a particular pattern of sonogram which is characteristic of brain death.\(^1\) The sonogram obtained from the basal cerebral arteries shows a major degree of reversed flow in diastole. We agree with the basic conclusion of the paper and having noted this phenomenon over the past three years published the validation of its use in clinical practice in 1987.\(^2\)

We analysed the sonograms from 23 children with very bad outcome out of a total series of 80 children monitored in coma. We thought it important that the sonogram was expressed numerically and therefore transformed the waveforms into a direction of flow index, DFI = 1 - R/F where DFI is direction of flow index and R and F are reverse and forward flow respectively.

Our conclusions were: (1) that once a middle cerebral artery signal had been observed after a 30 minute period with a time/velocity of less than 10 cm/s and/or a direction of flow index of less than 0-8 recovery of forward flow throughout diastole was never observed and no patient recovered brain stem reflexes. Where flow index was above these limits but with reverse flow in diastole recovery could occasionally be seen. The direction of flow index could occasionally drop below 0-8 briefly but when persisting for 30 minutes yielded no false positive results. (2) For medical and legal purposes we decided that no decision could be taken as a result of the inability to find a middle cerebral artery signal. Our study was not attempting to answer this question in the neonatal period.

Because of the high degree of concern about possible errors in the diagnosis of brain stem death we were permitted by the editors of the Journal of Neurology, Neurosurgery, and Psychiatry to publish quite a lot of the clinical and sonogram data in its primary form. By validation of phenomenon we mean that no clinical notice was taken of the sonogram and the children fulfilled the United Kingdom criteria for brain stem death over the appropriate time. We did not persist with intensive care until the heart stopped. At a recent meeting this additional method of confirming brain stem death was accepted by a number of people in the field as reliable outside the newborn period.

References


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Hyperventilation in the awake state in children with autistic traits

Sir,

Southall et al reported on hyperventilation in association with Rett syndrome.\(^1\) Hyperventilation is a behavioural trait common to Rett syndrome, infantile autism, and autistic traits resulting from severe organic brain damage.\(^2\) We had the chance of studying six children (four girls, two boys) belonging to the last group, who underwent polygraphic recording (electroencephalography, electrocardiography, and measurement of respiratory movements) and transcutaneous oximeter monitoring. The diagnosis of Rett syndrome and autism was excluded as our patients did not fit the criteria proposed by Olsson and Rett.\(^3\) All but one were severely mentally retarded with total absence of speech: only one girl showed a moderate mental retardation.

All our patients presented with hyperventilation. Interesting parallels were found with the cases of Rett syndrome of Southall et al. Prolonged apnoeic pauses or Valsalva manoeuvres, or both, occurred immediately after episodes of hyperventilation, sometimes resulting in a vagal syncope with consciousness impairment. Blood oxygen tension fell during breath holding and rose to normal values when respiration started again. Breathing was normal during sleep. A feeling of anxiety was experienced by all the observers when children hyperventilated and had prolonged apnoeas and self induced syncopes. The parents complained of the same feeling.

Five of our patients underwent measurement of their brain stem evoked responses that were elicited by monaural clicks at 70 dB hearing level during active wakefulness; absolute and interpeak latency values were normal. We did not succeed in recording brain stem evoked responses in the sixth patient because of his behavioural disorder.

We believe that the results of measurements performed in the children we studied indicate that the respiratory abnormalities in brain damaged children with autistic traits do not differ from those of Rett syndrome. Thus the same mechanism could be implied. As brain stem evoked responses represent a device for investigation of brain stem function, the hypothesis that hyperventilation in these children results from a brain stem dysfunction is not supported by our findings. Reduction of the higher centres inhibition could be a possibility, but we believe that the adjunctive hypothesis, psychological rather than medical, should be considered.

