CORRESPONDENCE

Prospective Risk Factor Monitoring Reduces Intracranial Hemorrhage Rates in Preterm Infants

by Dr. med. Manuel B. Schmid, PD Dr. med. Frank Reister, Dr. biol. hum. Benjamin Mayer, Dr. med. Reinhard J. Hopfner, Dr. med. Hans Fuchs, Prof. Dr. med. Helmut D. Hummler
in volume 29–30/2013

Consider Using Heparin

Intracranial hemorrhage is a severe complication affecting preterm neonates. Schmid and colleagues (1) in their article say that the rate of intracranial hemorrhage can be notably reduced by prospective risk factor monitoring. This is a useful prophylactic measure. An investigation into neonates in Baden-Württemberg in 2009 showed that sepsis owing to bacterial pathogens is the most common cause of intraventricular hemorrhage; no hemostaseological causes were mentioned (2).

Germinal matrix hemorrhage often occurs as a consequence of a venous infarction. The ischemia causes hemorrhage and is accompanied by periventricular leukomalacia. The protective use of magnesium sulfate is currently under discussion (3).

If, however, it really is venous thrombosis that triggers the hemorrhage then the use of heparin should be considered—for example, 5–10 IU per hour per kg given intravenously—since monitoring cerebral perfusion is too elaborate for routine clinical practice to be used as a prophylactic measure for hemorrhage. Beforehand, the clotting status needs to be determined in citrate blood (1.6 mL syringe), in order to rule out a coagulation disorder, often seen in neonates (4). If a plasma related bleeding tendency is confirmed, then heparin must not be administered; rather, clotting factors should be given, for example, clotting factors I, VII, IX, and X (PPSB) at a dosage of 20–50 IU per kg body weight.

A thrombocyte count should be obligatory in order to rule out thrombocytopenia—for example, neonatal alloimmune thrombocythemia (NAIT).

DOI: 10.3238/arztebl.2014.0058a

REFERENCES

1. Schmid MB, Reister F, Mayer B, Hopfner RJ, Fuchs H, Hummler HD: Prospective risk factor monitoring reduces intracranial hemorrhage rates in preterm infants. Dtsch Arztebl Int 2013; 110(29–30): 489–96.
2. Arbeitskreis der Neonatalerhebung der Bundesländer: Neonatalerhebung Baden-Württemberg 2009. Zentrum für Qualität und Management im Gesundheitswesen 2010; 1–80.
3. Tsuj M, Saul JP, du Plessis A, et al.: Cerebral intravascular oxygenation correlates with mean arterial pressure in critically ill premature infants. Pediatrics 2000; 106: 625–32.
4. Bidlingsmaier C, Eberl W, Kurnik K: Perioperatives Gerinnungsmanagement im Kindesalter. Bremen, London, Boston: Uni Med Verlag AG 2007.

Prof. Dr. Ing. Dr. med. Holger Kiesewetter
Berlin, info@haemostaseologicum.com

In Reply:

Cerebral hemorrhage in the neonate is mostly a consequence of the prematurity itself. Additional factors, such as sepsis, asphyxia, or postnatal transport, increase the risk of bleeding, but in the absence of extreme prematurity they rarely lead to hemorrhage. In contrast to cerebral hemorrhage in mature neonates, however, primarily hemostaseological causes play a negligible part.

Professor Kiesewetter appropriately explains the pathogenetic sequence from parenchymal hemorrhage as a result of germinal matrix hemorrhage and other factors (venous infarction if the flow from venous vessels is obstructed). This obstruction in the thin-walled, large-lumen venous collection vessels is presumably due to the vascular anatomy, the raised intrathoracic pressure, and partly to iatrogenic pressure variations, but typically not to venous thrombosis. Because of this, and bearing in mind the prohemorrhagic side effects of heparin, we would, on the basis of the current evidence, strongly advise against heparin treatment (1).

An individual clotting status, for which 1.6 mL citrate blood is required, extracts about 4% of the total blood volume from a premature neonate weighing 500 g. In view of the uncertain age-specific reference range and uncertain intervention thresholds, this intervention should be based on careful weighing up of the benefits and harms. Intervention thresholds in thrombocytopenia are not evidence based, either (2).

The administration of magnesium was the subject of controversial discussion in our working group. In order to utilize the neuroprotective effects of magnesium, a high serum concentration is required; the therapeutic range is narrow. The side effects of muscular hypotension and apnea counteract the attempt to avoid intubation and respiration. Data from the German Neonatal Network have shown an increased rate of intracranial hemorrhage in the combination with fenoterol. Medications with a more beneficial risk profile are available for the purposes of tocolysis (3).

DOI: 10.3238/arztebl.2014.0058b

REFERENCES

1. Lesko SM, Mitchell AA, Epstein MF, Louik C, Giacoia GP, Shapiro S: Heparin use as a risk factor for intraventricular hemorrhage in low-birth-weight infants. N Engl J Med 1986; 314: 1156–60.
2. Muthukumar P, Venkatesh V, Curley A, et al.: Severe thrombocytopenia and patterns of bleeding in neonates: results from a prospective observational study and implications for use of platelet transfusions. Transfusion Med 2012; 22: 338–43.
3. Schleußner E: The prevention, diagnosis and treatment of premature labor. Dtsch Arztebl Int 2013; 110(13): 227–36.
4. Schmid MB, Reister F, Mayer B, Hopfner RJ, Fuchs H, Hummler HD: Prospective risk factor monitoring reduces intracranial hemorrhage rates in preterm infants. Dtsch Arztebl Int 2013; 110(29–30): 489–96.

Dr. med. Manuel B. Schmid
Sektion Neonatologie und Pädiatrische Intensivmedizin
Ulm
manuel.schmid@uniklinik-ulm.de

Conflict of interest statement
The authors of both contributions declare that no conflict of interest exists.