

Higher fellowships for Ph D students and post-doctoral researchers

Even as scientists in national laboratories and academics in universities wait for salary increases following the Fifth Pay Commission recommendations, there appears to be relief in sight for the real foot soldiers of science. The Scientific Advisory Committee to the Union Cabinet (SAC-C) has recommended that the fellowships for research students and post-doctoral researchers be enhanced. The Committee under the chairmanship of C. N. R. Rao has recommended that:

'A post-doctoral fellow may be given 75% of the minimum emoluments of a scientist in the grade of Rs 3000-4500 (pre-revised). Annual increment should be such that a post-doctoral fellow gets the minimum emoluments of a scientist at entry point (present Rs 3000-4500) in about 3 years.

'A research fellow pursuing Ph D may be given 75% of the emoluments offered to a post-doctoral fellow. The annual increment should be such that the research fellow gets the minimum

salary of a post-doctoral fellow in about 5 years.'

The SAC-C recommendations come at a time when there is growing concern about the attractiveness of careers in scientific research and markedly declining input into institutions of higher education. The proposals have apparently met with the enthusiastic support of the Prime Minister and the Finance Minister. The ball is now in the court of the Department of Science and Technology.

OPINION

Adverse drug reactions: DPT and poliomyelitis in developing countries

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SEVERAL reviews of adverse reactions following immunizations to children in developing countries¹⁻³ including a review from the Ministry of Health and Family Welfare, India⁴ have been optimistic, reporting very few serious reactions resulting from hundreds of millions of immunizations. No review mentions that an intramuscular injection of the Diphtheria-Pertussis-Tetanus (DPT) vaccine carries a risk of provocation paralytic poliomyelitis if the child is incubating a poliovirus infection⁵. How great is this risk and why has it been ignored?

Provocation poliomyelitis

When infection with a poliovirus coincides with an intramuscular injection of an inflammatory substance, the risk of paralysis increases according to the degree of inflammation in the muscle. Provocation was recognized in 1949 in Australia and England because the first paralysis occurred in the arm injected with DPT, about 10 to 20 days after immunization. When wild viruses were circulating, DPT injections in the polio season were the main cause of provocation. When it was found that they caused

much of the inflammation, adjuvants in the DPT vaccines were removed and DPT injections were given when circulation of wild polioviruses was low. Provocation, proved by animal experiments and epidemiological studies, occurs in the time between infection with virus and its clearance from the bloodstream by antibodies, about 9 or 10 days after infection. Injections during and after clearance will not provoke because virus already in the nervous system is protected. The most extreme instance of provocation occurred in the Cutter Incident when children received live poliovirus by injection. However, provocation polio had been described, though not named, in children with congenital syphilis treated with salvarsan in England and Italy, in communities in the Pacific treated for yaws and in Africa in children following injections⁵.

There have been very few cases of polio in the US since the Sabin vaccine was used, and surveillance of the few cases in the US and Europe does not include details of injections or first paralysis. The belief that provocation does not occur with vaccine virus had led to denial of DPT provocation and its gradual disappearance from the textbooks. The

statement in an authoritative textbook by US authors, that '... the rare instances of paralysis in a limb recently injected with an irritating material during a period of high poliovirus prevalence⁶ is a feeble warning for developing countries where polio is endemic and everyone is given injections. Provocation of poliomyelitis by DPT does not appear in the index of the most recent US compendium on adverse effects of vaccines for children⁷. Advice on the giving of injections has focused on nerve damage without mentioning the risk of provocation, e.g. ref. 8.

In developing countries, the usual treatment for a child with fever is one or more injections⁹ and if the fever is caused by poliovirus already in the spinal cord, polio paralysis may follow in 24 to 48 h. Non-paralytic polio may become paralytic and paralytic polio be made more severe. The effects of this aggravation are usually confined to the injected limbs¹⁰.

Poliomyelitis following DPT injections in India

The first report of provocation polio in India following DPT injections was in 1973 when Basu gave details of 16

cases¹¹, of which 13 were correlated paralysis in the injected limb and of these, 6 were in the arm, a rare site of paralysis in India. Examination of the case histories of hundreds of children with polio at Children's Hospital, New Delhi showed that no more than 2% involved provocation following DPT¹². At JIPMER, Pondicherry, four of the 262 cases were provoked by DPT and another three had received DPT injections less than 48 h before paralysis—aggravation rather than provocation¹⁰. In Bombay, a survey showed that eight cases of 82 with residual paralysis had developed polio after their first DPT dose¹³. The most recent outbreak occurred in an orphanage in Delhi in 1992 when of 37 children 'inadvertently administered DPT', five were paralysed^{14,15}.

Discussion

When polio is endemic as it was in India and still is in many parts of Africa, DPT injections carry the risk of resulting polio, a risk acceptable if thousands of children are protected against diphtheria, whooping cough and tetanus. However, if DPT injections caused 1 to 2% of the polio cases in India (see above), then 20 to 40 thousand children were affected in the ten years from 1980. This might be acceptable for the greater good, but was a disaster for the families.

WHO policy that children with fever should be given DPT because otherwise

they might be liable to life-threatening infections, has resulted in cases of aggravation polio. When circumstances change so that diphtheria, whooping cough and tetanus are no longer as threatening, policy should be reconsidered. Textbooks from western countries with different practices and circumstances must be used with caution.

Health authorities are reluctant to admit that immunizations carry any risk and may even delude themselves that such risks do not exist or that faulty injection practices, not the vaccine, are the cause. Nevertheless, it is difficult to understand how papers published in Indian journals have been so completely forgotten. We must face unpleasant facts and report them honestly in the literature, not only because this is right and ethical, but also to prevent future misfortunes. I was informed by an anonymous referee that public health officials knew of a few cases of polio resulting from DPT injections, but keep silent rather than cast doubts on the safety of the vaccine⁵. Their silence condemned many children to paralysis when mass campaigns with DPT began in 1949 (ref. 5).

As Richard Feynman reported on the Challenger Space Shuttle disaster, '... reality must take precedence over public relations, for Nature cannot be fooled'.

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SCIENTIFIC CORRESPONDENCE

First occurrence of *Isoetites serratifolius* Bose & Roy from the Deccan intertrappean beds of Kutch, Gujarat

The Deccan intertrappean/infratrappian beds of Kutch represent the westernmost exposures in Peninsular India. The main localities are Anjar, Dayapar, Kora and Lakhmipar. Of these, at Anjar, several intertrappean beds are exposed. The third intertrappean bed is rich in dinosaurian remains and an iridium anomaly has been recorded. In other localities only one intertrappean/infratrappian bed is observed.

Some of these beds were noticed by Wynne¹ as early as 1872. The geology

and palaeontology of these beds were worked out by various geologists and palaeontologists from time to time^{2–10}.

For the present investigation, intertrappean beds at Anjar, Dayapar and Kora were studied. Anjar did not yield any plant megafossils whereas the exposures at Dayapar and Kora are rich in fragmentary leaf impression of *Isoetites*. No other plant megafossils could be recovered from these beds. Maceration for palynological fossils also turned barren.

At Dayapar, a couple of exposures of

infratrappian beds are observed on the eastern side of the Bhuj–Lakhpat metalled road between Dolatpar and Dayapar (Figure 1). The sedimentary rocks are capped by more than 1 m of basalt but no basaltic bed could be traced at the base. The lowermost bed consists of roughly 3 m grey to slightly brown variegated shale. It is overlain by one fourth metre of brown, gritty sandstone. Between this sandstone and the topmost basalt, one metre greyish marl and limestone is sandwiched. This bed is particularly rich in