OPTIMIZING BURN TREATMENT IN DEVELOPING LOW- AND MIDDLE-INCOME COUNTRIES WITH LIMITED HEALTH CARE RESOURCES (part 3)

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SUMMARY. The present review of the literature aims at analysing the challenges facing burn management in low- and middle-income countries and exploring probable modalities to optimize burn management in these countries. In Part I, epidemiology of burns injuries and the formidable challenges for proper management due to limited resources and inaccessibility to sophisticated skills and technologies in low- and middle income countries (LMICs) were presented. Part II discussed the actual state of burn injuries management in LMICs. In Part III of this review strategies for proper prevention and burn care in LMICs will be presented.

Strategies for effective burn care in developing countries

Burn care in low- and middle-income countries (LMICs) is very dependent on the availability of financial resources, equipment, and expertise.[59] An additional important problem is that burn care in most developing countries is usually delayed. In rural areas, access to burn care facilities and thus proper treatment are compromised by factors such as long distances to travel, inaccessible roads, and unavailable transportation means.[59] Burn survivors in Ghana for example seek medical help at the local hospitals only when their burns become infected, often waiting as long as 60 days.[59] Only 48% of all childhood burns in Ghana are treated at a modern health care facility, of which 68% are treated within 24 h post-burn. Lack of knowledge regarding the seriousness of the illness and financial constraints are some of the reasons cited for the delay in treatment.[59] To provide optimal burn care to a large population with limited resources, it is imperative to strengthen the existing infrastructure. A few regional burn centres should be developed to provide tertiary management and training to burn care staff. General surgeons working in district hospitals should form the nucleus of the burn care service and decide on referral procedures.[5]

Pre-hospital care

The availability, accessibility, affordability, and awareness of pre-hospital and emergency care after burns are crucial determinants between life and death.[30,88] Developing first-aid respondents, strengthening ambulance services, decreasing the interval between injury and hospital contact, promoting referral system based on triage, availability of facilities in hospitals, and expanding communication networks are key strategies to improve pre-hospital care.[89] Unfortunately, the absence in most LMICs of efficient first-aid networks, an inefficient culture-specific ambulance service, and improper referrals not based on proper triage result in delays in presentation and hospitalization[1,32,33] and strongly impact morbidity and morbidity secondary to major burn injuries.

In-patient provision for burn injuries

Burn service stratification is necessary to optimize access to the appropriate level of expertise and minimize unnecessary travelling by patient and family.[1] Basic burn care provision should be undertaken at district and base hospitals led by general surgeons with burns training.[1] Fluid resuscitation, conservative wound management, blood transfusion, treatment of septicaemia and simple skin grafting can be undertaken locally,[1] whereas complex and extensive burns should be treated at regional burn centres which can offer as much as possible high-quality rehabilitation, reconstructive surgery, and other therapies.[1] Referral guidelines should be drawn up to aid the identification of factors that can make a burn injury complex and suggest the need for early referral the regional burns centre.[1] If it is not possible to keep referred patients at burn centres for six to eight weeks of treatment, they can be discharged after two or three weeks of stabilization. Such patients can

then be treated at district hospitals or at home with the help of primary health centres. Thus, primary health centres can act as liaison between burn patients and district hospitals. The incidence of burn wound septicaemia with domiciliary treatment is remarkably low. These patients can be readmitted as necessary for blood transfusions, treating septicaemia, and skin grafting.[5]

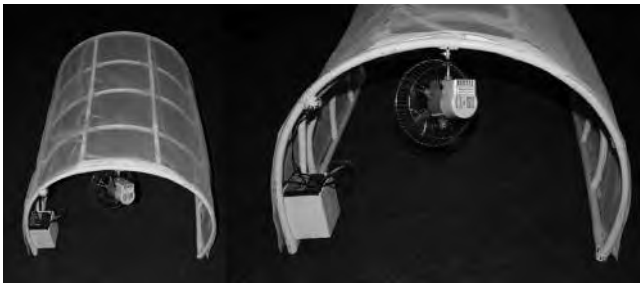

Fig. 1 - Effective cooling device for comfort of burn patients in hot humid tropical climates fabricated with a cheap small battery-run fan and a protective frame.

Adaptation of infrastructure and technologies to resource-poor settings

The need to target health needs appropriately based on priorities defined locally is increasingly recognized as being of crucial importance.[90] Difficulties faced by practitioners in the developing nations arise primarily from inability to provide the same level of infrastructure, technical support, and resources as in developed countries. Local practitioners should be innovative in adapting available resources and facilities to the needs of their patients while maintaining minimally acceptable standards (*Fig. 1*).

Operating theatres in developing countries often do not adhere to standards for physical parameters.[91] However, optimizing usage of existing facilities should be encouraged, such as placing two operating tables in one theatre for simultaneous surgical operations (*Fig. 2*). This has proved to be safe in various settings and highly cost effective. Reuse and recycling of donated and purchased items can allow health care facilities in developing countries to remain financially viable and provide services to those who could not otherwise afford them.[92]

Fig. 2 - Operating theatre in a big hospital in India equipped with two operating tables.

Commercially available splints and protective gear are expensive and not commonly available for third-world nations.[93] Cost-effective ear-cups to protect burned ears for example can be constructed from commonly available tea strainers held in place by a pair of Velcro-attached cloth/leather straps and D-rings.[93] This splint provides all the advantages of the standard ear-cup at lower cost. It is comfortable and easy to use, which enhances the client's compliance and provides a superior outcome in ear burns. It is extremely easy to make and thus has the potential to become the splint of choice for most of the third-world nations.[93] Similarly, low tech ventilators can be adapted to keep burn patients in tropical areas comfortable.

