ID 490 - CASE REPORT: USE OF ECG MONITORING IN A CASE OF UNDETECTABLE HEART RATE ON AUSCULTATION

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**Background:**
According to ILCOR and Newborn Life Support (2021) recommendations, pulse oximetry (POx) and Auscultation for heart rate (HR) assessment during resuscitation/stabilization should be the preferred method, with consideration given to the use of Electrocardiograph (ECG) monitoring. However, several studies and systematic reviews found HR monitoring using ECG compared to POx and Auscultation to be more objective, reliable and quicker.

We present a case of a preterm baby, focusing on HR detection and monitoring during stabilisation following currently recommended HR monitoring practice.

**Case report:**
Male infant 26weeks, birth weight 930g, born by caesarian section for Antepartum haemorrhage (APH) with almost immediate cord clamping. Born floppy, pale, bruised, HR <60 (auscultation) and no respiratory effort. All thermal control measures were put in place and POx applied to the right hand within a minute. NLS stabilisation algorithm was followed with airway manoeuvres and inflation breaths at PIP/PEEP 25/6cmH20 with successful chest rise during 2nd set. Ventilation breaths for irregular respiratory effort with good chest rise followed. HR was 100 (auscultation) at 3mins. FiO2 was increased to 50% and baby was pink by 4mins onwards but HR remained @100. At 7.5mins, the HR was difficult to appreciate on auscultation and thought to be <60, so cardiac compressions (CPR) commenced and pneumothorax ruled out on trans-illumination.

Intubated successfully at 9mins on 2nd attempt (1st at 5mins) confirmed by auscultation and CO2 capnograph, secured at 6.5cm. HR still difficult to auscultate @20mins, first POx Sats 58-60% in 100%, but no HR on POx. ECG monitor quickly attached, that showed HR 180 at 22 minutes with POx now showing HR 47 (see images). CPR was stopped based on this. Subsequent POx HR reading was intermittent and remained far below that on ECG monitor which gave consistent continuous HR >150

**Conclusion:**
In resuscitation/stabilisation, the most crucial parameter on which interventions are carried out is HR, therefore the best and most accurate method of detection and continuous monitoring should be used. With poor or difficulties with HR detection from auscultation and POx, continuous ECG should be applied as this has been found to be more reliable and accurate.
Fig: Monitors reading at same time-
Pulse oximetry (left) showing saturation of 58% and HR of 47/min,
ECG trace (right), showing HR 180/min.

None declared
ID 482 - UNBALANCED CYTOKINE RESPONSES IN TOLL-LIKE RECEPTOR STIMULATED CORD BLOOD MONOCYTES

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1Division of Neonatology, University Leipzig Medical Centre, Leipzig, Germany, 2University Children's Hospital, University of Würzburg, Würzburg, Germany, 3Section of Neonatology, Department of Pediatrics, University of Colorado School of Medicine, Children's Hospital Colorado, Aurora, United States

Background:
Unique features of early life immune responses are thought to place preterm and term infants at risk of severe infections and inflammation-related morbidities. Underlying mechanisms are not fully understood. Qualitative and quantitative differences in monocyte function including toll-like receptor (TLR) expression and signaling have been described. Some studies point to stimulus-specific patterns. The present study addressed early immune responses in preterm and term cord blood monocytes upon TLR1/2 (Pam3CSK4), TLR2/6 (zymosan), TLR3 (polyinosinic:polycytidylic acid; poly(I:C)), TLR4 (lipopolysaccharide), TLR5 (flagellin) and TLR9 (CpG oligonucleotide) stimulation compared to responses in adult cells.

Methods:
Neonatal and adult monocytes were stimulated with TLR agonists. Using qPCR, flow cytometry and bead-based immunoassay, expression of pro- and anti-inflammatory cytokines and chemokines (TNF-α, IL-1β, IL-6, IL-8, IL-10, IL-1RA, CXCL10 (IP-10), RANTES) and interferons (IFN-α2/β/γ) was assessed. Ratios of monocyte subsets and phosphorylation of TLR downstream molecules p65, p38, ERK1/2, SAPK/JNK, IRF3 and IRF7 were analyzed by means of flow cytometry. TLR expression was evaluated at the transcriptional and translational level.

Results:
Independent of stimulus, term neonatal monocytes mounted pro-inflammatory responses comparable to adult ones. Except from IL-1β release, this was also true for preterm monocytes. In contrast, preterm and term monocytes released lower amounts of IFN-γ, counter-regulatory IL-12 as well as anti-inflammatory IL-10 and IL-1RA and showed higher ratios of pro-inflammatory to anti-inflammatory cytokines. While basal ratios of monocyte subsets correlated with those in adults, stimulus-induced levels of so-called “non-classical” CD14dimCD16+ monocytes were higher in neonatal samples. Moreover, neonatal and adult monocytes partly differed in stimulus-induced TLR expression. Kinetics of phosphorylation of serine or threonine and tyrosine residues of p65, p38, ERK1/2, SAPK/JNK, IRF3 and IRF7 were analyzed in neonatal and adult monocytes. There was a tendency towards lower total amounts of phosphorylated p65 and ERK1/2 in preterm monocytes.

Conclusion:
Our data confirm robust pro-inflammatory immune responses in preterm and term monocytes, but show diminished counter-regulatory and anti-inflammatory responses, independent of stimulus, coming along with unfavorable cytokine ratios. Higher numbers of pro-inflammatory “non-classical” CD14dimCD16+ monocytes may further promote imbalanced inflammation. Distinct patterns of stimulus-induced TLR expression might render neonates more susceptible to a second hit.

