

partnership is to develop an evidence-based tool, which, in conjunction with existing nutritional guidelines, will guide Merlin's strategic approach to nutritional crises.

Methodology: Specific research questions relating to vulnerable populations were developed from the systematic assessment of the perceived need of Merlin headquarters (HQ) and field staff. A robust, systematic, critical, literature review was conducted that was sensitive to the broad types of evidence in this field. An evidence-based matrix for the level of evidence that facilitated a critical review for each research question (or evidence gaps) was developed. This matrix allowed identification of the relationships between programmes and population indicators.

Results: This paper describes a proactive approach to how such a partnership works, and presents some of the findings: The evidence matrix is presented for the following research questions on a population of seriously malnourished children:

1. What is the evidence for measuring specific prognostic indicators, particularly those related to redefining care for sub-sets of this population?
2. What is the evidence for comparative programmes outcome indicators?
3. What is the evidence on the relative importance of contextual factors?

These generic and pragmatic findings will be applicable to other NGOs in this field.

Keywords: assessment; emergencies; evidence; health; matrix; needs; populations; standards; tools; vulnerability

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Symposium: Clinical Issues in Disaster Medicine

Early Laser Ablation Accelerates The Healing of Partial-thickness Sulphur Mustard Burns

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Introduction: In man, the chemical warfare agent, sulphur mustard (SM), is a potent blistering agent. Skin exposure can produce partial-thickness burns that may take six times longer to heal than the equivalent depth thermal burns, possibly as a result of residual alkylation. The aim of this study was to investigate the use of early laser ablation as a means of accelerating this exceptionally slow rate of healing.

Methods: Four circular, partial-thickness, SM burns were induced on the dorsum of nine large, white pigs (under general anaesthesia). At 72 hours post-exposure, three burns per animal were ablated with a single pass of an Ultrapulse 5000C CO₂ laser, at a fluence of 5-6 J.cm⁻². All burns were dressed with silver sulphadiazine and a semi-occlusive dressing. Three animals were culled at 1, 2, and 3 weeks post-exposure respectively, and all lesions excised for histological analysis. Burn depth was confirmed, and measurements of the radii of regenerative epithelium were made so that the area of the zone of re-epithelialisation in each lesion could be calculated.

Results: Laser-treated lesions showed a statistically significant increase (350%) in healing rates compared to controls ($p < 0.005$). At two weeks, the laser treated sites were 95% healed in comparison with control sites (28% healed).

Conclusions: These data suggest that laser ablation may be efficacious in the treatment of SM-induced skin lesions.

Keywords: chemical warfare agent; sulphur mustard; laser ablation; chemical burn

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Crush Injury and the Kidneys: What Are the Lessons to be Learnt from Recent Earthquakes?

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Many areas of the world are prone to earthquakes. In the last few decades, earthquakes have affected populations in areas such as China (1976, 200,000 deaths), Armenia (1988, 25,000 deaths), Japan (1995, 5,000 deaths), and Turkey (1999). Review of the medical literature that followed these and similar events, highlight the significance of crush injuries on renal function. The review may facilitate enables assessment of the clinical management of these patients within the cohort of a disaster. Emergency services throughout the world regularly are exposed to non-earthquake-related crush injuries. Crush injuries occur due to structural collapse or from industrial or vehicular accidents.

While focussing on the particular goal of renal resuscitation, this paper reviews the overall management of crush injury. It includes the pathophysiology and the emergency and ongoing management. It particularly examines the published literature following earthquake disasters, and how this can be translated into management of smaller incidents.

Keywords: crush injury; crush syndrome; earthquake; emergency medical services; renal failure; renal resuscitation

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Pain Relief for the Injured in Disasters

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In a disaster situation, the first need for those who potentially can be saved is the provision of basic life support. Oxygen administration, if possible, also is a high priority. Along with rescue and retrieval, an easy, inexpensive supply of medications for pain relief is the next priority, but only rarely is it included in disaster packs.

Injected agents including narcotics are not practicable, although ketamine has been mentioned through the years. Cylinder supplies of nitrous oxide/oxygen mixtures are bulky, heavy, and difficult to clean between patients.

Inhaled methoxyflurane has many characteristics suiting it for stockpiling and use in disasters. It is an inhaled analgesic. It is simple to administer, involves minimal training, and is very safe when administered correctly. Methoxyflurane is very effective in relieving suffering in most conscious, injured victims, and can be used in combination with oxygen. It can be preloaded and thrown to trapped victims. It has a three-year shelf life. The analgesic device and co-packed medication can be stockpiled as it

requires little space for storage.

