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**LETTERS**

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**Hypoxaemia in children: “abnormal” values may be misleading**

Duke et al are to be commended for their interesting report aimed to determine normal oxygen saturation values in healthy infants and children and to assess the performance of oxygen saturation values in healthy infants. However, it is misleading to point out the limited availability of published data on the incidence, significance or clinical signs predicting hypoxaemia in infants less than three months of age. With similar concerns we had conducted a study in infants less than two months, a part of which was published in the *Archives*. We found that tachypnoea, defined as RR>60/min, predicted hypoxaemia with 80% sensitivity and 68% specificity. In that study we had also examined functional and behavioural responses as predictors of hypoxaemia (table 1). Five of these six variables had a very good sensitivity to detect hypoxaemia.

A very high prevalence of hypoxaemia in the population studied by Duke et al is rather intriguing. Out of total 257 sick neonates and children 52%, were hypoxic. Among children with acute lower respiratory infection (ALRI) 73% and those with non-ALRI 32% were hypoxic. In an ongoing study we have measured oxygen saturation (by Nellcor® oximeter) in a prospective cohort of 683 children 2–33 months of age. With similar concerns we had conducted a study in infants less than three months of age. With similar concerns we had conducted a study in infants less than three months of age. With similar concerns we had conducted a study in infants less than three months of age. With similar concerns we had conducted a study in infants less than three months of age. With similar concerns we had conducted a study in infants less than three months of age.

**References**


**Response to Duke et al**

We read with interest the article by Duke et al regarding hypoxaemia in acute respiratory and non-respiratory illnesses in infants and children in developing countries published recently in the *Archives*. The authors have rightly pointed out the limited availability of published data on the incidence, significance or clinical signs predicting hypoxaemia in infants less than three months of age.

However, our study at 4100 m revealed that SpO2 values are different according to different altitudes. Developing a medicine based on scientific evidence. These data will allow providing appropriate oxygen saturation levels than newcomers or resident non-natives in developing countries, particularly at primary level, where most sick children seek health care.

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referral and selection biases are likely. Hypoxaemia will be more common in emergency departments of referral hospitals than at primary care settings, and more common still among children requiring hospital admission. The prevalence of hypoxaemia in the hospitalised children will depend on thresholds for admission and case-mix. The 491 children in our study constituted about 20% of all the children admitted during the course of the study. A specialist paediatrician, whose practice was to oversee the care of sicker children, enrolled many of the patients, so this was a further source of selection bias. The much lower overall prevalence of hypoxaemia in children managed by Drs Singhi and Bharti in their emergency department population is therefore understandable. Of note the prevalence of hypoxaemia among sick neonates admitted to Goroka Hospital (43%) was similar to the prevalence among young infants (<2 months of age) attending the emergency department in Chandigarh (38.5%).

It is interesting to consider the effects of altitude on hypoxaemia in children with pneumonia. Some populations living at higher altitudes have a greater tendency to pulmonary hypertension; this susceptibility may be genetically determined and supports Dr Huicho's statement that ethnic differences in SpO2 at the same altitude are important. At altitude in response to hypoxia, pulmonary blood flow is shunted to the lung apices associated with an exaggerated vasoconstriction in the basal lung. This may have an adverse effect on ventilation perfusion matching in the supine position. In addition cardiac expression of natriuretic peptides increases in parallel with pulmonary artery pressure. These and other pathophysiological changes may account for the greater severity and prolonged duration of hypoxaemia seen at higher altitudes.

It is important to evaluate the simple intervention of 'hypoxaemia in adult acute respiratory and non-respiratory illnesses in neonates and children of developing countries. Arch Dis Child 2002;86:108–112.


**Hypoxaemia in developing countries**

Drs Huicho, Singi, and Bharti make the important points that definitions of hypoxaemia should be based on altitude-specific normal values and that further research at sea level and higher altitudes is needed. An altitude-specific definition of hypoxaemia (being an arbitrary value of SpO2 more than 2 or 3 standard deviations below the normal population mean) may be different from the threshold SpO2 for giving oxygen. Other considerations for giving oxygen are at what level of SpO2, (at different altitudes) oxygen is beneficial, local resource availability, and, in an individual child, confounding factors including the duration of exposure to altitude, age, or co-existent disease such as brain injury, severe anaemia, pulmonary hypertension, and cardiac failure.

We found that Papua New Guinean neonates and children living at an altitude of 1600m to determine normal range of oxygen saturation. Hypoxaemia in our study was a SpO2 more than 25D below the mean. In practice our threshold for giving oxygen to sick children (SpO2<85%; more than 3SD below the mean) was lower than this because of limited oxygen availability. However there is evidence that this is safe and effective. We stated that without further evaluation this should not be applied to hospitals at substantially lower altitudes than 1600m or in areas where oxygen availability is great.