None declared
ID 23 - ANTIMICROBIAL STEWARDSHIP INTERVENTIONS IN THE NICU (NEONATAL INTENSIVE CARE UNIT)

Mrs Julie Hitchcox
1Nottingham City, Nuh Trust, Nottingham, United Kingdom

Background:
Antibiotics are the most frequently used medication in the Neonatal Intensive Care Unit (NICU). Antimicrobial resistance (AR) is a global issue affecting intensive care population including NICUs increasing the risk of mortality and morbidity in premature and sick newborn infants. World Economic Forum has recognised AR as a “public health crisis” with 25,000 deaths per year die from multidrug-resistant bacteria, costing society around €1.5 billion annually.

This systematic review aimed to identify interventions that reduce inappropriate antibiotic use, improve antimicrobial stewardship (AMS) and provide robust recommendations for AMS management within the NICU setting.

Method:
A systematic review of the literature identified nine studies including retrospective and prospective observational studies; before-and-after studies; and audit quality improvement projects. There were no randomised control trials identified. Each study was systematically appraised using a dual framework of Critical Appraisal Skills Programme (CASP) and Parahoo’s models, assessing the rigour and validity of the research methodology, ensuring all relevant data was extrapolated.

Thematic analysis was carried out to identify recurring themes in AMS with evaluation of these themes and recommendations for clinical practice drawn.

Results (table 1):
Thematic analysis identified 5 recurring themes in AMS: Antimicrobial Stewardship Teams, Education, Guidelines, Audit and Feedback, and Hard Stop Prescribing (HSP). One study used a single intervention approach, HSP, and found a statistically significant reduction in Days Of Therapy (DOT) of 25% (p<0.0001).

Five further studies using mixed method interventions observed a statistically significant reduction of 10.6-30% in antibiotic DOT, with no increase in mortality or morbidity (p<0.05).

DOT reduction was not measured or found to be significant in the remaining three studies; however a number of secondary outcomes within the studies also supported the use of AMS. Reduction in prolonged antibiotic use in pneumonia (p<0.0001) and culture negative sepsis (p<0.04) were found to be significantly reduced when multiple interventions were initiated.

Conclusion:
A mixed intervention approach was found to be most effective in reducing inappropriate antibiotic use. A combination of each recognised thematic intervention is plausible and recommended for implementation on the NICU. Further research is required to develop strategies to improve AMS in the venerable neonatal population.
Table 1: Study results and interventions used

<table>
<thead>
<tr>
<th>Results of Therapy</th>
<th>Reduction of Days of Therapy</th>
<th>Reduced prolonged use in pneumonia</th>
<th>Reduced prolonged use in culture -ve</th>
<th>Other</th>
<th>Thematic Intervention Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>%</td>
<td>P value</td>
<td>%</td>
<td>P value</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>27%</td>
<td>P&lt;0.0001</td>
<td>82 to 7.5</td>
<td>46.5 to 7</td>
<td>AST, Education, Audit &amp; feedback, Hard stop prescribing</td>
</tr>
<tr>
<td>2</td>
<td>30%</td>
<td>P&lt;0.0001</td>
<td>64 to 28</td>
<td>66 to 33</td>
<td>Reduction in LOS rates p&lt;0.003</td>
</tr>
<tr>
<td>3</td>
<td>27%</td>
<td>P&lt;0.0001</td>
<td>36% P&lt;0.0001</td>
<td>31% P&lt;0.04</td>
<td>AST, Guidelines, Hard stop prescribing</td>
</tr>
<tr>
<td>4</td>
<td>4.3%</td>
<td>P 0.669</td>
<td></td>
<td>Reduction in prescriptions P&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>15%</td>
<td>P&lt;0.01</td>
<td>Post op:</td>
<td>Education, Guidelines</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Decline of Meropenum 4%, Cefotaxime 5%, Vancomycin 6%</td>
<td></td>
<td></td>
<td></td>
<td>AST, Education, Guidelines, Hard stop prescribing</td>
</tr>
<tr>
<td>7</td>
<td>25%</td>
<td>P&lt;0.0001</td>
<td></td>
<td>Hard stop prescribing</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10.6%</td>
<td>P&lt;0.05</td>
<td></td>
<td>AST, Guidelines</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Decline in commencement</td>
<td>76% P&lt;0.001</td>
<td>Reduced prolonged use 24%&lt;0.001</td>
<td>AST, Education, Audit &amp; feedback, Guidelines</td>
<td></td>
</tr>
</tbody>
</table>
ID 31 - CESAREAN SECTION VERSUS VAGINAL DELIVERY FOR THE NEONATAL OUTCOMES IN VERY PRETERM INFANTS

Doctor Mustafa Senol Akin1, Doctor Fatma Nur Sari1, Doctor Mehmet Büyüktiryaki2, Doctor Ömer Ertekin1, Doctor Evrim Alyamac Dizdar1, Doctor Serife Suna Oguz1

1Ankara City Hospital, Ankara, Turkey, 2Medipol University, Faculty of Medicine, Istanbul, Turkey

Background:
Vaginal delivery is the most common type of birth however, the rate of cesarean section is rising worldwide. And studies provide conflicting results about the association between delivery mode and neonatal morbidity or survival in preterm infants. We aimed to determine the effect of delivery mode on neonatal outcomes in very preterm infants.

