



Development of periventricular venous infarction in pretermly born infants

Norman Ilves, Pilvi Ilves, Dagmar Loorits,
Rael Laugesaar, Mare Lintrop
Tartu University Hospital,
The University of Tartu
Estonia



Tartu Ülikooli Kliinikum

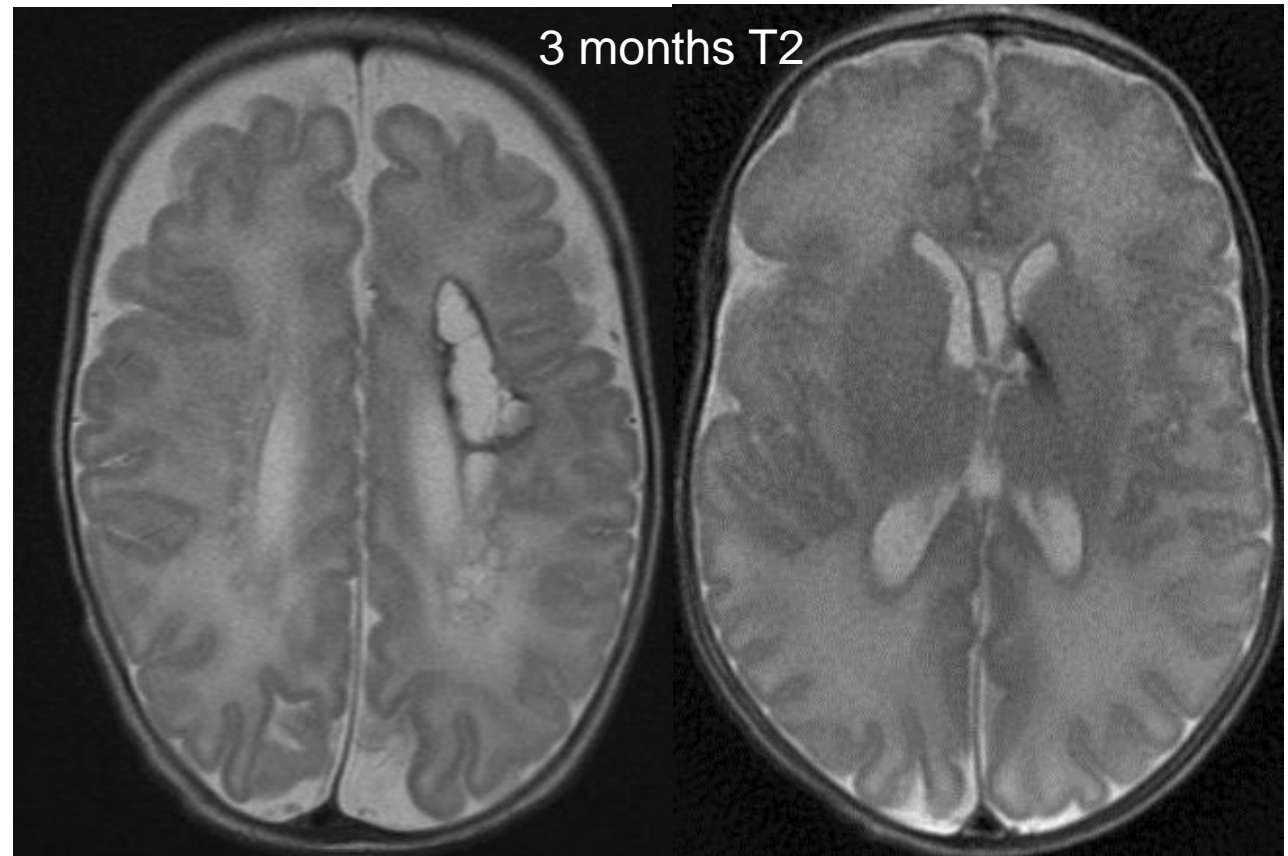
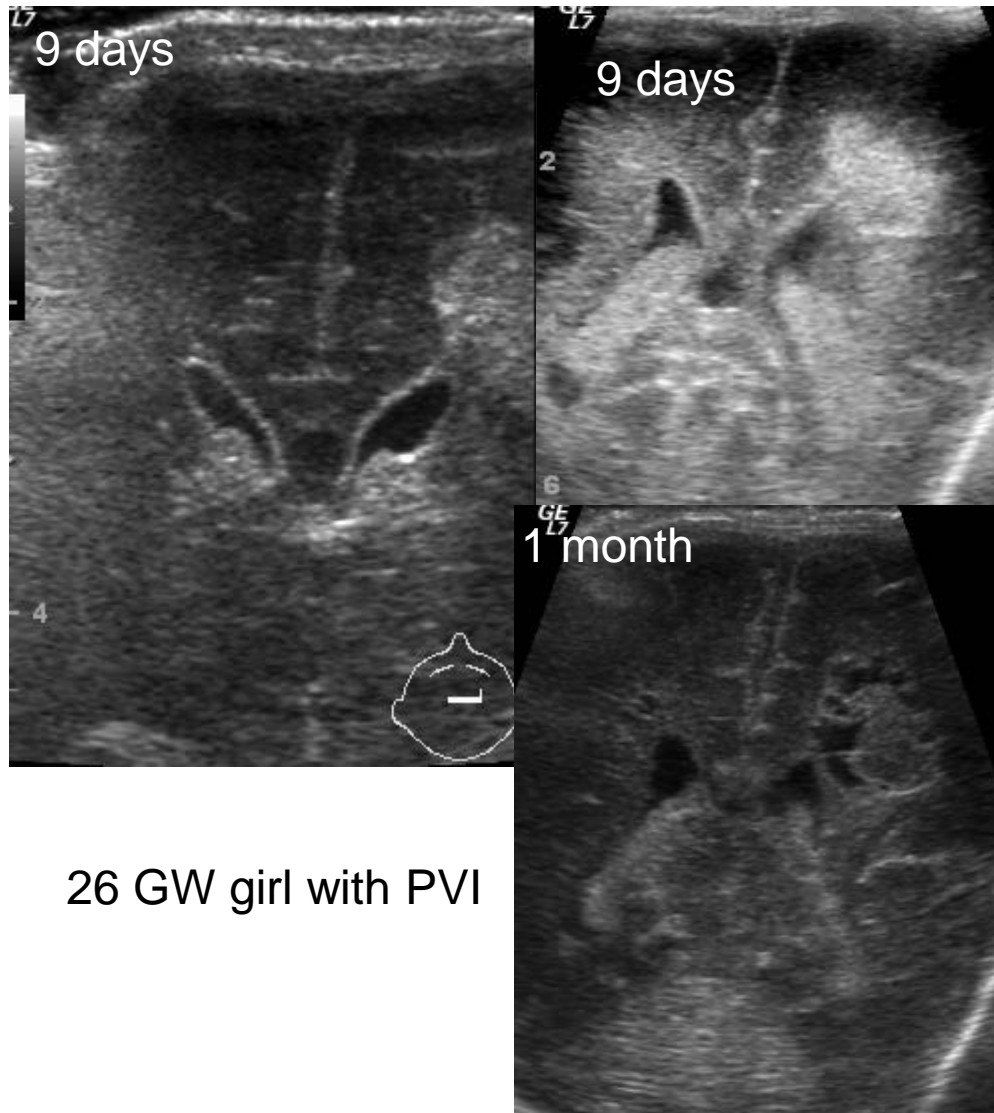
Perinatal stroke

