Trends in cerebral palsy prevalence in Northern Ireland, 1981–1997

Commentary

The good news in the paper from Dolk and colleagues[1] is that the severity of disabilities and overall rates of cerebral palsy (CP) in very low birthweight infants born in Northern Ireland decreased during the 1990s. This followed an increase in the 1980s, observed in many places following the introduction of assisted ventilation to neonatal intensive care. However, according to their paper the CP rates for births <1000g were still higher between 1994 and1997 than those observed in the early 1980s.

But were they really?

In Northern Ireland, perinatal epidemiologists appear to be hampered by a limited availability of perinatal statistics routinely collected on every birth. As confirmed by Table II in their paper, estimated rates of CP are very much higher for the infants in the lowest birthweight category if neonatal survivors are used as the denominator rather than if all live births are used. This is because infants that die neonatally are included in the denominator but cannot contribute to the numerator because, to be included on the Northern Ireland CP Register, a child must survive to the age of 1 year, even those who have cerebral defects that would result in CP had they survived. Ideally the number of 1-year survivors should be used as the denominator, but as mortality is highest in the neonatal period, the number of neonatal survivors is a reasonable surrogate. The difference that this change in denominator makes to the estimated rate of CP depends on the rate of neonatal mortality. The higher the neonatal mortality rate, the bigger the difference.

However, in developed countries, neonatal mortality has been declining over the period considered by Dolk et al.,[1] especially in the lowest birthweights. This means that the amount by which the CP rate is underestimated due to the inclusion of perinatal deaths in the denominator decreases over time. Hence the underestimation of the rate between 1981 and 1983 is greater than the underestimation of the rate between 1994 and 1997, for which period Dolk et al.[1] have measured the rate per livebirth to be only 47% of the rate per neonatal survivor. The measured rate between 1981 and 1983 would be an even smaller proportion of the rate per neonatal survivor. Thus by 1994 to 1997, the rate of CP per neonatal survivor may well be below the rate per neonatal survivor between 1981 and 1983.

The other apparent omission from routine perinatal data collection in Northern Ireland is the value of gestational age at delivery. One of the missions of the Northern Ireland CP Register is to measure the effects of changes in perinatal care on rates of CP. In response to the improving outcomes of increasingly preterm infants, one of those changes in perinatal care is a willingness on the part of obstetricians to deliver a fetus at increasingly earlier gestations. A common indication for early delivery is the presence of signs of fetal growth restriction. This willingness to intervene earlier in cases of evolving growth restriction changes the balance of gestational age and intrauterine growth in very low birthweight infants towards being gestationally younger but more appropriately grown. Birthweight is the result of intrauterine growth over the period of gestation: thus, the same birthweight can be achieved by a shorter period of more rapid growth as by a longer period of less rapid growth. While Dolk et al.[1] correctly state that both preterm birth and intrauterine growth restriction are risk factors for CP, short gestational duration is a much stronger risk factor than is intrauterine growth restriction,[2] especially in the most preterm infants, for whom the risk of CP does not appear to be associated with appropriateness of intrauterine growth relative to other preterm born infants. Thus, prematurity and growth restriction are likely to be on different causal pathways to CP, in which case preventive strategies are also likely to differ. In the absence of data for gestational age, not only is the degree of prematurity unknown, but the appropriateness of intrauterine growth cannot be estimated.

Historically, birthweight has been measured because weight has routinely been easily and reliably measured, whereas gestational age is more difficult to estimate reliably. However, the more frequent use of early ultrasound dating scans and the increasingly scientific methods of neonatal estimation together with algorithms to choose the best estimate by considering all the available data[3] has made it possible to have much more confidence in gestational age estimations. The advantages of having both birthweight and gestational age data for the understanding of aetiology of perinatal outcomes are enormous.

Thus Dolk et al.'s study[1] provides a good example of how the routine availability of these basic elements of infant outcome: neonatal survival, birthweight, and gestational age at delivery, could add great value to the careful data gathering of registers such as the Northern Ireland CP Register.

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