in musculoskeletal trauma should constitute an important area in the Armed Forces. We have carried out a study on patients with fractures and polytrauma in counterinsurgency operation areas and a study to develop a comprehensive psychotherapeutic package for amputees. A departmental project exploring body image, PTSD and pain in amputees is nearing completion. An ongoing AFMRC project is looking into comprehensive psychological assessment and management of amputees. However, much more is required to be done in this rather neglected field.

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One Man HAPO Bag

Dear Editor,

This refers to the article "Improved device for CO₂ absorption in the One Man Bag for High Altitude Pulmonary Oedema" published in *MJAFI* [1]. High altitude pulmonary oedema (HAPO) continues to be a challenging medical emergency to physicians and medical officers stationed at high altitude. Central to the pathogenesis of HAPO is hypobaric hypoxia leading to pulmonary arterial hypertension, increased pulmonary vascular resistance and endothelial injury. These results in increased capillary permeability and exudation of protein rich edema fluid into the alveoli. Much has been achieved and mortality brought down to near zero levels by prompt oxygen administration, quick descent, use of recompression chamber and now recently with the use of inhaled nitric oxide.

The one-man hyperbaric bag has been designed to provide a mini high-pressure environment and provide normobaric oxygen. Here air is compressed into the bag by means of a foot pump. Certain shortcomings of the bag viz. built up of carbon dioxide and water vapour have been overcome by incorporating CO₂ absorbent devices and small fans etc. The greatest limitation of the HAPO bag is that the physician / MO has no easy access to the patient for

Reply

This refers to the suggestion to try positive end-expiratory pressure (PEEP) for the treatment of high altitude pulmonary oedema (HAPO). The use of PEEP has already been tried and found useful [1,2]. However, in my experience a simple tight fitting facemask seems to work just as well.

It is agreed that the one-man HAPO bag has several limitations, but when it is used judiciously the results are most gratifying. Though monitoring patients is difficult, I have found the battery operated pulse oximeter most helpful as this little piece of equipment can be put into the bag with the patient and the pulse rate and SaO₂ can be read off directly through one of the windows on the bag. The High Altitude Medical Research Centre (HAMRC) had recommended to the office of the DGAFMS in 2001 that each of the one-man HAPO bags must be supplied with such a pulse oximeter.

It is also to be reiterated that the safest and surest form of treatment of early HAPO is a quick and considerable descent. This is not always possible hence the second best treatment modality still remains bed rest and oxygen by facemask (with or without

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monitoring and quick intervention. A possible alternative to the HAPO bag worth exploring would be tight fitting O₂ mask with a positive end expiratory pressure (PEEP) valve. Initially O₂ could be delivered at high flow rates and PEEP set at high values (10-15 cm of water) and then reduced depending on the Pa O₂ and Sa O₂. In field conditions only Sa O₂ monitoring would be possible. A small CO₂ absorbent canister could be incorporated at the side of the mask. It would be worth carrying out case control studies by physiologists and physicians stationed at high altitude on the use of such a device. A readily available mask is the one used with Ambu bag resuscitator and trials could commence using this mask.

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PEEP) given at a brisk rate of 8-10 L/min. The one-man HAPO bag is only the third option and is only a first-aid measure till the patient can be evacuated to hospital. But at remote posts from where evacuation is impossible or delayed, due to bad weather or enemy action, and the stock of oxygen cylinders is depleted then the third choice becomes the only choice and must be used despite all its limitations. Therein lies the importance of enhancing the capabilities of the one-man HAPO bag.

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