ID 75. 10-year results from the German Retina.net ROP registry and extension into the EU-ROP registry

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**BACKGROUND:** Treatment-requiring retinopathy of prematurity (ROP) is a rare disease with considerable impact on affected infants and their families. In Germany, the non-interventional Retina.net ROP registry was launched in 2011 with the aim to improve our knowledge of demographic parameters, treatment patterns and outcomes. The current analysis presents some key parameters from the registry data of children born between 2011 and 2020.

**METHODS:** This registry study analyzes changes in demographic parameters and ROP treatment patterns over the observed 10-year period. In addition, we provide an outlook on the newly-created EU-ROP registry which will allow expansion of the registry in other European countries.

**RESULTS:** A total of 353 infants (691 eyes) from 19 centers were treated for ROP and documented in the registry. Mean gestational age was 25.3 weeks (±1.8) and birth weight 691g (±223). The average postmenstrual age at treatment was 37.7 weeks (±3.2) and mean postnatal age 12.4 weeks (±3.1). Mean weight at treatment was 2310g (±746), with weight gain from birth to treatment averaging 19g per day (±6.2). Demographic parameters remained stable over the 10 years analyzed. However, treatment patterns changed considerably over time. While in 2011 anti-VEGF treatments accounted for only 14% of all treatments, anti-VEGF treatment was given in 61% of treated ROP cases in 2020. While bevacizumab was predominantly used for anti-VEGF therapy from 2011 to 2018, all but two documented anti-VEGF treatments in 2019 and all anti-VEGF treatments in 2020 were performed with ranibizumab.
CONCLUSION: To our knowledge this is, next to the Swedish SWEDROP, the longest period of real-life data on treated ROP studied so far. Over this 10-year period, we observed a major change in the treatment approaches used. While laser treatment rates declined, anti-VEGF treatments increased significantly. Following the approval of ranibizumab for ROP in 2019, all anti-VEGF treatments in the registry were performed with ranibizumab. These results may be representative for Germany but do not reflect treatment patterns in other countries. To address this situation, we are currently working on opening the registry for other countries. For reference please see www.eu-rop.org.

The authors received speaker fees and research grants, participated in advisory board meetings and clinical trials from: Alimera Sciences, Allergan, Bayer, Heidelberg Engineering, Novartis, Roche related and unrelated to topic.
ID 231. High rate of visual impairment and associated neurological disorders in children born before 24 weeks gestation

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BACKGROUND
Infants born extremely preterm have a high risk of neurological disorders including visual impairment. We aimed to investigate long-term ophthalmological and neurological outcomes for infants born before 24 weeks’ gestational age (GA).

METHODS
A retrospective nation-based study of infants born before 24 weeks’ GA with completed screening for retinopathy of prematurity (ROP) 2007 to 2018 was conducted. ROP data were retrieved from the Swedish patient registry for ROP, SWEDROP. Ophthalmological outcomes, such as visual acuity, refractive errors, manifest strabismus and nystagmus, birth characteristics, neonatal morbidities, and neurological outcomes were retrieved from the medical records.

RESULTS
Ophthalmological outcomes were assessed in 355 children, median GA 23+2 weeks and median birth weight 565 grams. The median age at the last ophthalmological examination was 4.8 years (range 0.5 to 13.2 years). There was wide variability in the frequency of ophthalmologic follow-up and type of recorded data. Nystagmus was recorded in 21.1% (44/209), strabismus in 34.8% (109/313) and 51.0% (154/302) wore spectacles. Altogether 67.3% (239/355) had ocular and/or visual problems requiring ophthalmological follow-up. Out of 333 children, 73 (21.9%) were categorized as visually impaired (referred to a low vision clinic at any age and/or having a visual acuity less than 20/60 at 3.5 years of age or older). Neurological deficits such as intellectual disability (63.8% versus 33.3%, p<0.001), epilepsy (21.1% versus 7.5%, p=0.001), cerebral palsy (27.1% versus 14.7%, p=0.016) and autism spectrum disorders (32.8% versus 20.9%, p=0.043) were more frequent in visually impaired children than in those not visually impaired. Ophthalmological and/or neurological deficits known to associate with cerebral visual impairment (CVI) were reported in 74.6% (265/355) of the children. Nine children were diagnosed with CVI.
CONCLUSION

A high proportion of the children born before 24 weeks GA were visually impaired and the majority had ophthalmological problems requiring follow-up. Neurological deficits were more frequent in visually impaired children than those without visual impairment. CVI investigation was rarely considered although associated ophthalmological and neurological deficits were present, suggesting potential underdiagnosis of this condition. National follow-up guidelines need to be instituted and resources allocated to identify difficulties in these vulnerable children presenting with multiple ophthalmological and neurological disorders.

