Background and aims Device-related infections are thought to be initiated by adhesion of the bacteria to a medical device, followed by colonisation and mature biofilm formation. Preterm infants are susceptible to device-related infections caused by Staphylococcus epidermidis. Also, preterm infants have lower levels of antimicrobial peptides, including human cathelicidin antimicrobial peptide LL37, a condition that may result in their increased vulnerability. Our aim was to evaluate the effect of peptide LL37 on 1) the expression of biofilm-associated genes and 2) biofilm mass, by using an in vitro model.

Methods Biofilm formation of S. epidermidis was studied on intra vascular catheter pieces and in culture plates, in the absence or presence of LL37. Bacterial biofilm mass was investigated by scanning electron microscopy (SEM). Changes in biofilm-associated gene expression was determined by real-time polymerase chain reaction.

Results Tissue-like concentration of the peptide down-regulated most of the investigated genes after 2 h. A diminished biofilm mass was seen on the catheter surface by SEM after 24 h incubation.

Conclusions Peptide LL37, as part of innate immune defense of the newborn infant is crucial for the regulation of the commensal flora, including Staphylococcus epidermidis. A diminished activity of LL37, as found in preterm infants, may contribute to increase their risk of device-related infections.

Introduction Newborn infants are at risk of vitamin D deficiency and various studies implicate vitamin D as having immunomodulatory effect. Adequate generation of reactive oxygen intermediates (ROI) by neutrophils (PMN) during sepsis is bactericidal. However, production of neutrophil oxidase activity in the presence of sepsis is impaired in neonates.

Aim To examine the in vitro effect of 1, 25(OH)2D3 on whole blood PMN and monocyte ROI, TLR4, CD11b in newborn infants during sepsis in vitro.

Methods Whole blood from preterm infants <32 weeks gestation within 24 h of birth, cord blood from term infants and adult controls were analysed for phagocytic expression of Toll-Like Receptor 4 (TLR4; pathogen recognition); CD11b (chemotaxis and adhesion) and ROI production (bacterial kill) using flow cyrometry. These were assessed in response to Lipopolysaccharide (LPS; Endotoxin; in vitro) and 1,25(OH)2D3.

Results ROI production from preterm and term neonatal neutrophils incubated with LPS alone was not significantly increased in contrast to adults. However pre-incubation with 1,25(OH)2D3 before adding LPS demonstrated a significant increase (p = 0.001) in ROI production for both preterm and term infants while simultaneous LPS and 1,25(OH)2D3 had no effect.

Conclusion New born infants were hypo-responsive in the presence of sepsis in vitro which recovered on pre-treatment with 1, 25(OH)2D3. Pre-treatment with vitamin D may improve term and preterm infants’ antibacterial responses.

Enteroviruses (EV) are among the most common viruses infecting humans. One third of EV infections concern children under 1 year. Neonatal EV infections lead to a wide range of clinical manifestations, from mild febrile illness to severe, potentially fatal sepsislike conditions with multiorgan failure.

EV detections by serotype were reported by the “National Reference Centre for Infections EV” Lyon, on a monthly basis. Demographic, clinical and biological data are also collected in neonates hospitalised in 2012 for EV infection. Two sub-groups were identified according to the beginning of symptoms before or after 8 days of life (D8). There were 120 neonatal EV infections. Before D8, children with severe infection were born more prematurely with a low birth weight. EV most commonly detected in neonates included CVB4 and E11. Risk factors of severe EV infections included liver (73% before D8) and haematological damages (thrombocytopenia 82% and coagulopathy 64% before D8).

This study suggest a systematic serotyping of neonatal EV infections and biological monitoring of liver function to early identification of children at high risk of clinical severity and fatality.

Human parechoviruses (HPeVs) belong to Parechovirus genus and have recently been added to the Picornaviridae family. Their epidemiology, pathogenicity and virulence is only beginning to be understood. Neonates, infants and young children seem to be the most susceptible subjects. The clinical presentation is similar to that of enterovirus infections. HPeV type 3 has been reported to cause neonatal infection, presenting with central nervous system symptoms or a sepsis-like illness.

Objective As part of a prospective study on neonatal sepsis, we aimed to assess the importance of HPeV as a cause of infection in the neonatal period.

Materials and methods During the period October 2012 – December 2014, term newborns (0–28 days) admitted to the...
NICU for a suspected infection (defined by clinical or analytical sepsis, fever without a source, or neurological symptoms) are included in the study. Neonates with clear respiratory or gastrointestinal symptoms are excluded. A screening for bacterial and viral infection is performed. In negative cases, a real-time RT-PCR for HPeV detection is performed in cerebrospinal fluids.