- Stroke occurs during the entire lifetime including the fetal period
- Perinatal stroke occurs between 20th week of fetal life and the 28th postnatal day (Raju et al 2007)
- In infants <1000g or less than 28 GW intraventricular hemorrhage was (IVH) found in 15-20% (J.Volpe 2008)
- Periventricular venous infarction (PVI) can develop after germinal matrix hemorrhage or IVH



Development of periventricular venous infarction (PVI)

- Germinal matrix hemorrhage can cause obstruction of medullary veins draining the periventricular white matter.
- **PVI** develops after a few hours or days
- Porencephaly develops after some weeks.



The aim of the study

- To identify the time of development of III grade IVH and PVI in pretermly born infants.
- To identify ultrasound findings which are connected with initial poor prognosis
 - hydrocephalus with permanent shunt
 - death within neonatal period



Patients and methods

- All preterm infants with III grade IVH or PVI were identified in Tartu University Hospital's information system in 2006 - 2017.
- Images and reports of ultrasound, CT and MRI were re-evaluated in the All Estonian Picture Archive
- The routine ultrasound studies were usually made on the 1st day, 2nd-3rd day, 5-7th day and once a week until discharge.

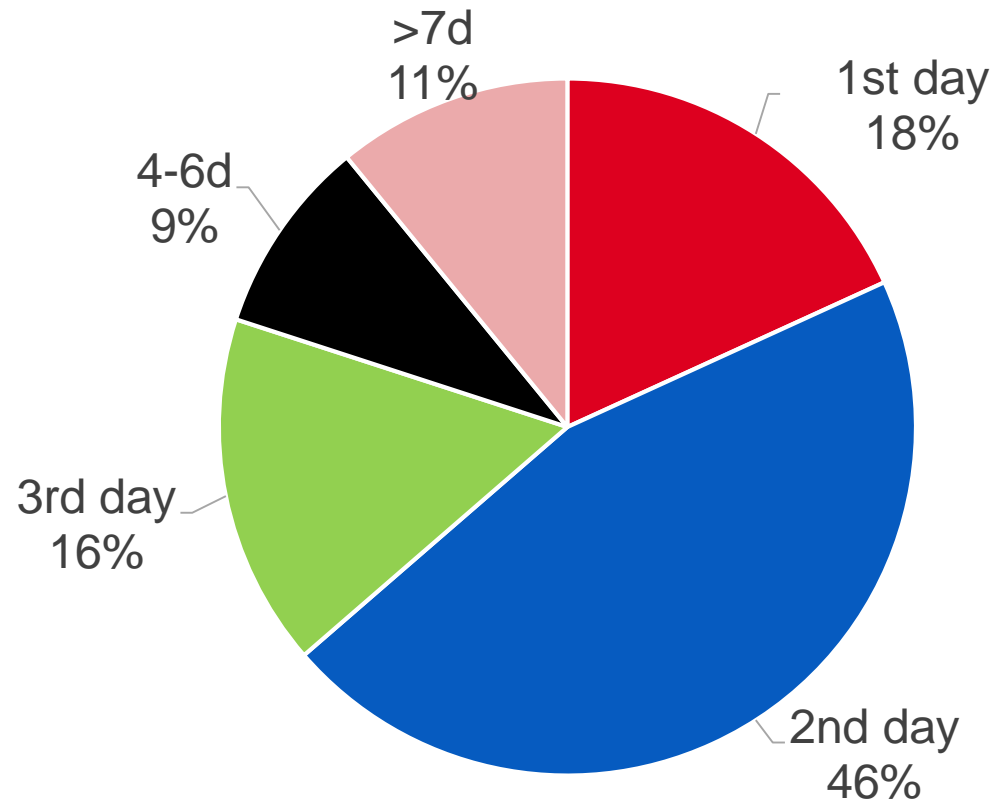


Results

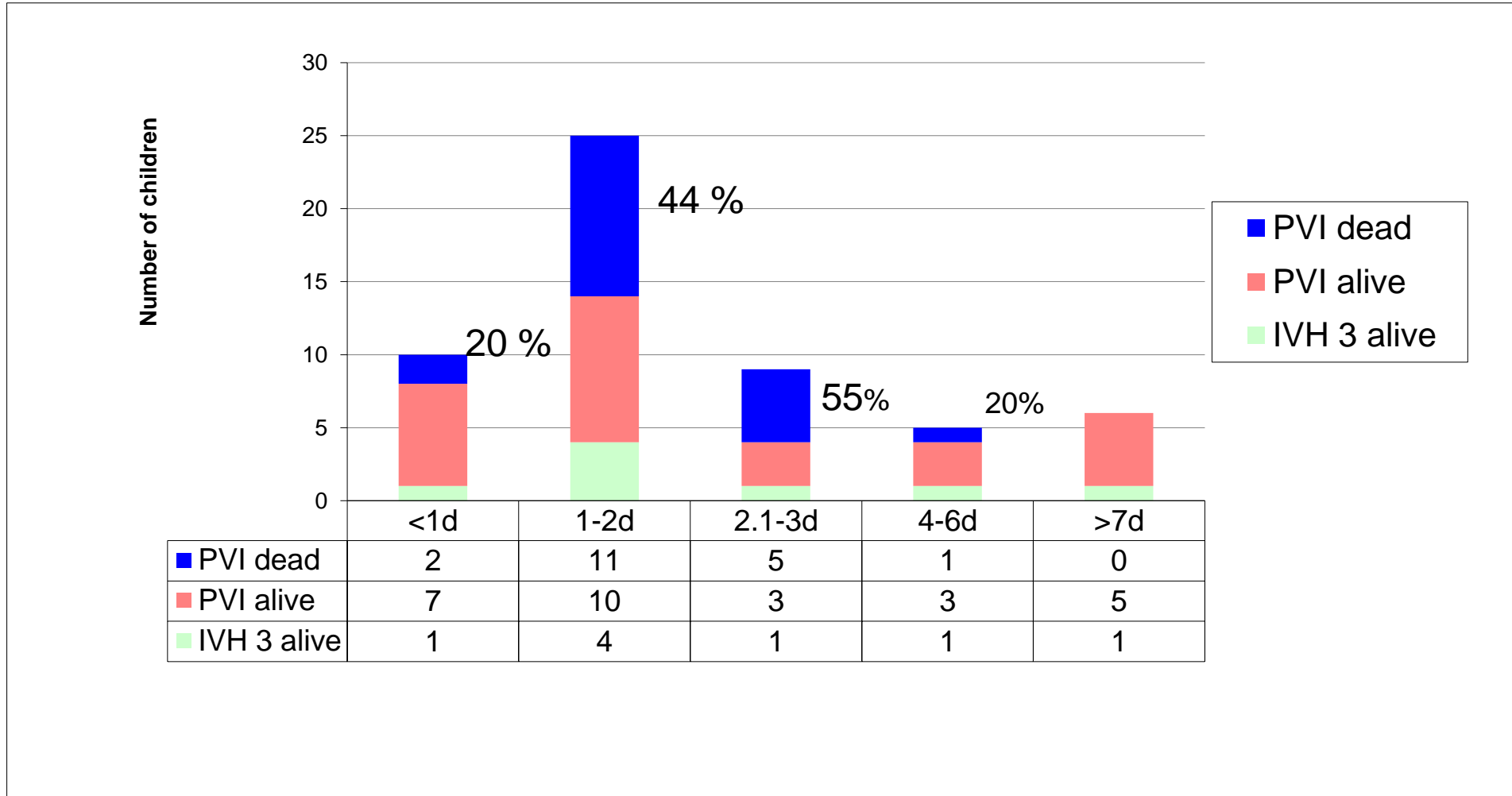
	IVH 3 n= 8	PVI n=47	P-value
Alive	8 (100%)	28 (60%)	-
Boys/girls	7/1	28/19	0,2
Twins	3	15	1
Gestational age median (min - max)	25,4 (24,3-27,3)	27,0 (22,9-39,6)	0,09
Apgar score 1 min mediaan	4 (3 -7)	5 (2 -7)	0,8
Shunt	1	2	0,6



