Changing approach in limits of viability: the effect on neonatal outcome in extremely preterm infants in a large tertiary perinatal center in the Netherlands

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Background

In the last two decades the Dutch policy towards the limits of viability has been modified twice: 2006 (active treatment from 26 to 25 weeks' gestation) and 2010 (active treatment from 25 to 24 weeks' gestation). Knowledge concerning the effect of these guideline changes on neonatal outcome is limited. The aim is to evaluate early neonatal outcome in infants born below 29 weeks' gestation in one of the ten tertiary perinatal centres in the Netherlands.

Methods

Study population: retrospective, single-center cohort study of all live- and stillborn infants born <29 weeks' gestation at Máxima Medical Center Veldhoven between 2006-2016.

One-year survival rate was evaluated and complication rates were calculated relative to infants born alive and infants alive at 36 weeks' postmenstrual age (serious brain lesion: grade $\geq$ III intraventricular hemorrhage or cystic periventricular leukomalacia; necrotizing enterocolitis stage 2-3; oxygen need >21% at 28 days, as a proxy of bronchopulmonary dysplasia; laser therapy or surgery for retinopathy of prematurity).

Results

844 preterm infants were included (table 1). One-year survival rate of live born infants demonstrates an increase in one-year survival for infants born at 24 (0% to 63%) and 25 (59 to 79%) weeks' gestation (figure 1). Overall, prematurity related morbidity rates are decreasing with increasing gestational age (table 2). Figure 2 shows no substantial differences in complications over time.

Gestational age(weeks)	22	23	24	25	26	27	28	Total
All infants	28	23	88	107	186	186	226	844
Stillbirths	28	23	17	14	14	7	6	109
Live births	0	0	71	93	172	179	220	735

Table 1. Vital status at birth (cohort 2006-2016)

Gestational age	24 wks		25 wks		26 wks		27 wks		28 wks	
	Live births	Alive at 36 wks	Live births	Alive at 36 wks	Live births	Alive at 36 wks	Live births	Alive at 36 wks	Live births	Alive at 36 wks
• Serious brain lesion ¹	29%	7%	11%	7%	9%	8%	7%	6%	5%	5%
• NEC stage 2 or 3 ²	4%	3%	3%	4%	10%	7%	6%	4%	4%	3%
• BPD ³	45%	92%	67%	87%	65%	76%	49%	52%	24%	25%
• Therapy for ROP ⁴	9%	25%	17%	23%	8%	10%	3%	3%	0%	0%

¹Defined as grade $\geq$ III intraventricular haemorrhage or cystic periventricular leukomalacia

²NEC, necrotizing enterocolitis stage II and III, according to the staging of Bell.

³BPD, bronchopulmonary disease. Defined as oxygen > 21% need at 28 days, as a proxy of bronchopulmonary dysplasia

⁴Defined as laser therapy of surgery for retinopathy of prematurity (ROP).

Table 2. Neonatal morbidity rate as percentage of infants born alive and infants alive at 36 weeks' postmenstrual age (cohort 2006-2016)

Conclusion

With the changing policy in neonatal care, survival of as improved considerably extremely preterm infants in the last decade without significant changes in neonatal complications. Further studies are required to evaluate the effects on long-term outcomes.

Figure 1. One-year survival of live born infants over the year 2006-2016

Figure 2. Neonatal morbidities in infants alive at 36 weeks, born <29 weeks' gestation between 2006 and 2016 divided into three-year periods.

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