Methods:
Preterm infants with birth weight 1000-1500 g and gestational age <30 weeks, born in a tertiary center were retrospectively evaluated. In order to determine the effect of mode of delivery on neonatal outcomes, the study population was divided into two groups as those born by vaginal delivery (VD) or cesarean delivery (CD). Neonatal results of the infants were compared according to delivery mode.

Results:
A total of 404 infants were recruited to the study; 70 of whom were delivered vaginally. The median gestational age (28 vs 29 weeks) and birth weight (1200 vs 1195 g) of the infants were similar in VD and CD groups. Surfactant administration was significantly higher in infants born by CD (55 % vs 28.6 %; p = <0.001). Resuscitation need in the delivery room and the use of inotropes in the first week of life were more common in infants born by CD (p=0.001, p=0.021; respectively). Also, infants’ oxygen requirement at NICU admission, duration of non-invasive or invasive ventilation were higher in infants born by CD (p = <0.001, p = 0.002, p = 0.001, respectively). There was a non-significant increase in occurrence of severe intraventricular hemorrhage, early onset sepsis, hemodynamically significant patent ductus arteriosus, retinopathy of prematurity requiring treatment and bronchopulmonary dysplasia in CD group compared to VD group. Additionally, it was observed that CD might have negative impact over mortality, although the difference was not significant (9.3% vs 5.7%; p= 0.33).

Conclusion:
Very preterm infants delivered by cesarean section should be closely monitored in terms of possible adverse neonatal outcomes.

None declared
ID 543 - ENTEROVIRAL MENINGITIS IN NEONATES: A SINGLE CENTRE CASE SERIES OVER 9 YEARS PERIOD

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¹Watford General Hospital, Watford, United Kingdom

Background
Enteroviral infection in the newborn ranges from a self-limiting benign illness to severe life-threatening illness with devastating sequelae. Currently there is no specific antiviral treatment available, however early diagnosis allows clinicians to stop antibacterial treatment and continue with supportive management. Identifying risk factors and clinical features associated with high mortality and morbidity would allow clinicians to support patients and families, monitor and prognosticate outcomes.

Aim of this study is to describe the clinical presentation and management of neonatal enteroviral meningitis and identify risk factors to predict morbidity and mortality.

Methods
A single centre retrospective observational study was conducted over a 9-year period (2012-2020). Neonates with identified enterovirus on cerebrospinal spinal fluid (CSF) polymerase chain reaction (PCR) were included. Demographics, age at presentation, clinical features, investigations, treatment, complications, length of hospital stay were collected. Duration of antibiotic treatment, time taken for results to be available were also noted as part of quality improvement and antibiotic stewardship.

Results
74 symptomatic infants tested positive for enterovirus on CSF PCR. The average age at presentation was 14 ±7 days. Table 1 shows the demographic and clinical data. Commonest symptom at presentation was fever (90.5 %), irritability (37.8 %), poor feeding (27%), respiratory symptoms (18.9%) and lethargy (28.4%). There was one death noted in this cohort. Average duration of antibiotics treatment was 4.1±2.1 days. Seasonal variation was noted in this cohort with majority (65%) of the cases occurring between May and August with an exception to the year 2015 when all cases were reported during winter times.

Conclusion
This is one of the largest cohort of data on neonatal enteroviral meningitis which demonstrated that most neonates presented with symptoms throughout the neonatal period and resolution was noted without sequelae. CSF PCR results were available within a short timeframe although antimicrobials were often continued longer. This will allow us to explore health professional anxiety on stopping antibiotics and improve our antibiotic stewardship.

Further data will be collected to look at long term follow up.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation at birth (weeks) (Mean, SD)</td>
<td>39+2 weeks ±13 days</td>
</tr>
<tr>
<td>Birth weight (g) (Mean, SD)</td>
<td>3119.15± 1009.55 g</td>
</tr>
<tr>
<td>Mode of delivery (SVD%)</td>
<td>62.1%</td>
</tr>
<tr>
<td>Maternal illness (%)</td>
<td>27%</td>
</tr>
<tr>
<td>Sibling/family illness (%)</td>
<td>31.1%</td>
</tr>
<tr>
<td>Age at Presentation (days) (Mean, SD)</td>
<td>14 ± 7</td>
</tr>
<tr>
<td>Clinical Presentation with Fever (%)</td>
<td>90.5%</td>
</tr>
<tr>
<td>Fever maximum (mean, SD)</td>
<td>38.78 ± 0.72 C</td>
</tr>
<tr>
<td>Tachycardia without fever (%)</td>
<td>39.2%</td>
</tr>
<tr>
<td>Arrythmias (%)</td>
<td>3 (4.1%)</td>
</tr>
<tr>
<td>Pericardial/pleural Effusion</td>
<td>4 (5.4%)</td>
</tr>
<tr>
<td>Inotropes</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Assisted Ventilation</td>
<td>3 (4.1%)</td>
</tr>
<tr>
<td>CRP (Mean)</td>
<td>36.04</td>
</tr>
<tr>
<td>Thrombocytopaenia (&lt;100)</td>
<td>3 (4.1%)</td>
</tr>
<tr>
<td>CSF Glucose (Mean, SD)</td>
<td>2.9±0.57</td>
</tr>
<tr>
<td>CSF Protein (Mean, SD)</td>
<td>0.89±0.58</td>
</tr>
<tr>
<td>CSF WCC (Median, Range)</td>
<td>5 (&lt;1-2330)</td>
</tr>
<tr>
<td>Positive Blood culture</td>
<td>4 (5.5%)</td>
</tr>
<tr>
<td>Troponin (number of infants with test performed)</td>
<td>10 (13.5%)</td>
</tr>
<tr>
<td>Abnormal Cranial scan/MRI Brain (%)</td>
<td>2 (2.7%)</td>
</tr>
<tr>
<td>Abnormal ECHO (%)</td>
<td>6 (8.1%)</td>
</tr>
<tr>
<td>Abnormal ECG (%)</td>
<td>2 (2.7%)</td>
</tr>
<tr>
<td>Death (%)</td>
<td>1 (1.4%)</td>
</tr>
<tr>
<td>Length of hospital stay (Mean, SD) days</td>
<td>4.8 ±3.1</td>
</tr>
</tbody>
</table>