Methoxyflurane has been used for >27 years in the Australian ambulance services, with minimal problems. It now is used widely by those who provide first aid and by volunteer ambulance staff, of particular importance in Western Australia, where the combination of great distances, remote locations, and lack of paid professional responders is a potential disaster in itself!

Keywords: analgesic; Australia; methoxyflurane; pain relief
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Epidemiology of Burns in Edo State in Nigeria: Need for Appropriate Documentation and Policy Interventions

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A burns incident of epidemic proportions occurred in Edo State, Nigeria, West-Africa in 2001 between the months of January and February that affected 522 people. A survey was done involving gender and age distribution of the victims involved in the incidents. Out of a total of 522 people, 168 (32.2%) were male and 346 (66.3%) were female; 277 (53.1%) were adults and 221 (42.3%) were children. Eight patients (1.5%) did not have gender recorded, and for 34 (6.5%), no age was recorded. The cause of the epidemic involved the accidental mixing of kerosene with petrol at the point of transference of the kerosene from tank wagons to storage tanks in preparation for sale. Early detection of this mixture was impeded by administrative delays resulting in a wider proportion of the population being susceptible to the epidemic. This study served to highlight the need for proper documentation to facilitate speedy and proper intervention(s) in terms of treatment, management, and policy-making. It identified inadequate methods of documentation and record keeping.

It is hoped that this study would help to sensitize the relevant bodies involved in disaster management in Nigeria; to facilitate the development and implementation of adequate and appropriate policies and infrastructure.

Keywords: burns; demography; documentation; incident; information; injuries; management; policies
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Report of a Calamitous Snowslide

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The so-called "high altitude" usually means that land is >3,000 meters above sea level. Its geographic environment, weather, natural conditions, and atmospheric pressure are special. This article describes the place where snowslides occur in the Tong Gu La Mountains that are 5,400 meters above the sea level (atmospheric pressure = 420 mmHg, the PIO₂ = 68 mmHg). Persons living there may suffer from hypoxia, pulmonary hypertension, polycythemia, retinal haemorrhages, and other acute mountain sicknesses.

Cause of Snowslides—Snowslides usually occur about 5,000 meters above sea level. The snow-capped tops of the mountains are frozen all year. But, the temperature of the lower part of the snow line is only 10–15°C. Therefore, the

internal part of snow gradually dissolves, and the snow loses its support. Eventually, a snow slide occurs. According to the experience of Xi Zang natives, the snowslides usually appear during June and July.

On 10 June 1990, at the Tang Gu La Mountain Pass (Xi Zang Area), which is 5,444 meters above sea level, a snowslide killed 41 border guards. All were young men (<25 years old), and were submerged under a thick layer of snow. They died suddenly of traumatic apnea [asphyxia]. At the time of the snowslide, environmental conditions of high altitude were poor, and communication traffic was blocked. Hence, the news was obtained 25 hours after snowslide had occurred. The clinical signs of those killed showed that all of the dead persons were submerged under a few meters of snow and died of crush syndrome. When the vocal cords closed immediately, the air in lungs and trachea could not be expelled, the intrathoracic pressure became elevated. The organs in the mediastinum such as heart, aorta, venacava, etc., were displaced. Most venous blood was forced toward non-valvular veins of head, neck, and the upper part of thorax. Clinically, there was subcutaneous ecchymosis and emphysema and conjunctival haemorrhages. No fractures were present. These signs corresponded to those associated with traumatic asphyxia. Prophylaxis of Snowslides—Snowslides usually occur in June and July in areas of high altitude (>5,000 meters above sea level). Anyone wishing to pass through such an area is advised to avoid such a route. If such travel is necessary, one should travel on the northerly slope of the mountains. Guides and the natives of Xi Zang usually mark the safety line with marks before large groups of persons pass through the area.

Keywords: altitude; avalanche; emphysema, conjunctival[hemorrhages, conjunctival; snow-slide; traumatic asphyxia
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Method to Transfer Patients to Suitable Hospitals during a Disaster Using Personal Radio Stations

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Following the Hanshin-Awaji (Kobe) earthquake of 1995, victims who might have been saved, but needed special drugs and/or equipment, died because they were not transferred to appropriate hospitals. These unfortunate results occurred because rescue teams could not receive information relative to which hospital to convey the patient. After an earthquake, relay stations for telephones and computers may not be available due to disconnected lines, too much access, and blackouts. Therefore, controlling centers for ambulances cannot relay information to ambulances necessary to choose proper hospitals.

Ham (personal)-radio stations seem to be the best medium to relay such information from hospitals to controlling centers, because: (1) they are available nationwide; (2) they do not rely on telephone lines; (3) they do not need relay stations; (4) they can operate on independent power; and (5) they are operated on an independent basis. The Japan Amateur Radio League is a voluntary association