Research letters

Annual incidence of shaken impact syndrome in young children

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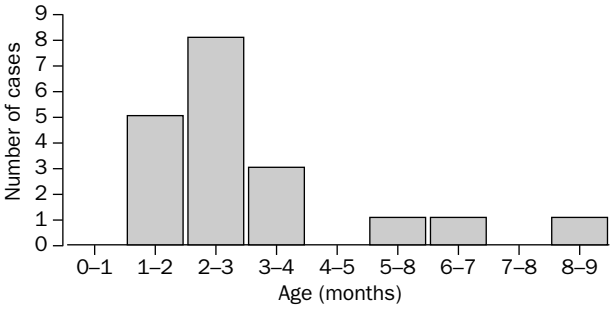
We looked at the incidence and demography of non-accidental head injury in children in a prospective population-based study of paediatric units in Scotland during 1998–99. Shaken impact syndrome occurs with an annual incidence of 24·6 per 100 000 children younger than 1 year (95% CI 14·9–38·5). Cases are more common in urban regions, and during autumn and winter months. The risk of a child suffering non-accidental head injury by age 1 year is one in 4065. These brain injuries occur almost exclusively in young infants (median age 2·2 months).

Child abuse is the most common cause of infant death and morbidity from head injury.[1] Non-accidental head injury (NAHI) includes shaking injury, with or without impact (shaken impact syndrome), compression, penetrating, and pure impact injuries. This syndrome presents as an acute encephalopathy with subdural haemorrhages, cerebral oedema, retinal haemorrhages, and fractures, occurring in the context of an inappropriate or inconsistent history, and commonly with additional evidence of other impact or malicious injuries.[2] In addition to the mortality, 78% of survivors have significant long-term neurological and developmental abnormalities.[3]

The incidence of non-accidental head injury is not precisely known and is estimated from the incidence of subdural haematoma in infancy. In southwest England and south Wales, the incidence of subdural haematoma was 21·0 per 100 000 children under 1 year (95% CI 7·5–34·4) and it was estimated that non-accidental injury accounted for 82% of these.[4] A 15-year retrospective study in Scotland suggested that an estimated incidence of NAHI of 11·2 per 100 000 children younger than 1 year was an underestimate because shaken impact syndrome is not a single coding entity in the international classification of diseases (ICD).[5] We therefore undertook a prospective study to assess the incidence and demography of NAHI in Scotland during 1998 and 1999. We registered all cases by weekly contact with all hospital paediatric departments, paediatric intensive-care units, and neurosurgical units admitting children. Validation was done by 6-monthly questionnaires. A separate search from the Information and Statistics Division of the Scottish Health Service according to the ICD-10 coding system was done. To ensure that children who died beacuse of NAHI before admission to hospital were not omitted, we searched the Registrar General database for childhood deaths in Scotland. Only anonymous details were obtained. With these methods we are confident that no cases of NAHI were missed and none doubly recorded. We obtained multicentre and local ethics approval before the study began.



Distribution of ages at admission to hospital for shaken impact syndrome

We identified 19 cases of NAHI, 12 boys and seven girls, between July 1, 1998 and December 31, 1999. The annual incidence of NAHI was 24·6 per 100 000 (95% CI 14·9–38·5) children younger than 1 year. The median age at acute admission was 2·2 months (range 4 weeks–8·8 months), younger than the average age of 5 months reported in other series,[2] and no child was older than 12 months. The age distribution of cases is shown in the figure. 75% of the children were admitted to hospital during the autumn and winter months. There was a higher incidence in the urban areas of Greater Glasgow and Lothian regions (45·7 and 43·8 per 100 000, respectively). During this period, three children died in Scotland because of child abuse, one from brain injuries.

A Swedish study concluded that children at risk of child abuse can be identified, and the incidence reduced by legislation banning corporal punishment. Currently the UK, including devolved parliaments have issued consultation documents on the law relating to reasonable chastisement—in particular questioning whether shaking children, blows to the head, and the physical punishment of very young children should always be unlawful. Our more precise measurement of incidence for NAHI in infants younger than 1 year will enable epidemiological surveillance to assess the impact of any future legislative changes and the effectiveness of health education packages in preventing shaken baby syndrome.