Table 1: Demographic, clinical data, investigations and complications
None declared
ID 137 - CRANIAL ULTRASOUND SCREENING OF NEWBORNS FROM MOTHERS WITH COVID-19 DURING PREGNANCY

Doctor Anna Sugak¹, Professor Dmitry Degtyarev¹, Doctor Elena Filippova¹, Doctor Olga Grebneva¹, Doctor Irina Nikitina¹, Professor Victor Zubkov¹, Doctor Anna Karavaeva¹, Professor Anna Degtyareva¹
¹National Medical Research Center For Obstetrics, Gynecology And Perinatology Named After Academician V.i. Kulakov, Moscow, Russian Federation

Background. SARS-CoV-2 infection in a pregnant woman can have an adverse effect on the fetus and newborn like other viral infections. Owing to coagulopathy observed in patients with COVID-19, these complications are likely due to impaired fetoplacental perfusion and thrombotic changes. To date, studies of the COVID-19 effect on the fetus and newborn are insufficient and they are based on a small number of observations. The aim of study is to investigate the spectrum and prevalence of the brain lesions detected by ultrasound in newborns from mothers with COVID-19 during pregnancy.

Methods. Screening cranial ultrasonography was performed in 302 neonates born from July 2020 to March 2021 to mothers with COVID-19 during pregnancy. Neonates with antenatal congenital malformations were excluded from the study. Cranial ultrasonography was performed according to the standard methodology. The age of the neonates was from 1 to 4 days of life. 237 patients (79%) were in physiology departments and discharged home, 25 patients (8%) were transferred to neonatal pathology departments, and 40 patients (13%) were in intensive care units. 277 newborns (92%) were full-term, and 26 (9%) - preterm.

Results. The most common findings were choroid plexus cysts – in 59 neonates (19%); subependymal pseudocysts and germinal matrix hemorrhages (grade 1) in the cystic phase – in 25 neonates (8%); lenticulostriate vasculopathy – in 8 neonates (3%). A mild ventricular dilatation was detected in 3 neonates (1%). White matter injury were observed in 2 neonates (1%) – in one case, a contrast MRI of the brain revealed small vascular malformation with perifocal hemorrhage, in the second case – bilateral intraventricular hemorrhage (IVH) grade 3 and multiple intraparenchymal and extracerebral hemorrhages. None of the neonates had IVH grade 1 in the acute phase and IVH grade 2.

Conclusion. The vast majority of brain lesions detected by ultrasound in newborns from mothers with COVID-19 during pregnancy are typical for neonatal period and are not accompanied by clinical manifestations, with the exception of rare findings in isolated patients.

None declared
BACKGROUND
COVID-19 infection has been associated with haematological abnormalities (e.g. lymphopenia), hypercoagulability and thrombo-embolic disease in adults. Adverse perinatal outcomes (e.g. prematurity, low birth weight) and COVID-19 placentitis (associated with stillbirth in a number of cases) have been described following COVID-19 infection during pregnancy. The aim of this study was to evaluate if a COVID-19 infection during pregnancy resulted in haematological abnormalities or hypercoagulability in umbilical cord blood at birth.

METHODS
This was a prospective observational study. Infants born to women with a SARS-CoV-2 diagnosis at any time during pregnancy were recruited (n=15). Ethical approval was obtained. Umbilical cord blood was collected at birth; full blood counts were performed; thrombin generation was evaluated using Calibrated Automated Thrombography and clinical demographics were recorded. A group of healthy term infants (recruited prior to the outbreak of COVID-19) were the historical control group (n=10).

RESULTS
The clinical outcomes (birth weight, fetal distress, NICU admission) in infants born to women with COVID-19 were similar to controls. There was no evidence of haematological abnormalities (lymphopenia, leucopenia or thrombocytopenia) in the cord blood of the COVID-19 group (all were within local neonatal reference ranges). There was no difference in any of the thrombin generation parameters (lag time, peak thrombin, endogenous thrombin potential or time to peak thrombin) between the two groups (Table 1).

CONCLUSION
This study provides some reassurance regarding the haematological outcomes, following in utero exposure to maternal COVID-19. Further larger studies are required to evaluate the impact of COVID-19 infection in pregnancy, in particular, infections in the first trimester and COVID-19 placentitis.
Table 1: Plasma thrombin generation parameters in the COVID-19 group compared with controls; Median values (IQR).