The time of detection of the III grade IVH or PVI



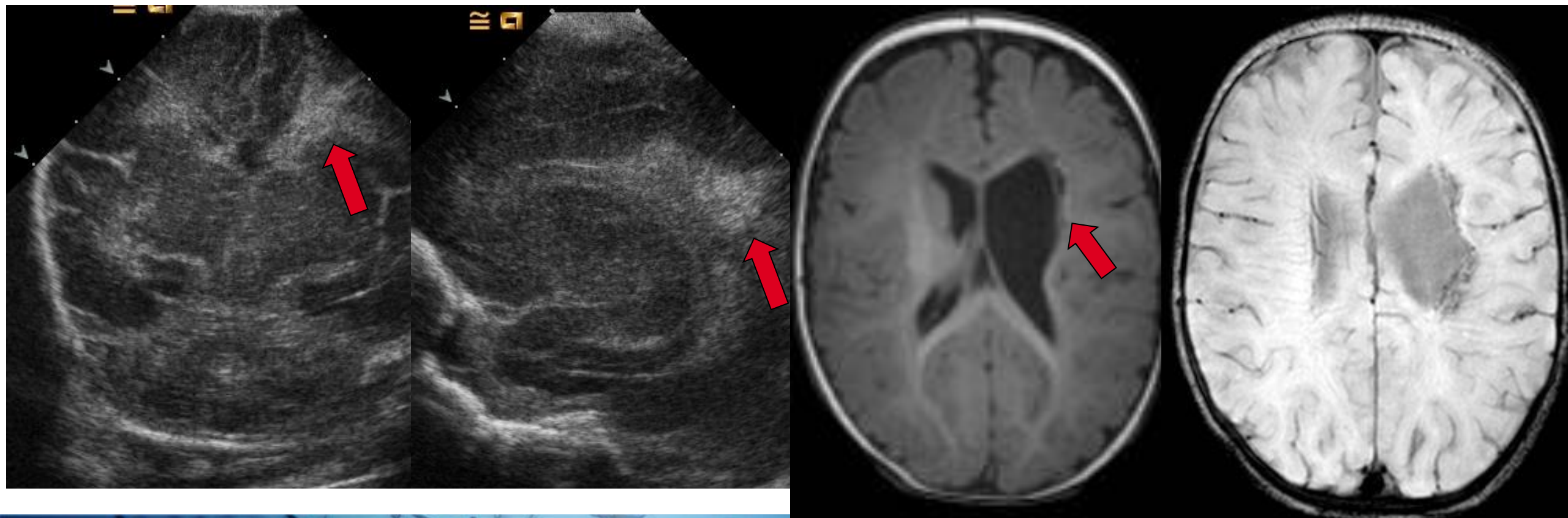
Prognosis based on the time of III grade IVH or PVI development