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Association between neonatal blood microtransfusions in the 1960s and hepatitis C virus infection

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In the 1960s, a common practice in Italy was to give a few mL of blood or plasma to underweight or preterm newborns. We postulated that this practice might be the cause of hepatitis C virus (HCV) infections seen today in adults with a negative history, and no recall of such transfusions. We examined the transfusion files of children admitted to the Department of Paediatrics during 1968–74, and found that 613 children had been transfused within the first year of life. Of 57 traceable patients, 28 are now positive for antibodies to HCV, 17 of whom received at least one microtransfusion from a common donor who is also positive.

About 30–50% of individuals positive for antibodies to hepatitis C virus (HCV) do not have any known risk factors.[1,2] However, the history of risk factors is based mainly on the memory of the patient, who is not always aware of events that took place in the distant past when medical practices were different from those at present. In an attempt to explain the origin of such infections, we decided to investigate the medical procedures used in the 1960s—a period during which some of these infections could have been contracted. During that time, a common practice in Italy was to give a few mL of blood or plasma to underweight neonates. Those with a birthweight of less than 2500 g were regarded as "immature",[3] and a blood transfusion was thought necessary to correct the inherent anaemia.[4] We wondered whether this practice could have been involved in the transmission of HCV to individuals who, as adults, would not remember such transfusions. Therefore, we examined the transfusion files of children born in the Department of Obstetrics and Gynaecology and admitted to the Department of Paediatrics of the Hospital of Legnano (Milan, Italy) in the period between 1968 (when records started) and 1974 (when the number and indications for transfusions became similar to those of today).

Year	Total number of newborns in hospital	Number of children transfused within first month of life	Number of children transfused between first month and first year of life	Total number of transfusions
1968	1688	153 (9·1%)	13 (0·8%)	385
1969	1964	96 (4·9%)	10 (0·6%)	228
1970	1614	63 (3·9%)	19 (1·2%)	180
1971	1575	58 (3·7%)	23 (1·5%)	154
1972	1536	36 (2·3%)	22 (1·4%)	90
1973	1654	65 (3·9%)	20 (1·2%)	155
1974	1457	23 (1·6%)	12 (0·8%)	56
Total	11 488	494 (4·3%)	119 (1·0%)	1248

Transfusions given to children during 1968–74

In this period, 613 children were transfused within the first year of life, 494 of whom received blood within the first month. The diagnostic indications for transfusion had been: immaturity (343 cases), general debility (117), haemolytic disease of the newborn (67), anaemia (63), and other diseases (gastroenteritis, dyspepsia, eczema) for 23. Children with diseases requiring multiple transfusions (eg, Cooley's disease, haemophilia, leukaemia) were excluded. The mean number of transfusions per child was two (range 1–13). The total number of transfusions was 1248. 411 donors gave 538 blood units of 300 mL between 1968 and 1974. Of these 538 units, 391 (72·7%) were given to children as entire units, whereas 147 (27·3%) were divided into portions of 20–150 mL, giving a total of 857 microunits of blood and plasma, all transfused into children. The distribution of the number of children born in our hospital and transfused at birth or within the first year of life between 1968 and 1974 is shown in the table.

57 of the 613 children have been traced and have given their consent to the study. Of these, 29 were HCV-antibody negative and 28 were positive. 17 positive individuals (15 of whom were HCV-RNA positive with a 1b genotype, and two of whom were HCV-RNA negative) had been given a mean of 3·8 (range 1–8) microtransfusions. All 17 positive individuals had had at least one microtransfusion from a common donor, presently found to be positive for HCV antibodies and HCV RNA (genotype 1b). For another two groups, one comprising three individuals of genotype 1b, and the other two individuals of genotype 2a/2c, investigation of the donors revealed that all had received microtransfusions from several donors, but at least one was common for each group. However, for these two groups of patients, the present HCV status of the donors is unknown, since they have either died or cannot be traced. Only four of the 28 HCV-antibody-positive individuals had other risk factors (three were children of HCV-antibody-positive mothers and one was a drug addict). Of the 57 individuals investigated, only five (three of whom were HCV-antibody positive) were aware of having received a transfusion within their first year of life.

We suggest that some HCV infections in Italian