<table>
<thead>
<tr>
<th>CAT Parameter</th>
<th>COVID-19 N=14</th>
<th>Control N=10</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lag Time (mins)</td>
<td>2.84 (2.67 – 3)</td>
<td>2.84 (2.67 -3.33)</td>
<td>0.92&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Peak thrombin (nM)</td>
<td>136.7 (130.7 - 156.1)</td>
<td>133.9 (129.2 - 149.5)</td>
<td>0.44&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>ETP (nM.min)</td>
<td>967.8 (869 - 1055.6)</td>
<td>861 (826.3 – 980)</td>
<td>0.24&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Time to peak (mins)</td>
<td>6.4 (6.0-7.0)</td>
<td>6.3 (5.7 - 7.3)</td>
<td>0.94&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Table 1: Plasma thrombin generation parameters in the COVID-19 group compared with controls; Median values (IQR).
Prof. Fionnuala NíAinle has received research funding (paid to the University) from Bayer and Sanofi (unrelated to this project). The remaining authors report no conflicts of interest.
BACKGROUND
COVID-19 infection during pregnancy has been associated with adverse perinatal outcomes including preterm birth. There is growing concern about the B.1.1.7. variant; associated with more severe maternal illness and COVID-19 placentitis. The B.1.1.7. variant has been the dominant strain in Ireland since January 2021. The aim of this study was to evaluate the neonatal outcomes of liveborn infants, to women with a SARS-CoV-2 diagnosis during pregnancy, in a Tertiary University Maternity Hospital (8,500 deliveries/year) in Ireland.

METHODS
This was a retrospective review of liveborn infants, born to women with a SARS-CoV-2 diagnosis at any time during pregnancy, delivered between 1st March 2020 and 1st March 2021. Ethical approval was obtained. Clinical data was collected and sub-analysis were performed to evaluate the impact of maternal symptom status and diagnosis after the outbreak of B.1.1.7. as the dominant strain.

RESULTS
133 liveborn infants were delivered to women with a confirmed SARS-CoV-2 diagnosis during pregnancy. A majority of SARS-CoV-2 diagnosis occurred in the third trimester (n=119 (89.5%)). The median birth weight was 3.45kg and gestational age at birth was 39.3 weeks. Fourteen infants (10.5%) were born preterm (<37 weeks), although 12 (86%) were late preterm (34-36 weeks). Twenty-two infants (16.5%) required admission to the neonatal unit and 4 (3%) were critically unwell requiring mechanical ventilation. Seven infants (5.3%) were small for gestational age (<10th centile) and 12 infants (9%) had congenital anomalies. There was no difference in growth, preterm birth or neonatal unit admission based on maternal symptom status or infection after the outbreak of B.1.1.7. as the dominant strain.

CONCLUSION
The neonatal outcomes (preterm birth and NICU admission) following a maternal COVID-19 infection during pregnancy did not differ significantly from the 5-year hospital incidence. Maternal symptom status or infection following the outbreak of the B.1.1.7. variant did not alter neonatal outcomes. Further studies are required to evaluate the impact of COVID-19 in early pregnancy, the B.1.1.7. variant and COVID-19 placentitis.
<table>
<thead>
<tr>
<th></th>
<th>Pre-B.1.1.7 emergence</th>
<th>Post B.1.1.7 emergence</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of maternal SARS-CoV-2 diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestational age at diagnosis (weeks) IQR</td>
<td>34.9 (30 – 38.9)</td>
<td>37.7 (35 – 39)</td>
<td>0.002**</td>
</tr>
<tr>
<td>Gestational age at birth (weeks) IQR</td>
<td>39.6 (38.6 – 40.3)</td>
<td>39.3 (38.3 – 40.4)</td>
<td>0.57a</td>
</tr>
<tr>
<td>Birth weight (kg) IQR</td>
<td>3.46 (3.05 – 3.84)</td>
<td>3.39 (2.97 – 3.82)</td>
<td>0.91a</td>
</tr>
<tr>
<td>Preterm birth</td>
<td>7 (10.5%)</td>
<td>7 (10.6%)</td>
<td>0.98b</td>
</tr>
<tr>
<td>NICU admission</td>
<td>11 (16.4%)</td>
<td>11 (16.7%)</td>
<td>0.97b</td>
</tr>
<tr>
<td>Small for gestational age (&lt;10th centile)</td>
<td>4 (6%)</td>
<td>3 (4.6%)</td>
<td>0.71b</td>
</tr>
</tbody>
</table>

Table 1. Neonatal outcomes before and after the emergence of variant B.1.1.7. *p <0.05, a-Mann Whitney U test, b-Chi-squared test

The authors have no conflicts of interest to disclose.
Background

Though tuberculosis (TB) among pregnant women is not unusual in our country, documented cases of congenital tuberculosis are rare and can be easily misdiagnosed because the disease presents few or no symptoms in the fetus during pregnancy and nonspecific symptoms in neonates. The prognosis can be fatal if untreated and is difficult to diagnose in time to treat successfully without knowledge of a maternal history of TB, as many of them are asymptomatic. We report 6 cases of congenital tuberculosis diagnosed on basis of revised Cantewell criteria.