![Figure 1: Percent of children with neurological deficits and visually impaired (n=73) or not (n=260). *** p<0.001, **p<0.01. *p<0.05](image)

Figure 1: Percent of children with neurological deficits and visually impaired (n=73) or not (n=260). *** p<0.001, **p<0.01. *p<0.05

None declared
ID 450. MICRO-PREMATURE INFANTS (<25 WEEKS GA) IN NEW JERSEY SHOW IMPROVED MORTALITY AND MORBIDITY FROM 2000-2018

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Background: Micro-premature newborns, gestational age (GA) < 25 weeks, have high rates of mortality and morbidity. Literature has shown improving outcomes for extremely low gestational age newborns (ELGANs) GA < 29 weeks, but few studies have addressed outcomes of ELGANs < 25 weeks.

Objective: To evaluate the trends in outcomes for ELGANs born in New Jersey, from 2000 to 2018 and to compare two subgroups: GA 23 to 25 weeks (E1) and GA 26 to 29 weeks (E2).

Design/Methods: Thirteen NICUs who participate in the NJ NICU Collaborative submitted de-identified data on ELGANs of GA 23 to 29 weeks to a central depository for the period 2000 to 2018. To ensure standardization we utilized the data submitted annually by each center to the Vermont Oxford Network. We excluded all out-born infants and those with major congenital anomalies. Outcomes for mortality and seven major morbidities were calculated. Linear regression analyses were performed for each measure to obtain rates of change over the 19 years. Correlation coefficients were tested for statistical significance.

Results: Data from 12,707 infants comprised the majority of ELGANs born in NJ from 2000 to 2018. There were 3,957 in the E1 group and 8,750 in the E2 group. Mortality decreased significantly in both groups; E1, 43.2% to 30.2% and E2, 7.6% to 4.5% over the 19 years. The decline in E1 was significantly greater than in E2. Most morbidities also showed significant improvement over time in both groups. Survival without morbidity increased from 14.5% to 30.7% in E1s and 47.2% to 69.9% in E2s(TABLE 1).

Conclusion(s): Significant declines in both mortality and morbidity have occurred in ELGANs over the last two decades. The rates of improvement for the more immature ELGANs of GA 230 to 256 weeks were greater than for the more mature group in several outcomes. While the rates of morbidity and mortality remain high, these results validate current efforts to support the micro-premature newborn.
**Table 1 ELGAN Morbidity and Mortality Comparisons 2000 - 2018**

<table>
<thead>
<tr>
<th></th>
<th>E1 (23rd - 25th weeks)</th>
<th>E2 (26th - 28th weeks)</th>
<th>E1 - E2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000* slope*</td>
<td>2018* r</td>
<td>p</td>
</tr>
<tr>
<td>Mortality</td>
<td>43.2</td>
<td>-0.72</td>
<td>30.2</td>
</tr>
<tr>
<td>Morbidity in all patients</td>
<td>93.1</td>
<td>-0.83</td>
<td>75.2</td>
</tr>
<tr>
<td>Survival with no morbidity*</td>
<td>14.5</td>
<td>+1.9</td>
<td>30.7</td>
</tr>
</tbody>
</table>

**Individual Morbidities (Percentage of All Patients Evaluated for the Morbidity)**

<table>
<thead>
<tr>
<th></th>
<th>CLD</th>
<th>LI</th>
<th>sPlH</th>
<th>sFOP</th>
<th>PaT</th>
<th>NEC</th>
<th>PVL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.03</td>
<td>-0.52</td>
<td>48.1</td>
<td>0.53</td>
<td>22.0</td>
<td>0.020</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>-0.042</td>
<td>-1.33</td>
<td>26.3</td>
<td>0.07</td>
<td>-0.001</td>
<td>29.6</td>
<td>-1.23</td>
</tr>
<tr>
<td></td>
<td>0.022</td>
<td>-0.011</td>
<td>18.0</td>
<td>0.52</td>
<td>0.025</td>
<td>7.6</td>
<td>-0.15</td>
</tr>
<tr>
<td></td>
<td>-0.084</td>
<td>-0.81</td>
<td>13.5</td>
<td>0.81</td>
<td>&lt;0.001</td>
<td>6.0</td>
<td>-0.24</td>
</tr>
<tr>
<td></td>
<td>0.029</td>
<td>0.019</td>
<td>9.3</td>
<td>0.20</td>
<td>0.045</td>
<td>4.7</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>0.009</td>
<td>0.025</td>
<td>4.3</td>
<td>0.01</td>
<td>0.071</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>0.009</td>
<td>0.025</td>
<td>4.3</td>
<td>0.01</td>
<td>0.071</td>
<td>0.30</td>
<td>0.20</td>
</tr>
</tbody>
</table>