Gastaut stated that self induced Valsalva manoeuvres could represent a behaviour reinforced from the pleasure obtained by the brief loss of contact with the surroundings.\(^4\) We consider that breathing abnormalities and loss of consciousness evoke painful emotions in observers. The children we studied have very poor means of expression—with five out of six being totally speechless—thus the reported behaviour could be considered a psychotic means of communication of bad feelings.

References

Treatment of renal failure in neonates

Sir,

We are interested by the frequency with which renal failure is diagnosed and peritoneal dialysis prescribed in Manchester as we have dialysed only two infants in the last 40,000 births: one with severe birth asphyxia and one with congenital heart disease, both of whom died. Six other infants in whom renal failure was present at the time of death were not dialysed because their primary condition (birth asphyxia or congenital abnormalities) was irremediable. We suspect that the difference lies at least in part in the criteria for diagnosis.

'Poor urine output' together with uraemia and hyperkalaemia do not necessarily constitute acute renal failure. All these are common in preterm neonates with normal renal excretory ability. The babies cited above are the only ones in whom we detected a significantly reduced glomerular filtration rate as indicated by a plasma creatinine concentration rising above 130 μmol/l. Creatinine measurement is an indispensible indicator of renal function. Although a single result for plasma creatinine may be difficult to interpret (both because of maternal influences and analytical interferences), a rising creatinine concentration is a useful indicator of functional renal decline. Moreover, the measurement of urine creatinine will distinguish between decreased renal perfusion and intrinsic renal failure. Low urine volume will occur with both.

The high plasma urea concentration, common in sick preterm infants, is caused by their hypercatabolic state with urea excretion rates up to 15 mmol/kg/day in our studies. Similarly potassium turnover is far higher in catabolic infants, and may exceed the capacity of the normal preterm kidney which can only filter 3 or 4 mmol/kg/day. It is not surprising that hyperkalaemia is common.

Our observed incidence of renal failure severe enough to require dialysis is in agreement with that of Brocklebank of 0-2/1000 live births. Other infants may have had transitory renal impairment which was managed, without hazard, conservatively. Although Meeks and Sims do not mention the number of births their unit covers, their incidence of infants requiring dialysis does seem high.

While we would agree that peritoneal dialysis is a relatively straightforward technique, it is not without its hazards, and is no substitute for careful monitoring of renal function together with paying meticulous attention to the details of water and electrolyte balance. We believe that recoverable renal failure amenable to dialysis is uncommon. Moreover, in view of the long term neurological and renal consequences in the survivors of neonates receiving dialysis, treatment should be approached with caution.

References


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Clinical research group

Sir,

Clinical research is an integral part of training for the hospital doctor and experience in this field has become an important factor in securing senior registrar posts. Junior doctors with a busy clinical commitment may find it difficult to find time and motivation to undertake clinical research. With this in mind, a clinical research group was formed in Liverpool in 1985 to promote clinical research in paediatrics among junior doctors in the region.

The main aim of the group is to provide an informal forum to exchange ideas, discuss, promote, and improve the quality of clinical research in paediatrics. Doctors are encouraged to present hypotheses or ideas for research at an early stage of development after having formulated the idea into a written research protocol, but before having embarked on the project. The group discusses the proposed hypothesis and protocol and may make constructive criticisms and suggestions for alterations to the methodology. After completion of the project, presentation to the group affords a valuable opportunity for practice of a spoken paper before a critical audience before presentation to a scientific meeting.

Doctors who have previous experience in clinical research are invited to share their experience and lecture on research methodology and related subjects. Topics have included: the design and analysis of results from a clinical questionnaire, literature searching, design and running a drug trial, the use of a personal computer to run a research project, reviews of statistical software, and advice in planning an MD thesis. Guests are invited from staff within the hospital and university, to talk on selected topics requested by members of the group. Contributions on statistical analysis have been particularly well received. Members of the department of medical illustration have talked on the presentation of graphical material and artwork for publication and slides, and on the preparation of posters for scientific meetings.