Case Summary

Six vaginally delivered term neonates (aged 14-44 days) presented with cough, respiratory distress, abdominal distension and fever. Two neonates presented with severe sepsis with shock and required blood transfusion, inotropes and mechanical ventilation support. They had nonspecific pulmonary infiltrates in Chest X-ray and massive hepato-splenomegaly. Gastric aspirates were positive for Acid-fast bacilli in 5 neonates while endotracheal aspirate was positive in the 5th neonate. Mantoux test was positive in all neonates. Ultrasonography and computerized tomography of abdomen and thorax in three neonates showed multiple hypoechoic lesions in the liver along with regional lymphadenopathy, ascites and unilateral or bilateral pleural effusion. Other possible co-morbidities like malaria, TORCH infection, HIV and storage disorders were ruled out thoroughly. Standard antitubercular therapy was started and all neonates had recovered well. The mothers of all four neonates were asymptomatic, but undocumented past history of pulmonary tuberculosis with a positive Mantoux test. Histopathology for endometrial biopsies showed typical tubercular granulomas and PCR was positive for mycobacterial DNA. They all had a good response to standard antitubercular treatment. Other contacts of neonates were healthy and had a negative screening for tuberculosis.

Conclusion

Congenital TB is treatable if diagnosed and treated early. Non-specific presentation of congenital tuberculosis should be familiar to clinicians because early identification and treatment can prevent devastating consequences of serious disease. Congenital tuberculosis should be considered in newborns with pneumonia not responding to antibiotics if the mother is at risk for tuberculosis. As most of the women are asymptomatic, we recommend the screening of all possible pregnant women for tuberculosis.

None declared
Introduction:
To date, there are no exhaustive reports concerning possible sequelae on psychomotor and neurosensory development in newborns from SARS-CoV-2 infected mothers. Hereby we analyse a cohort of neonates from SARS-CoV-2 infected mothers, born at Luigi Sacco Hospital of Milan from March to November 2020.

Methods:
70 newborns from SARS-CoV-2 infected mothers were enrolled. Real-time PCR for virus detection on nasopharyngeal swab (NPS) was performed on all neonates during hospitalization. Neonatal management was in accordance with Italian Neonatal Society guidelines. Each patient underwent routine blood test, fundus oculi examination, infectious disease clinical evaluation, brain ultrasound, neurological examination and SARS-CoV-2 serological test (IgG - EUROIMMUN kit). Patients tested negative at 3 months did not repeat the test at 6 months. Follow up and recruitment is ongoing.

Results:
Nine out of 70 neonates resulted positive at SARS-CoV-2 on NPS during hospitalization. Three patients acquired SARS-CoV-2 infection at 1 months of life. At 3 months of age no blood routine test (57 out 70) and fundus oculi (59 out 70) alterations were found. All newborns were growing harmoniously according to the WHO growth curves. Two out of 30 had brain ultrasounds mild biventricular dilatation (one had positive NPS at 1 month of life). In 6 out of 65 patients mild axial hypotonia was observed at the neurological examination (one had perinatal positive NPS): 3 of these cases solved, 2 were lost to follow-up and in the other one psychomotor retardation was confirmed by neurological evaluation at 12 months of age, without any molecular or clinical criteria of SARS-CoV-2 infection. Serological analysis at 3 months of age revealed SARS-CoV-2 IgG presence in 11 out of 39 patient (2 had positive NPS), at 6 months 5 out of 19 (2 were positive at 3 months, 0 had positive NPS), at 12 months 2 out of 3 (1 was positive at 3 months, 0 had positive NPS).

Conclusion:
Our preliminary data reveal that SARS-CoV-2 infection acquired during pregnancy have no significant psychomotor and neurosensory impairment. However, more studies are needed to further understand the SARS-CoV-2 infection risk in newborns and its possible short- and long-term sequelae.

None declared
ID 189 - VIDEO-BASED REFLECTION ON NEONATAL INTERVENTIONS DURING COVID-19: AN OBSERVATIONAL STUDY

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Background
Covid-19 restrictions led to a decline in bedside teaching and training opportunities. The use of eye-tracking glasses has recently emerged as a revolutionary method in procedural education which might facilitate the training of healthcare providers and students without direct bedside attendance. Due to the eye-tracking method researchers can measure healthcare providers’ gaze patterns from a first-person view. The aim of this study was to determine the experience with, and the feasibility of, point-of-view video recordings using eye-tracking glasses for training and reviewing neonatal interventions during the COVID-19 pandemic.

Methods
This observational prospective single-center study was conducted at the Leiden University Medical Center in a single-room NICU ward from September to November 2020 and was designed following the STROBE guidelines for observational studies. All neonatal healthcare providers were included. There were two groups, proceduralists, who wore eye-tracking glasses during procedures, and observers who later watched the procedures as part of a video-based reflection. The procedures included endotracheal intubation, minimally invasive surfactant therapy (MIST), and umbilical catheter insertion. Both groups were asked to give feedback on the point-of-care video recording using a short questionnaire.

Results
We conducted 12 point-of-view recordings on ten different patients (median gestational age of 30.9 ± 3.5 weeks and weight of 1,764 grams) undergoing neonatal intubation (n=5), minimally invasive surfactant therapy (n=5), and umbilical line insertion (n=2). We conducted nine video-based observations with a total of 88 observers. The use of point-of-view recordings was perceived as feasible. Observers further reported the point-of-view recordings to be an educational benefit for them and a potentially instructional tool during COVID-19.

Conclusion
We proved the practicability of eye-tracking glasses for point-of-view recordings of neonatal procedures and videos for observation, educational sessions, and logistics considerations, especially with the COVID-19 pandemic distancing measures reducing bedside teaching opportunities. The authors report no potential conflict of interest.
ID 421 - SUPRAVENTRICULAR TACHYCARDIA IN THE SETTING OF SARS-COV-2 INFECTION IN A NEONATE

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Background:
Thus far, SARS-CoV2 infection appears to follow a mild course in the vast majority of neonates. Information regarding cardiovascular involvement in neonates is scarce.