In comparing the prevalence of hypoxaemia between studies in different health facilities, it may also be worthwhile to conduct studies with a large sample size at sea level (plains) and in various settings before reaching a conclusion about SpO2 cut off for hypoxia at heights. S Singhi, B Bharti Department of Pediatrics, Advanced Pediatrics Centre, Postgraduate Institute of Medical Education & Research, Chandigarh-160 012, India

**References**


**Refugee children: don't replace one form of severity with another**

We strongly agree with Fazel and Stein's view that refugee families require help that is culturally sensitive. Failure to provide appropriate interventions in a culturally sensitive way to these children and their families may lead to severe adverse effects. We agree with Fazel and Stein's positive view of school such adversity may include, for some children, integration into the UK educational system. While we agree that psychological trauma can be identified in significant numbers of refugee children, many will have qualities of "resilience" that will have been highly developed by their experiences of war and other adversities prior to their arrival in this country.
Pharmacogenomic can give children safer medicines

I read with great interest Clarkson and Choorna’s paper on the fatal suspected adverse drug reactions (ADRs) in the UK, and I strongly agree with their conclusions, namely that an evidence based approach to drug treatment is needed to minimise fataliti-

Ketoadic levels may alter osmotonicity in diabetic ketoacidosis and precipitate cerebral edema

Inward and Chambers have called for a rethink of the management of diabetic keto-

References


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BOOK REVIEWS

The Lazarus case, Life and Death Issues in Neonatal Intensive Care


When things go badly wrong in the perinatal period there has developed a culture in many “advanced societies” that demands a search for someone to blame. This search for guilt, accountability, punishment, and recompense often results in litigation.

In this thought provoking book John D Lantos describes such lawsuits as “our public morality plays” and uses his experience as a neonatologist, expert witness, and ethicist to create, debate, and crystallise relevant issues of ethics related to the neonatal intensive care of a fictional preterm infant who should have died but did not—The Lazarus Case.

A fictitious neonatologist, Dr Miller, decides to stop resuscitation of a very preterm infant who seems past reasonable care. The baby who might have died survived with severe neurological problems and the parents sue Dr Miller, alleging that stopping treatment was negligent. John Lantos places himself in the role of expert witness and uses questions put by the plaintiff’s lawyers to explore the moral, ethical, legal, and social factors and to illustrate the ambiguities, misunderstandings, responsibilities, and evasions highlighted by the perinatal care of a 25 week gestation infant.

A key question put to Dr Lantos by one lawyer was “Can studying philosophy tell you whether what a doctor does in a particular case is right or wrong?” Probably not is the final conclusion reached by Dr Lantos, but it was just as unlikely that definitive guidance would come from sociology, religious doctrine, strict medical protocols, or any other single source.

There have been many attempts over the past half century to face and explain the moral dilemmas associated with our attempts to save the lives, prevent damage, and encourage optimal development of critically ill preterm infants. The Lazarus Case reviews in a most effective, compelling, erudite, and compassionate way the enormous complexity of these issues. It is highly recommended to all who are concerned with the care of preterm infants and their families and is essential reading for those required to provide medico-legal advice on life and death issues in neonatal intensive care.

Forrester Cockburn

Problems in Paediatric Drug Therapy, 4th edn


There is increasing interest in both the clinical and scientific aspects of drug therapy in paediatric patients. This text book by the American Pharmaceutical Association is aimed at the North American market.

It is a reference book aimed at paediatric pharmacists. It covers a wide range of the problems associated with paediatric drug therapy, with chapters on the administration of drugs, fetal toxicity, drugs in breast milk, and both poisoning and drug toxicity, and also specific clinical areas, for example chemotherapy. There did not appear to be any order in the chapters. It would seem more appropriate to put chapter 13 on neonatal doses after chapter 3 on drugs in breast milk than after a chapter on chemotherapy.

There are several chapters with information on the dosage of medicines and it is of interest that these are divided into three separate chapters, one for neonates, one for infants/children and adolescents and one specifically for intravenous drugs. Despite having a chapter specifically on intravenous drugs, the chapters on drug dosing on both neonates and infants/children and adolescents contains details on the doses required for intravenous administration. This makes the book far more difficult to use. The dosage guidance is far less user friendly than publications such as Medicines for Children or the Neonatal Formulary.

It is for this reason I would not therefore recommend Paediatric Pharmacy departments to buy a copy of the book.

I Choonara