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## Pre-hospital treatment: The bane of organophosphorous poisoning in rural India

Organophosphorous (OP) compounds have been used as insecticides, herbicides, antihelminthics, ophthalmic agents and in chemical industry. The most nefarious use has been as nerve gas in chemical warfare. OP pesticides were introduced in 1940s and have since been used widely. With the widespread use of insecticides especially in developing countries, they have become notorious as agents for suicidal use. The suicidal poisoning is resorted to by the most productive younger age groups; the typical scene is of the poor farmer affected by failure of crops, ingesting the insecticide, shifted to secondary or tertiary care centre after hours of travel, some times without even body wash, presenting with near respiratory arrest or aspiration. Thus, there is critical time lapse precipitating deeper toxicity before medical treatment especially respiratory support is provided to the victim.

The retrospective study of the OP poisoning conducted in a tertiary care hospital by Syed M Ahmed and others<sup>[1]</sup> published in this issue of Indian Journal of Anaesthesia should be assessed in this back ground. The authors have not considered the intensive care related parameters and investigations, possibly due to lack of database, such as those related to respiratory (including ventilation related parameters), cardiac, renal and metabolic systems nor have they discussed the infection status as other predictors.

No clear statistics are available in India but at least 20,000 people die every year due to OP poisoning world-wide annually (15% of total OP poisonings).<sup>[2,3]</sup> The higher morbidity and mortality is reflective of system deficiencies in health care in developing nations. The lack of primary health care facilities, delay in administration of atropine, lack of transport and ambulance facilities and of timely ventilator support are some of the major

contributors. Thus, the authors in this study report a mortality rate of 100% in the sub group where the mechanical ventilation duration was for 2-4 days, mainly ascribed to longer lag time before presentation and administration of pralidoxime (2-pyridine aldoxime methyl chloride [PAM]) contributing to more severe toxicity. Other than this factor, no single predictor was found and they suggest that a combination of overlapping factors were contributors to death. The phosphate poisonings are generally more severe, needing higher mechanical ventilation and drug support (atropine, PAM) when compared with carbamates.<sup>[4,5]</sup> Carbamates are the second highest consumed self-poisons after OP compounds for suicides and form less stable bond with the acetylcholinesterase with faster regeneration when compared with phosphates. The duration of ventilation and mortality therefore are more with OP compounds. Recommendations and reports of the need, timing and dosing of pralidoxime and atropine vary widely but there are no proven, effective treatment recommendations with respect to these two drugs.<sup>[2,4]</sup> Though the authors deduce the time delay in administration of PAM as predictor of duration of mechanical ventilation and death, the conclusive evidences based on randomised controlled trials are lacking. Since PAM administration was part of institutional protocol, comparison of outcome without PAM administration was not obtained from the database during the retrospective analysis. Among all approaches, early atropinisation and external decontamination are only likely to be beneficial in OP poisoning and oxime use is unlikely to be effective.<sup>[2,4]</sup> Stomach lavage as a first aid and treatment step is also not supported by quality evidence for its benefits.<sup>[6]</sup> The World Health Organization-United Nations Environment Programme resource tool gives guidelines for management of all types of pesticide poisoning which can form the baseline approach in all countries.<sup>[4]</sup> In India, majority

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of patients reach secondary hospitals from the village, with no availability of intensive care including ventilatory support even in secondary hospitals. It is imperative that at least the basic measures such as external decontamination, atropine administration and initial resuscitation are provided before the patient is shifted to the tertiary centre. The transport ambulance should be equipped, at the minimum, with facility and personnel with respect to three aspects: continued atropine administration, oxygen supplementation and resuscitation. Of course, subsequent improvements in morbidity and mortality, including neurological complications depend on the quality of intensive care management in the tertiary care hospital.

**S Bala Bhaskar**

Department of Anaesthesiology and Critical Care, Vijayanagar  
Institute of Medical Sciences, Bellary, Karnataka, India  
E-mail: sbalabhaskar@gmail.com

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