Although not all of these practices would be acceptable in developed countries or comply with high standards of care, they are a direct consequence of the impact of poverty on health care systems in a developing country.[92]

Burn injury prevention in LMICs

While much has been accomplished in the areas of primary and secondary prevention of fires and burns in many developed or high-income countries (HICs), the same cannot be said of many LMICs.[3,94-96] Many health, agencies, corporations authorities, and even medical personnel in LMICs consider injury prevention to have a much lower priority than disease prevention.[1] Injury prevention policies and programmes are conspicuously absent and ongoing efforts are crisis-oriented, *ad hoc*, and unscientific in nature. Consequently, burns prevention programmes have failed to receive the government funding that they deserve.[1] Moreover, lack of government initiative and limited access to media in most LMICs preclude effective prevention programmes.[1]

It costs approximately US$ 1000 per patient per day to provide satisfactory care in the Western world. This is clearly not possible in many developing countries. Prevention of burn injuries, based on the epidemiology of burn in developing countries, remains a major way of reducing the current spate of morbidity and mortality[10] and is the only logical solution. This is not easy and is time-consuming. But easy or not, there are no options; burns must be prevented.[14,51] Focusing on burn prevention in LMICs rather than on treatment cannot be overemphasized, owing to a shortage of for secondary and tertiary management in these settings.[3] Adequate preventive measures towards high-risk population groups (under 3 yr) and a specialized unit for adapted management should be instituted.[3] Prevention programmes should be directed at behavioural and environmental changes which can be easily adopted into lifestyle. The programmes need to be executed with patience, persistence, and precision, targeting high-risk groups with special attention to cultural sensitivities.[5,14]

The emphasis should be on prevention, by advocating change from harmful cultural practices. This needs to be done with care and sensitivity.[25] Depending on the population of the country, burns prevention could be a national programme.[5] Passive prevention strategies developed in HICs may not be applicable in most LMICs settings. Lowering hot water heater temperatures for example, used as an intervention in many HICs, makes little sense in LMIC households without electricity. Flame burns would be reduced dramatically in LMICs if efficient, safe, inexpensive kerosene lamps and stoves were utilized. The Sri Lanka Safe Bottle Lamp Project, which has redesigned the kerosene lamp in use, is a good illustration of a successful passive prevention measure adapted to the actual needs of the local population.[14]

Recent systematic reviews of fire and burn interventions in HICs have found some effective interventions, including burn educational campaigns in schools and in the home focusing on a three-pronged intervention involving regulation, education, and technology as well as targeting flame and scald burns in high-risk groups via a media campaign. These interventions need to be tested and evaluated in LMICs.[14,32] Irrespectively, there is a need for health education in most LMICs to reduce the incidence of burn injury[15] and a national body of burn professionals could be constituted for that regard to educate all healthcare staff involved in burn care.[5] Moreover, collaborative initiatives that help train staff in burns management are welcome and are certainly very useful.[25]

Conclusion

Developed countries have achieved ideal burn care through costly burn centres, units, and equipment[97] certainly not available in most LMICs. What developing countries need in order to achieve satisfactory results is scientific knowledge, fundamental surgical skills, and standard operating theatres, as well as dedicated doctors, nurses, therapists, and hospital administrators. To improve burn management in resource-poor situations there is an urgent need to enhance activities in burn prevention, care, rehabilitation, and research. In view of the high cost of burn units, equipment and consumables, as well as the paucity of trained staff and the poverty of the governmental financial situation, help is needed from foreign organizations to establish regional burn units. These are badly needed, especially in the event of mass burn disasters.[26,28] Impoverished countries can also be helped by sending them experts from developed countries and sending their own surgeons to high-standard burn centres in order to learn appropriate techniques. Knowledge, training, and dedicated staff would be key to success.[28]

Despite the lack of resources some excellent burn care can be provided. Under sometimes difficult circumstances,

many African countries often combine traditional and western management principles. Born out of need, this combination provides an intricate partnership between the classical standard health system of developed countries and the purely traditional medicine provided by traditional healers.[59] With initiative, effort, and efficient organization of available facilities and resources, developing countries can achieve more in burn care management. Suggested steps in this endeavour should include: 1. communication with local health organizations to find out their real needs; 2. conferences/symposia to highlight the problem; 3. appropriate training programmes and workshops onsite for motivated surgeons and other burn care staff; 4. arrangements for local personnel to visit burn units overseas.[28]

The importance of burn prevention, of which education is an important component, cannot be overemphasized, particularly in LMIC settings. People must learn the rules of behaviour that emergency situations require, and for this reason prevention campaigns are of fundamental importance. These campaigns must teach people how accidents can be prevented by observing certain techniques and guidelines, and they must also illustrate in detail what to do when an accident occurs.[14,33] As M.H. Keswani said in 1986, "The challenge of burns in India lies not in the successful treatment of a 100 per cent burn, but in the 100 per cent prevention of all burn injuries."[98]

RÉSUMÉ. Les Auteurs de cette revue de la littérature se sont proposés d'analyser les problèmes majeurs que les pays à revenu faible ou intermédiaire (PRFI) doivent affronter dans la gestion des brûlures et d'explorer les modalités possibles pour optimiser la gestion des brûlures dans ces pays. Dans la première partie ils ont considéré l'épidémiologie des brûlures et les énormes problèmes pour garantir leur gestion adéquate en raison des ressources limitées et de l'inaccessibilité des compétences et des technologies sophistiquées dans les PFRI. La deuxième partie s'est occupée de l'état actuel de la gestion des brûlures dans les PRFI. La troisième partie de la revue présentera des stratégies pour la prévention appropriée et les soins des brûlés dans les PRFI.

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