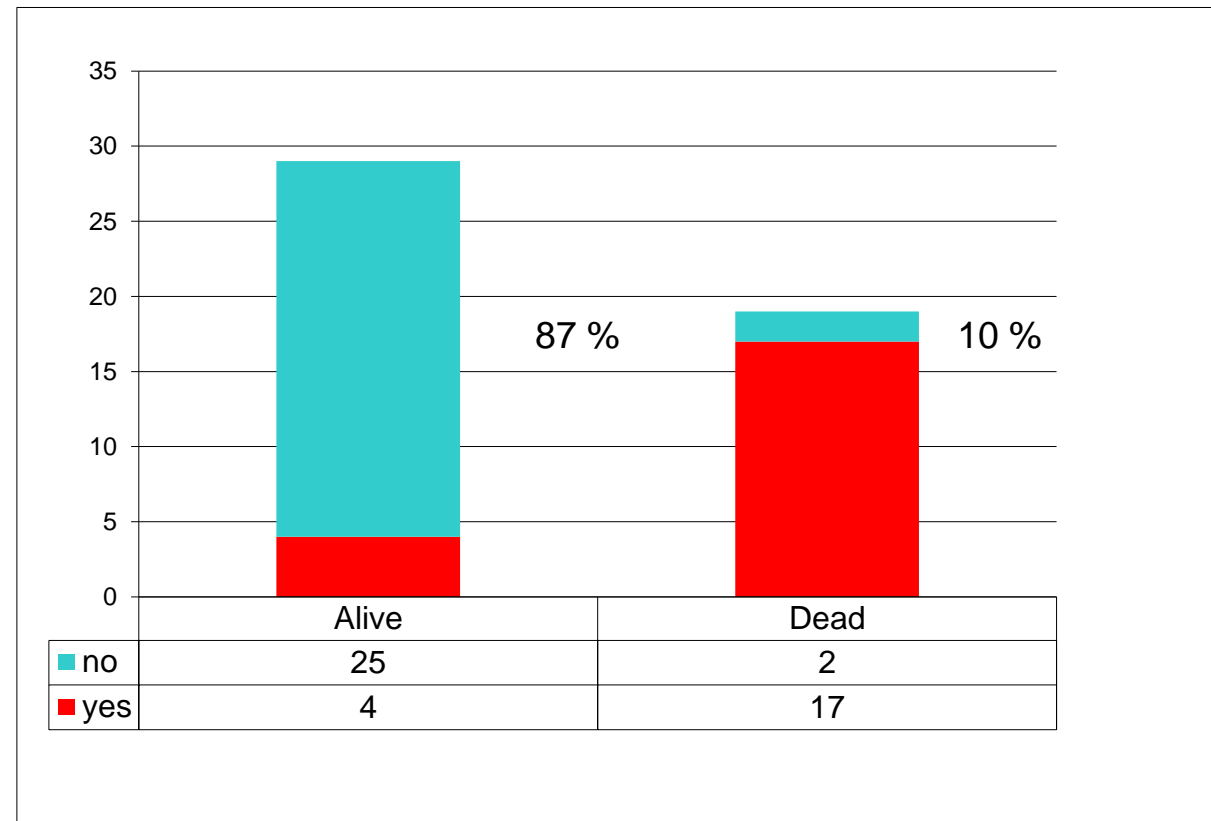
Girl born in 30 GW from vaginal delivery, Apgar score 8-8-8, no resuscitation, no ventilation. Mother treated for Streptococcus uroinfection from 28 GW. Germinal matrix hemorrhage and PVI visible on the first day.

1st day IVH II and PVI sin

9 month MRI T1 and SWI



Midline shift and prognosis ($p < 0,0001$)