**Results** We present the data for the first 18 months of the study period. 28 newborns were included in the study. There were 2 confirmed cases of HPeV-3 infection. Both presented in May 2013, with fever of unknown origin, and had normal cerebrospinal fluid analysis. Case 1 was 6 days old. Case 2 was 19 days old and during the hospitalisation period developed diarrhoea and respiratory apneas requiring oxygen support. Both had a favourable evolution.

**Conclusions** Clinicians should include HPeV in the differential diagnosis of neonatal infection.

---

**PS-306** NEO NATAL LUMBAR PUNCTURE – ARE CLINICAL LANDMARKS ACCURATE?

1. R W Baxter, 1 E Evans, 1 R Morris, 1 U Ghafoor, 1M Nana, 1 T Weldon, 2 G Todor, 1 Hildebrandt. 1Paediatrics and Neonatology, Princess of Wales Hospital, Bridgend, UK; 2Paediatric Radiology, Princess of Wales Hospital, Bridgend, UK

**Background** The intercristal line, defined by the superior aspect of the iliac crest, is used to clinically identify the correct position for lumbar puncture in neonates. Accepted practice is to insert the needle in the intervertebral space at L3/4 or L4/5.

**Aim** We hypothesised variation in anatomical structures in term neonates and that the intercristal line might not accurately aid identification of the correct intervertebral space.

**Method** Following ethical approval 30 term neonates were recruited. Paediatricians identified and marked the intercristal line and intervertebral space above, with neonates in left lateral position. The anatomical position of both points and the conus medullaris end point were confirmed using ultrasonography.

**Results** The intercristal line was marked from L2/3 to L5/S1. In 25 neonates (83%) the intercristal line was identified between L3/4 and L4/5. The intervertebral space above this line was marked between L1/2 to L4/5. The potential site for lumbar puncture was identified too high in 11 cases (36%).

The end of the conus medullaris ranged from L1 to L3 terminating at L2 or lower in 11 cases (36%).

**Conclusion** There is wide variation in the position of the intercristal line and potential lumbar puncture site. The potential lumbar puncture site was marked higher than anticipated at L2/3 or above in 11 neonates (36%). The end of the conus medullaris was identified in 11 neonates (36%) at L2 or lower. Using the intercristal line to guide lumbar puncture does not appear to be accurate raising the possibility of potential spinal cord damage.

---

**PS-307** NATIONAL RECOMMENDATIONS FOR THE INVESTIGATION OF EARLY ONSET NEONATAL SEPSIS: LUMBAR PUNCTURE INCIDENCE AND INDICATIONS

R Irving, P Lister, D Jolley, LF Hamilton, HE Gillet, JV Davis. Neonatology, St Michael’s Hospital University Hospitals Bristol, Bristol, UK

**Background** Early onset sepsis (EOS) is a leading cause of morbidity and mortality in newborns. The incidence of culture-positive EOS in UK neonates is 0.9/1000 live births. We aimed to compare EOS investigation practice with The National Institute of Clinical Excellence (NICE) guidelines (2012) for investigation, and determine factors that influence LP acquisition.

**Method** We conducted a retrospective observational study in a regional neonatal unit, using data from 213 babies investigated for EOS (<48 h). We reviewed patient notes, electronic records, and pathology results in 2 epochs (September–October 2012, April–May 2013). Clinical concern of infection was judged retrospectively using NICE criteria (any ‘Red Flag’, >2 risk factors, or other clinical indicators).

**Results** Data was collected from 213 term babies (228 infection episodes). Clinical concern for infection was identified in 52/228. These infants had more respiratory distress and shock than those without clinical concern. (p < 0.05). In total 31/228 babies had an LP; 14/31 infants had clinical concern of infection. Clinical concern for infection was similar in the ‘LP group’ and ‘non-LP group’. The ‘LP group’ had a larger proportion of neonatal pyrexia (18/31 vs. 60/137, p < 0.05) and median maximum CRP (19 mg/l vs. 1 mg/l, p < 0.05) than the ‘non-LP group’. There were no positive blood/CSF cultures.

**Conclusion** Despite its low incidence EOS causes substantial clinical concern. LPs were not carried out in a number of infants despite meeting NICE criteria. Maternal risk factors and maximum CRP appear to determine the acquisition of LP more than physician ‘concern’ of infection.