

- nus mortality in rural community of Haryana. *Indian Pediatr* 1988, 25: 167-168.
2. Kumar H, Aneja S, Prasad VK, Arora SK, Mullick DN. Tetanus neonatorum: Clinico Epidemiological profile. *Indian Pediatr* 1988, 25:1054-1057.
  3. Ghosh JB. Prevention of tetanus neonatorum. *Indian Pediatr* 1990, 27: 210.
  4. Deivanayagam N, Nedunchelian K, Kamla KG. Neonatal tetanus: Observations on antenatal immunization, natal and immediate post-natal factors. *Indian J Pediatr* 1991, 58: 119-122.

### **Pediatric Mechanical Ventilation in India Need, Indications, Cost and Problems**

We are undertaking mechanical ventilation (MV) seriously since three years, beginning with infants and children and then including neonates also. MV is provided to about 15 cases every month presently, 1 to 3 cases receiving it at a time. MV typically lasts for a few days, longest duration having been 37 days. Overall survival of 30% in 1992 is steadily improving. The following presentation of our experiences at Choithram Hospital and Research Centre, Indore is partly based on a prospective study(1).

The need for MV arose in about 10 to 20% of the Pediatric and the Neonatal Special Care Unit Admissions (annual admissions 500 in each unit) and in 3 to 5% of total pediatric and neonatal admissions (annual admissions 2500). Most babies needing MV were below 1 year.

The disorders requiring MV in neonates were hyaline membrane disease, protracted apnea, birth asphyxia, aspira-

tion, septicemia and others. In infants and children these were neurological (encephalitis, meningitis, poliomyelitis, polyneuritis, malaria, *etc.*), cardiorespiratory (respiratory infection, aspiration, congenital heart disease), metabolic and others (injuries, poisonings, bites). Preventable nature of many cases always struck us and indicated that the resources should be directed there first.

The average cost of MV in general ward has been Rs. 7000 per week. Twenty per cent of this is accounted for by MV proper (bed, ventilator, nurses, doctors); 30% by MV monitoring (blood gases, vital signs monitors, X-rays) and 50% by other management (biochemistry, cultures, drugs, nutrition, blood products, *etc.*)

The expenses have been upto 15 to 25,000 Rupees per week in cases with multiple organ failure who required extensive support. Ethical and legal considerations prevented us from selecting only good prognosis cases or those requiring short-term, low monitoring MV only, although cost effective utilization of limited resources in our country would call for it.

Initially main problem occurred with airway management (delay in intubation,

blocking of tube, accidental extubation, wrong placement, *etc.* in 42% cases), equipment malfunction and MV technique. Undertaking MV and intubation as an emergency measure and certain inadequacies in expertise were responsible. Poor motivation, high risk phobia and earlier infrequent use of ventilator interacted to create hesitancy in initiating early, elective and planned MV. The vicious circles were broken and the problems were overcome by continuing education addressing the problem areas and by improving expertise. Now major problems faced are infection, barotrauma, malnutrition and weaning difficulties.

The feasibility and utility of MV in well developed Indian units is demonstrated by our and others experiences(2-4). As Indian data is scanty and many aspects like requirement, cost and problems have not been addressed earlier, the experience presented above should be useful.

#### Acknowledgements

The help and encouragement received from hospital management and departmental colleagues and staff is gratefully acknowledged.

**S. Jain,  
A. Gangrade,  
M. Harshey,**  
*Department of Pediatrics,  
Choithram(Hospital and Research Centre,  
Indore 452 001.*

#### REFERENCES

1. Gangrade A. A study of status of mechanical ventilation therapy in a developing intensive care pediatric and neonatal unit with special emphasis on the problems, complications and their solutions. Thesis of Diplomate National Board, Choithram Hospital and Research Centre, Indore, 1992.
2. Singh M, Deorari AK, Paul VK *et al.* Three year experience with neonatal ventilation from a tertiary care hospital in Delhi. *Indian Pediatr* 1993, 33: 783-789.
3. Bhakoo ON, Narang A, Ghosh K. Assisted ventilation in neonates: An experience with 120 cases. Paper presented at IX Annual Conference, National Neonatology Forum, Manipal, February 17-20, 1990.
4. Kler N, Saluja A, Saxena U, Singh R. Mechanical ventilation in neonates. Paper presented at IX Annual Conference, National Neonatology Forum, Manipal, February 17-20, 1990.

### Combined Mother and Child Card

This has reference to the letter from Prakash and Swain(1) regarding a combined mother and child card which I had suggested in 1987(2). It is heartening to note that they have devised and used such a card and found it very useful for commu-

nity work and for better understanding and performance for ANMs and other staff. I only wish a fascimile of the card had also been published, so that many others could experiment with it and modify it if necessary, to suit their specific requirements. Such a combined mother and child care card would have given dividends and improved maternal and child care because of the high profile immunization programme.