Case presentation:
A 10-day old boy presented to the emergency department with reported fever up to 38.5°C and nasal congestion.
He was born full term via normal spontaneous vaginal delivery without any complication. His birth weight was 3200 gr. There was a negative family history of sudden death or rhythm disorders. Despite being asymptomatic, his mother had SARS-CoV-2 infection confirmed by rapid antigen detection test (RADT) on nasopharyngeal swab.
The neonate’s clinical examination, initial laboratory findings and chest X-ray were normal. His RT-PCR on a nasopharyngeal swab sample turned out positive. The neonate underwent a full sepsis work up. Blood, cerebrospinal fluid and urine samples were negative and the patient received broad-spectrum antibiotics.
On day 2 post admission he presented with tachycardia (250 beats per minute) during deep sleep. The neonate was afebrile and hemodynamically stable during this episode. Neither altered consciousness nor colour change were noted. A 12 lead electrocardiogram showed supraventricular tachycardia (SVT). The episode was self-limited, as the rhythm converted to sinus rhythm spontaneously. In addition, a 2-D colour echocardiography was performed and did not reveal either left ventricular dysfunction or hypokinetic posterolateral wall or hypokinetic septum. Additionally, troponin levels were normal, so myocarditis was ruled out. In accordance with the cardiologist’s suggestion, oral propranolol was initiated at a dose of 3mg per kilogram daily, titrated.
On day 7 post admission, a 24-hour rhythm record was performed. The ambulatory electrocardiogram showed sinus rhythm interrupted by 3 episodes SVT from 2 to 5 contractions, none of which was accompanied by symptoms.
The patient was afebrile from day 2 post admission and he had no further recurrence of clinical arrhythmia so he was discharged on day 14, with guidance for cardiologic surveillance and intermittent rate counting.

Conclusion:
The effect of SARS-CoV2 on myocardial function is still not well established. Nevertheless, it is important to be aware of the potential cardiac involvement in neonates, such as cardiac arrhythmias, in the setting of COVID-19 infection, as emergency care is required.

None declared
ID 498 - EARLY SERUM CYTOKINES ELEVATION (IL-6, IL-8, MCP-1) AS A PREDICTOR OF SEVERE RECURRENT NEC IN A PREMATURE NEONATE

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BACKGROUND.
Analysis of serum cytokines (IL6, IL8) is used in the diagnosis of neonatal sepsis (EONS and LONS). However, the dynamics of MCP-1 and its role haven’t been sufficiently studied.

CASE REPORT.
During our prospective study "Assessment of the cytokine profile in neonates with infectious and non-infectious diseases", all eligible patients (n=68, GA˂37w) from 2019 to 2020 underwent serum cytokines measurement on DOL 1,3 and 7 (IFNγ, TNFα, IL-1β, IL-2, IL-6, IL-12, IL-17, IL-4, IL-5, IL-10, IL-13, IL-8, MCP-1, MIP-1β, IL-7, G-CSF, GM-CSF). Preliminary data analysis of this study showed that one clinical case significantly differed from others. A premature boy, BW 1690 gr, Apgar score 7/8, delivery mode - C-section due to placenta previa accrete; had a pronounced cytokine response (IL-6, IL-8, MCP-1) on DOL 3 despite the absence of severe infectious clinical presentation within the 1st week of life. From the 1st DOL the baby was on non-invasive ventilation (NEOMOD- 3, nSOFA – 0). 1st DOL sepsis check-up, including blood culture, showed negative results.

On DOL 4 enteral feeding intolerance started to develop gradually, which progressed to NEC IIb by DOL 8 (Bell’s criteria). Later, a torpid disease course with 2 recurrent episodes was observed, which ended with intestinal perforation, laparotomy (bowel resection) on DOL 31, and death on DOL 33, despite massive antibacterial and intensive therapy.

A retrospective assessment of the cytokine levels in this patient showed an expressed increase in IL-6, IL-8, MCP-1 starting from DOL 3 with a maximum level on DOL 7. These findings preceded the development of specific clinical symptoms by 5-7 days (fig. 1). MCP-1 reacted in all patients with subsequent NEC and had a pronounced sensitivity and specificity at DOL 7 (AUC=0,97, (95% CI, 0,92–1,0; p=0,001) Se-100%, Sp -90%; Cutoff point 102,3 pg/ml).

CONCLUSION.
This case stands apart from other NEC cases because of 1) severe torpid recurrent course in spite of all efforts 2) an outstanding cytokine response (especially MCP-1) ahead of the disease manifestation. Further research is needed to determine the relationship between early cytokine elevation and subsequent NEC, as well as predictive value of MCP-1 in incidence and severity of NEC.
Figure 1. Clinical course

None declared
ID 557 - CANDIDA BLOODSTREAM INFECTIONS IN A NEONATAL INTENSIVE CARE UNIT: A 21-YEAR PERIOD RETROSPECTIVE SURVEY

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BACKGROUND:
The incidence of neonatal candidaemia varies across different Neonatal Intensive Care Units (NICUs). It ranges from 0.5% to 20% and is one of the major causes of morbidity and mortality. We evaluated the epidemiology of candidaemia in the NICU of a Greek University Hospital and investigated emerging trends.

