Molecular diagnostics of short- and long-term outcomes in perinatal asphyxia

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Abstract

Perinatal asphyxia is the leading cause of infant mortality and morbidity. The incidence rate is 3-4 in 1,000 newborns. Low oxygen supply at a birth may cause kidney insufficiency, damage of CNS and cardiomypathy, and may predispose to neurodegenerative, cardiovascular and cancer diseases as well as to senescence in adulthood. Extent of organ damage depends on asphyxia severity and individual stress reactions. Currently no precise diagnostic system is developed, in order to estimate individual short- and long-term outcomes in perinatal asphyxia. There is an obvious need in a development of a precise early and even prevent diagnostic approaches which might predict individual stress reaction as well as outcomes. Attractive approaches may be non-invasive blood transcriptome and proteome based methodology. Proteins such as S100 and COX2 have been shown to be stably highly expressed to blood and even urine of asphyxiated newborns. The same molecular markers have been demonstrated to be highly increased in blood proteome of Alzheimer’s and Parkinson’s patients, patients with glaucoma, breast and prostate cancer. In order to differentiate among distinct pathologies asphyxiated newborns are predisposed for, individual blood proteome/transcriptome patterns should be investigated in correlation with corresponding pathologies. Molecular imaging methodology, which includes disease genomics, transcriptomics and proteomics should be apply. A combination of multidisciplinary expertise for those research projects is highly desirable, which includes neonatology, paediatrics, ophthalmology, neurology, radiology, biotechnology, etc. Projects applying for financial EU-contribution should consider the issue. EUROPET should support this kind of activities.

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