40) and 28 (25-30) wks; 3651 (3324-3970) and 1154 (814-1564) g
- Colonisation with SH was
  - more likely in preterm than term neonates (45/49 vs 11/20; OR 9.2; 95%CI 2.4-35.5)
  - equally likely in gut and on skin (55/69 vs 51/69; OR 1.4; CI 0.6-3.1).
- In unit A 15/19 and in unit B all neonates were colonised with *SH* (p=.018294)
- 621 isolates represented 41 MLVA-types, 32 present in preterm and 12 in term neonates, with only 3 colonising both term and preterm.

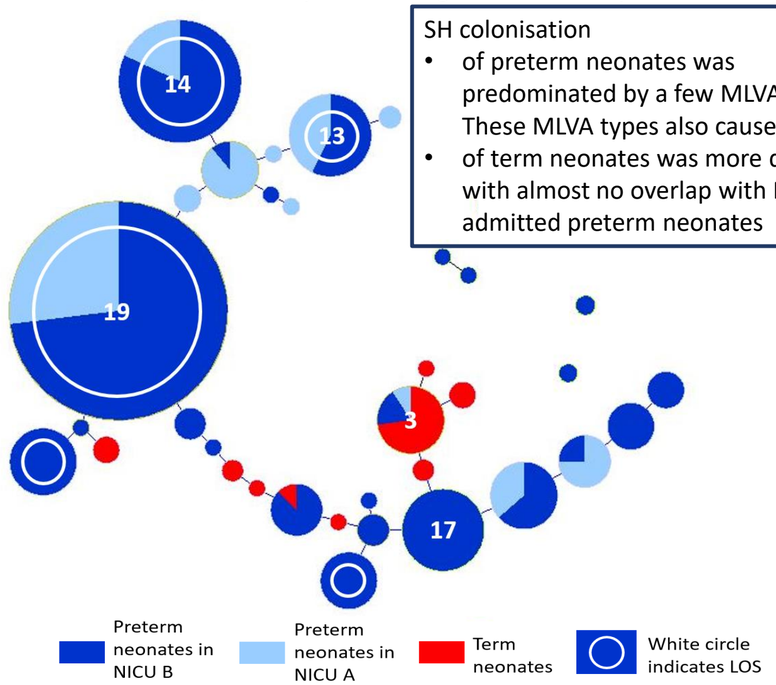


***Figure*: *MLVA-types colonising term and preterm neonates*.** *Each node represents a distinct MLVA-type and the size of the node is proportional to the number of isolates of the MLVA-type. Numbers in nodes represent 5 most common MLVA-types. MLVA-types yielding multiple bands in loci Sh1 and Sh2 (n=7) were excluded.*

SH colonisation

- of preterm neonates was predominated by a few MLVA-types. These MLVA types also caused LOS.
- of term neonates was more diverse with almost no overlap with NICU admitted preterm neonates

- MLVA-types colonising preterm compared with term neonates carried more likely virulence genes
  - *mecA* (153/185 vs 1/27; OR 124.3; 95%CI 16-950)
  - IS*256* (95/185 vs 0/27; OR 58; 95% CI 3-966)
- None of tested isolates were *icaA* positive.
- Five MLVA-types (Figure 1)
  - Colonised 69% (34/49) of preterm, but none of term neonates
  - Caused 7 episodes of LOS in 6 preterm neonates. (Table)

Table: *LOS cases.*

Patient	MLVA-type	Age during first isolation from blood (days)	Isolated from SKIN before LOS (days)	Isolated from GUT before LOS(days)
B10	14	7	=	*
	19	17	*	3
B16	15	10	4	*
B20	13	11	2	5
B21	18	6	*	*
B22	19	7	5	5
C07	19	15	5	5

Each MLVA-type is presented in a different color. If MLVA-types colonised gut or skin prior to or at the same time as blood, it is colored accordingly.
= isolated on the same day as LOS
** Isolated later than from blood or not fount on this site*

Conclusion

- NICU environment may be responsible for higher colonisation with more virulent SH strains in preterm.
- Control of virulent NICU clones may hold potential to reduce the burden of invasive infections.

SH – *Staphylococcus haemolyticus*
BM – breast milk
LOS – late-onset sepsis
NICU – neonatal intensive care unit

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