METHODS:
The study included all neonates admitted in NICU from 1999 to 2020, identified with fungemia. Their medical records were reviewed and demographic data, clinical characteristics, microbiological results and outcome were recorded.

RESULTS:
During the study period, a total of 10,784 neonates were admitted to our unit, and 341 cases of culture-proven sepsis were identified. Thirty-six neonates were diagnosed with fungal bloodstream infection, resulting in an incidence of 0.33%, whereas during the last six years estimated incidence was 0.21%. Thirty-three (91.7%) of the patients were premature (mean gestational age: 29 weeks). Two of the three full-term infants had serious underlying conditions. One or more risk factors (central catheters, parenteral nutrition, use of antibiotics, endotracheal tubes, abdominal surgery, prolonged hospitalization) were present in all patients. No exposure to H2 blockers was noted. The majority of infections were caused by Candida albicans (52.8%) and Candida parapsilosis (36.1%). All isolates were in vitro susceptible to amphotericin and liposomal amphotericin B was administered to all patients. In one patient with fungal meningitis, flucytosine was used synergistic with amphotericin. In six cases of persistent candidaemia, caspofungin, micafungin or fluconazole were added to the therapeutic regimen. No serious adverse reactions of antifungal agents were recorded. The candidaemia-related mortality was 5.6% (2/36).

CONCLUSION:
Candida species is a relatively common pathogen in our unit, mainly for preterm and high-risk neonates. The overall incidence of candidaemia appears to be decreasing during the last years. Possible explanations include increased use of antifungal prophylaxis in high-risk infants and antibiotic stewardship.

None declared
ID 572 - CONGENITAL CYTOMEGALOVIRUS INFECTION: A REPORT FROM A REFERENCE CENTRE IN NORTHERN ITALY

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Background:
Congenital Cytomegalovirus infection (cCMV) is the most common congenital viral infection and represents the leading non-genetic cause of paediatric neurosensorial hearing loss and neurological impairment. A poor rate of awareness is reported worldwide and international agreement on universal screening, diagnostic procedures and management is still lacking. We report our experience in cCMV-patients management in a Reference Centre in Northern Italy over a period of 7 years.

Methods:
We conducted an observational retrospective analysis including all patients who referred to our Paediatric Infectious Disease Department for a confirmed cCMV-infection from 2014 to 2020. A strict follow-up including blood tests, neuro-audiological and ophthalmological assessment was performed for each patient; mean duration of follow-up was 24 months. We created an anonymous database including data about pregnancy history, birth information, cCMV diagnosis, cCMV-related symptoms and long-term sequelae.

Results:
We enrolled a total of 40 patients, 21 females and 19 males. 31 patients (77.5%) referred to our Department in the last 3 years (Figure 1). An early diagnosis at birth was done in 87.5% of patients and in 100% of neonates from mother with documented pregnancy cCMV-seroconversion. 22.5% of patients, all with a maternal non-primary cCMV-infection, received a late diagnosis due to significant neurological impairment. During follow-up, 12.5% developed mild to severe sensory-neural hearing loss; at brain ultrasound, cystic lesions and periventricular echogenicity were found in 20% of patients while brain structure anomalies were detected at MRI in 37.5% (cystic lesions, polymicrogyria, periventricular leukomalacia). Moreover, during neurological follow-up, 20% of patients developed anomalies (upper limb hemiparesis, hypotonia, epilepsy, psychomotor delay, dysphagia).

Conclusion:
We highlight that cCMV-infection growing awareness is revealing cCMV as an increasingly significant cause of infant morbidity. According to recent literature, non-primary cCMV-infections can correlate with severe long-term sequelae; however, cCMV serological screening in early pregnancy can be ineffective in detecting CMV reactivations. Therefore, a careful evaluation of the neonate at birth remains a fundamental milestone in order to detect possible precocious sign of cCMV-infection.
Figure 1: Distribution of cases from 2013 to 2020

None declared.
ID 349 - CONGENITAL RUBELLA SYNDROME

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**BACKGROUND:**
Congenital rubella syndrome is a rare condition. It is observed in more than 80% of fetuses of non-immunised mothers who contracted rubella during the first two trimesters of pregnancy, the extent of which varies according to the gestational age of seroconversion.

**METHODS:**
Retrospective descriptive study conducted in the neonatology department of the maternity and neonatology center of Tunis over a period of 5 years (January 2012 to December 2016)

**RESULTS:**
We collected 14 cases of congenital rubella syndrome, including one mono chorale bi amniotic twin pregnancy. Discovery was antenatal in 12 patients. The average term of seroconversion was 15 weeks of amenorrhea (SA). The discovery was postnatal in 2 patients with severe growth retardation and dysmorphic syndrome. Birth was premature in 57% of the patients with a mean term of 35 SA (30 SA - 39SA). Growth retardation was noted in 71.8% of the newborns with an average birth weight of 1610 g and microcephaly in 10 of them. Neurosensory findings included microphthalmia in three. Cataract was diagnosed in 4 patients, two of whom underwent surgery, and one case of chorioretinal atrophy. Axial hypotonia was noted in three patients, one of whom had neonatal seizures. These three patients are currently being followed for psychomotor retardation. Cardiac ultrasound was pathological in 2 patients with pulmonary artery abnormalities. One died of heart failure decompensated by severe bronchiolitis at the age of 3 months.

**CONCLUSION:**
In Tunisia, CRS continues to exist despite the vaccination program. The sensitization of gynaecologists is necessary for the prevention of this syndrome.

None declared