* % is 2000 estimated from y-intercept from linear regression
+ % change/year
+ % in 2018 estimated from y-intercept from linear regression + 18 * slope
* an increase in percentage from 2000 to 2018 is an improvement

None declared
ID 10. Meningitis Trends and Association with Intraventricular Hemorrhage in Very Preterm Infants

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Background:
Meningitis is often considered to be a subset of neonatal infections that should respond to infection control strategies; however, a preliminary report from the Canadian Neonatal Network (CNN) indicated that an infection control program decreased late onset sepsis but not meningitis. There was also no significant decrease in the incidence of severe neurological injury. We aimed to compare trends in the incidence of late onset sepsis and meningitis among very preterm infants in Canada, and to determine whether there is an association between late onset meningitis and intraventricular hemorrhage (IVH).

Methods:
All very preterm infants <33 weeks gestational age admitted to tertiary level neonatal intensive care units (NICUs) in the CNN from 2010-2018 were included. Statistical analyses were performed to compare the trends for incidence rates of late onset culture positive bloodstream infection (CPBSI) and late onset meningitis, and to examine the association of meningitis and IVH (exposure), after adjustment for patient risks.

Results:
Of 36,573 infants in this study, 32,198 had no infections, 3977 had only late onset CPBSI and 398 had late onset meningitis. Between 2010 and 2018, there was a significant decrease in the incidence of late onset CPBSI (rates decreased from 14% to 11%; (AOR)=0.93; 95%CI 0.92, 0.95) but not for late onset meningitis (rates were not significantly changed from 1.5% to 1.2%; (AOR)=0.98; 95%CI 0.94, 1.01). Infants with IVH grade 3 or above had higher odds of late onset meningitis compared with infants with no infection (AOR 4.16; 95%CI 3.17, 5.44), and infants with late onset CPBSI (AOR 4.11; 95%CI 3.08, 5.50).

Conclusion:
There was a decreasing trend of late onset CPBSI but not meningitis. An association between late onset meningitis and IVH was observed. Late onset CPBSI and meningitis may have different risk factors and require different prevention strategies.

<table>
<thead>
<tr>
<th>INFECTION CATEGORY</th>
<th>AOR (95%CI): Late Onset CPBSI vs No Infection</th>
<th>AOR (95%CI): Late Onset Meningitis vs No Infection</th>
<th>AOR (95%CI): Late Onset Meningitis vs Late Onset CPBSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVH (grade 1 or 2)</td>
<td>1.25 (1.14, 1.37) b</td>
<td>1.25 (0.98, 1.59)</td>
<td>1.00 (0.78, 1.28)</td>
</tr>
<tr>
<td>IVH (grade 3 or above)</td>
<td>1.01 (0.87, 1.17)</td>
<td>4.16 (3.17, 5.44) b</td>
<td>4.11 (3.08, 5.50) b</td>
</tr>
<tr>
<td>Sensitivity analysis a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IVH (grade 1 or 2)</td>
<td>1.25 (1.15, 1.37) b</td>
<td>1.39 (1.07, 1.81) b</td>
<td>1.11 (0.85, 1.46) b</td>
</tr>
<tr>
<td>IVH (grade 3 or above)</td>
<td>0.98 (0.84, 1.14)</td>
<td>2.92 (2.11, 4.04) b</td>
<td>3.00 (2.13, 4.22) b</td>
</tr>
</tbody>
</table>

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; CPBSI, culture positive bloodstream infection; IVH, intraventricular hemorrhage.

a Sensitivity analyses were conducted omitting infants who had meningitis occurring within 7 days of life or who had cerebrospinal fluid shunt or reservoir procedures.
b p<0.0

Multinomial Logistic Regression Showing Associations of Intraventricular Hemorrhage and Infection Categories
None declared