

Key messages

- Subdural haemorrhage in children under 2 years of age is a relatively common occurrence. The majority are due to child abuse
- The mortality and morbidity of this condition are both high and serious
- The high probability of child abuse in cases is still not being recognised, and cases are not being investigated fully
- The clinical investigation of subdural haemorrhage must include a full series of basic investigations
- Previous child abuse in an infant is a strong risk factor for subdural haemorrhage, and social services must be aware of this in the future care plans for that child and family

of choice, however, as it has the capability of recognising small subdural haemorrhages not easily seen on computed tomograms. Magnetic resonance imaging can detect shearing injuries within the brain and indicate the age of the haemorrhage.²¹

Coagulation abnormalities were excluded in all cases tested. A subdural haemorrhage may rarely present in a child with a clotting disorder.²² In several of our cases there had been a significant fall in serum haemoglobin concentration at presentation. This implies that the bleed may have occurred more than 24 hours previously.

Retinal examination was performed by an ophthalmologist in less than half the cases. Three studies quote an 80% association between retinal haemorrhages and subdural haemorrhage in children.^{8 23 24} Our findings are confirmatory.

Previous child abuse in the family is a significant risk factor for subdural haemorrhage in children; all the children who had been previously abused died. Child protection agencies must therefore give high priority to the protection of all current and future children in such families.

It has been suggested that the public may not recognise how harmful shaking is to a baby. The Louise Woodward case in the United States, and more recent cases in the United Kingdom, have resulted in considerable media coverage of this subject. It is therefore important to alert the public to the dangers of shaking a baby, as the National Society for the Protection of Children has recognised in its "Never Shake a Baby Campaign."¹⁵ Professional agencies dealing in child health and child protection agencies must heighten their awareness of both the diagnosis and prevention of this condition.

Contributors: SJ, AR, FG, JP, JS, PS, JRS, and AMK participated in the design, execution, analysis, and writing up of the study. SJ, AR, JP, JRS, and AMK will act as guarantors for the paper.

Funding: This study was partly funded by the Agatha Christie Trust for Children and the Wales Office of Research and Development.

Competing interest: None declared.

1 Tardieu A. Etude medico-legale sur les services et mauvais traitements exercés sur des enfants. *Ann Hyg Publ Med Leg* 1860;13:361-98.

2 Caffey J. Multiple fractures of long bones of children suffering from subdural haematoma. *Am J Roentgenology* 1946;56:163-7.

- 3 Billmire ME, Dyers PA. Serious head injury in infants: accident or abuse. *Paediatrics* 1985;75:34.
- 4 Carty H, Ratcliffe J. The shaken infant syndrome. *BMJ* 1995;310:344-5.
- 5 Wilkins B. Head injury—abuse or accident. *Arch Dis Child* 1997;76:393-7.
- 6 Hadley MN, Volkes K, Sonnteg H, ReKate HL, Murphy A. The infant whiplash shake injury syndrome: a clinical and pathological study. *Neurosurgery* 1989;24:536-40.
- 7 Office for National Statistics. London: HMSO, 1993-5.
- 8 Department of Health. *Confidential enquiry into stillbirths and deaths in infancy (CESDI). Third annual report*. London: Department of Health, 1996.
- 9 British Paediatric Surveillance Unit. *Sixth annual report*. London: British Paediatric Association, 1991.
- 10 Ludwig S, Barman M. Shaken baby syndrome. A review of 20 cases. *Ann Emerg Med* 1984;13:104-7.
- 11 Committee on child abuse and neglect. American Academy of Pediatrics. Shaken infant syndrome: inflicted cerebral trauma. *Paediatrics* 1993;92:872-5.
- 12 Bonnier C, Nassogne M, Evrard P. Outcome and prognosis of whiplash shaken infant syndrome; late consequences after a symptom-free intervals. *Dev Med Child Neurol* 1995;37:943-56.
- 13 Caffey J. On the theory and practise of shaking infants. *Am J Dis Child* 1972;124:161-9.
- 14 Brown JK, Minns RA. Non-accidental head injury with particular reference to whiplash shaking injury and medico-legal aspects. *Dev Med Child Neurol* 1993;35:849-69.
- 15 Showers J. Don't shake the baby: effectiveness of prevention programme. *Child Abuse Negl* 1992;16:11-3.
- 16 Guthkelch AN. Infantile subdural haematoma and its relationship to whiplash injuries. *BMJ* 1971;iii:430-1.
- 17 Alexander R, Crabbe L, Sato Y, Smith W, Bennett T. Serial abuse in children who are shaken. *Am J Dis Child* 1990;144:58-60.
- 18 Duhaime AC, Alanio AJ, Lewander WJ, Schut L, Sutton MD, Seidl TS, et al. Head injury in very young children: mechanism, injury types and ophthalmologic findings in 100 hospitalised patients younger than 2 years of age. *Paediatrics* 1992;20:179-85.
- 19 Salman M, Crouchman M. What can cause subdural haemorrhage in a term infant? *Paediatr Today* 1997;5:42-5.
- 20 Haller JO, Kleinman PK, Merten DE, Cohen HL, Cohen MD, Hayden PW, et al. Diagnostic imaging of child abuse. *Pediatrics* 1991;87:262-4.
- 21 Alexander RC, Schor DP, Smith WL. Magnetic resonance imaging of intracranial injuries from child abuse. *J Paediatr* 1986;109:975-9.
- 22 O'Hare AE, Eden OB. Bleeding disorders and non-accidental injury. *Arch Dis Child* 1984;59:860-4.
- 23 Green MA, Lieberman G, Mitroy CM, Parsons MA. Ocular and cerebral trauma in non-accidental injury in infancy: underlying mechanisms and implications for paediatric practice. *Br J Ophthalmol* 1996;80:282-7.
- 24 Kaur B, Taylor D. Fundus haemorrhage in infancy. *Survey Ophthalmol* 1992;37:1-17.

(Accepted 28 July 1998)

Corrections

Obituary

The wife of Dr Jonathan ("John") James Mercer Kew (26 September, p 890) is called Jocelyn and not Mitch.

Secondary prevention in acute myocardial infarction

In this fortnightly review by Rajendra H Mehta and Kim A Eagle (14 March, pp 838-42), two errors occurred in table 3. Firstly, in the results for the first trial in the "selective" group (Pfeffer et al) the values for relative risk of death should have been 0.19 (0.03 to 0.32); P = 0.019 [not 0.21 (0.05 to 0.25); P = 0.014]. The published values related to the reduction in cardiovascular mortality, not total mortality. Secondly, in the results for the last trial in the selective group (Ambrossioni et al) the values for relative risk of death should have been 0.25 (0.11 to 0.60); P = 0.19 [not 0.34 (0.08 to 0.54); P = 0.018]. The published values related to the combined end point of death or congestive heart failure.

Mammography and the politics of randomised controlled trials

The following information should have been included at the end of this paper by Jane Wells (31 October, pp 1224-9). The author spent six months at the University of Maryland at Baltimore, during which time her salary was paid by the Anglia and Oxford Regional Health Authority. The author thanks Kay Dickersin for advice and help during this stay in Baltimore and for comments on an earlier draft of the paper.