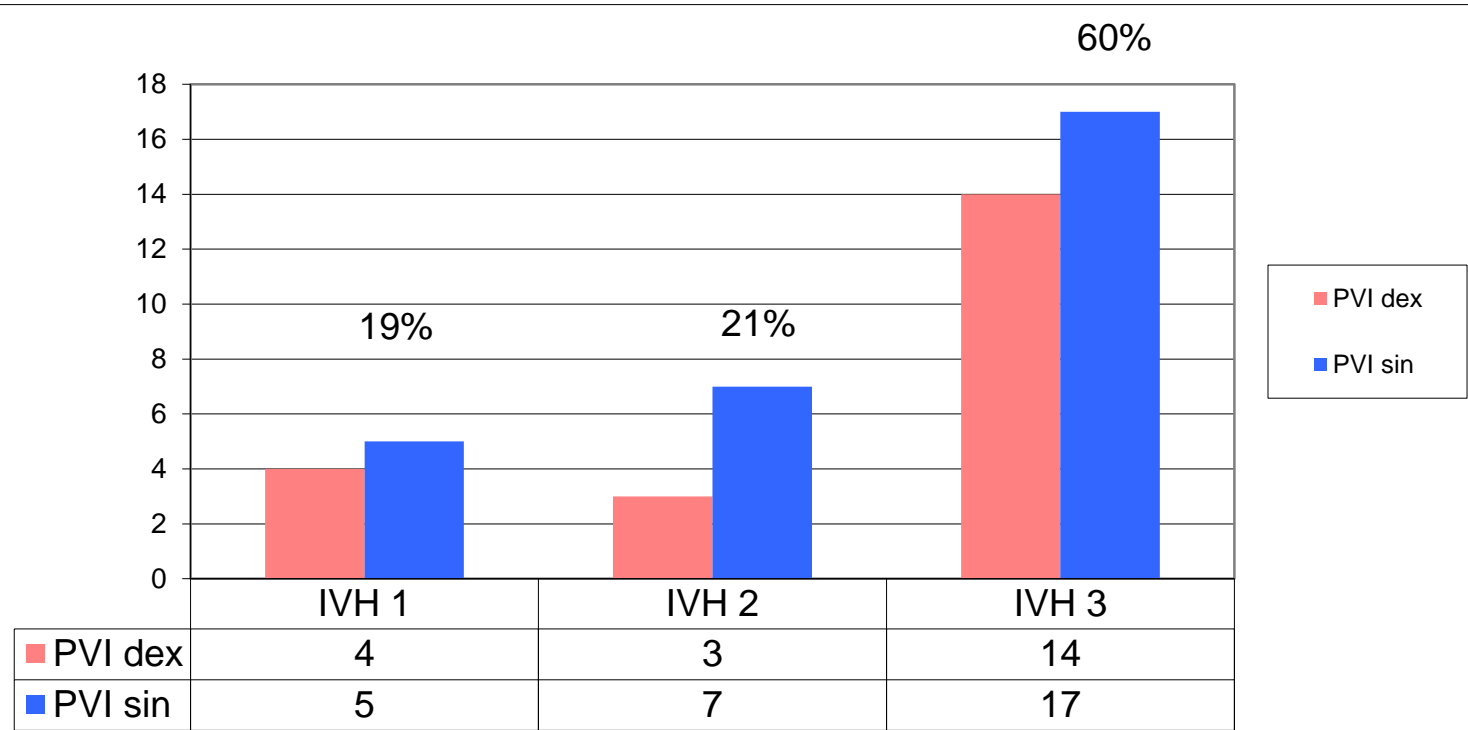
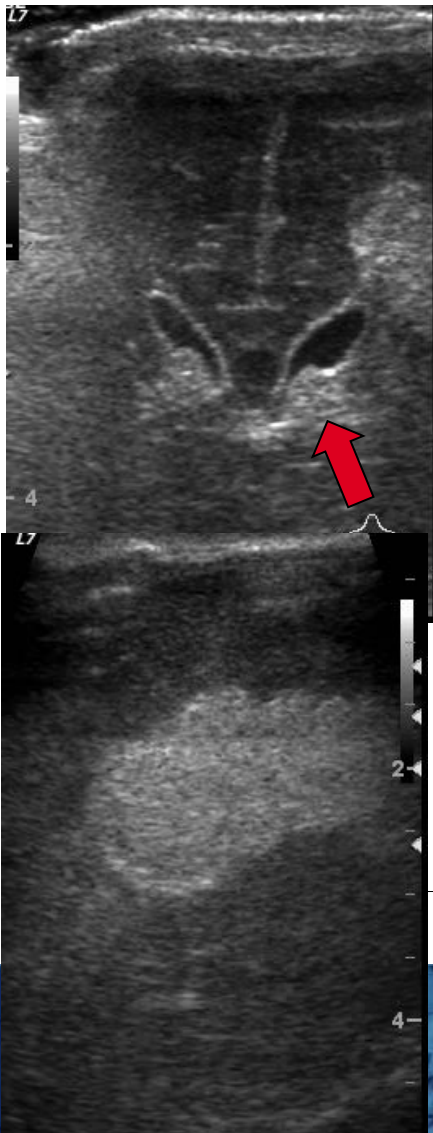
Apply phase-shift operator

the depth step size



Tartu Ülikooli Kliinikum

Stage of IVH in children with development of PVI



Conclusion

- In 18% of severely preterm infants hemorrhage or large PVI were seen during the first day and it can be prenatal origin, 80% of them survived.
- In 2/3 of the preterm infants PVI developed on the 2nd or 3rd day and half of them died.
- Midline shift was connected with poor prognosis.
- The long-term outcome of these children needs further evaluation.



Thank you!



Tartu Ülikooli Kliinikum

Apply phase-shift
operator

the depth step size $\epsilon = 0$