Setting the Goals in the Management of Mutilated Injuries of the Hand—Impressions Based on the Ganga Hospital Experience

S. Raja Sabapathy, MS (Gen), MCh (Plastic), DNB (Plastic), FRCS (Edin), MAMS[a,*], Praveen Bhardwaj, MS (Ortho), DNB (Ortho), FNB (Hand & Microsurgery), EDHS[b]

KEYWORDS

• Mutilated hand injuries management • Transfer of injured patients • Primary care of hand injuries • Accessibility of quality health care • Cost of hand injury care

KEY POINTS

- Mutilated upper limb injuries if not treated appropriately end up in amputation or with severe disability to the individual.
- Making quality care available at the time of need is the key to success. It is desirable to set the following goals in the management of these injuries to achieve consistent good outcomes:
  - Goal 1: mutilated hand injuries must reach the appropriate center for their primary care.
  - Goal 2: experienced surgeons must be available at the time of primary decision making.
  - Goal 3: quality care must be made accessible to all patients with mutilated hand injuries irrespective of the socioeconomic status.
  - Goal 4: cost containment measures must be practiced to provide affordable services in the management of mutilated hand Injuries.

INTRODUCTION

Mutilated hand injury is a complex injury wherein there is injury to or loss of multiple tissue components in the upper limb. The bone is almost always fractured and there may be urgent need to vascularize the distal part. Unless treated effectively, there is a risk of amputation or for the individual to spend the rest of his life with severe disability. This possibility has not changed with time. So what has changed? First, there are more data on the outcome of efforts at salvage of these complex injuries to plan the strategy of management.[1–12] Second, these injuries need high skill levels, and matching the availability of such skilled work force to the need in various parts of the world has become a challenge. Third, the cost of care has become an important issue in all health care systems and provision of cost-effective services has again become a challenge.[13–17]

With industrialization, work-related injuries contributed the greatest number of mutilated hand injuries. The enforcement of safety standards has thankfully reduced the injuries not only in the Western world but also in the developing world.[18]

[a] Division of Plastic Surgery, Hand Surgery, Reconstructive Microsurgery and Burns, Ganga Hospital, 313, Mettupalayam Road, Coimbatore, Tamil Nadu 641 043, India; [b] Hand & Wrist Surgery and Reconstructive Microsurgery, Ganga Hospital, 313, Mettupalayam Road, Coimbatore, Tamil Nadu 641 043, India
* Corresponding author.
E-mail address: rajahand@gmail.com

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Even in India, work-related injuries are showing a diminishing trend. This positive development is offset by the increasing number of injuries that happen due to road traffic accidents. To this number needs to be added the severe injuries that happen in the operating room of war and terrorism. Because these injuries happen mostly to young people in the productive phases of their lives, effort to provide good care becomes worthwhile.

THE GOAL OF MANAGEMENT

The goal of management of a mutilated limb injury is to get a patient to preinjury status as early as possible. Because mutilated injuries often are associated with loss of tissue, reaching preinjury status may not be possible in many instances. The injuries are diverse and may pose a great challenge that a hand surgeon should be capable of handling.[19,20] Such injuries need all the skills of a hand surgeon, ranging from bone fixation to complex microsurgical flap cover and reconstruction. del Piñal[21,22] has suggested that an ideal scenario — the acceptable hand as one that has a thumb and at least three fingers of the correct length with motion at the proximal interphalangeal joint preserved along with sensation. This ideal, in many situations, may not be achievable. According to Moran and Berger[23] the minimal requirements for the hand are a stable wrist and 2 opposing sensate and painless digits. For digital requirements, only 1 digit requires motion, whereas the other can be a stable post, but both digits must be stable to withstand the force required to generate pinch. To accommodate larger objects and allow for prehensile movement, a cleft must be present between digits. Moran and Berger[23] also detail what is lost when the various components of the hand are lost. Having this idea guides salvaging components of the hand when possible and also aims at restoring function by secondary reconstruction.

Functional restoration has to be achieved at an affordable cost in the prevailing health care systems and patients have to be rehabilitated as early as possible.[24] Achieving these 2 objectives involves demands on infrastructure, availability of manpower, and logistics in administration.

The Health Care Paradigm

Effectiveness of health care delivery can be analyzed by the gaps that exist between healthcare need, availability, and utilization (Fig. 1). It is almost impossible to match these three in any disease management in most health care systems. The narrower the gap, the better the delivery of care. Bridging the gap between the need and availability requires efforts of high magnitude in infrastructure development and training and staffing of skilled workforce and may involve huge financial outlay, which needs the commitment of the government leadership and policy pronouncements and is a long-term target. Bridging the gap between availability and utilization is simpler and can be done by institution of protocols, set practices, and education. Much of it can be done by health care professionals and administrators and early measurable results can be achieved. Narrowing the gaps is again the goal in mutilated injury management.

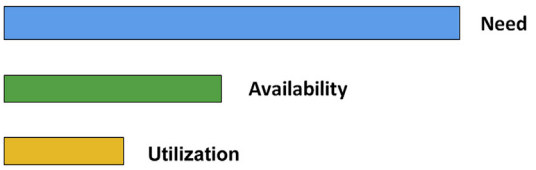

Fig. 1. The typical gaps in health care delivery status. Bridging gaps between need, availability, and utilization is the goal in the management of mutilated hand injuries.

A dedicated hand injury service was set up at Ganga Hospital in the Tier 2 city of Coimbatore, South India, in 1991 and gradually it has developed into a tertiary-level trauma care center. Approximately 6000 hand surgical procedures, including 51 replantations, 91 critical revascularizations, and 255 free tissue transfers, were done in the year 2015. The unit had a humble beginning and an analysis of the factors that made it successful has revealed that making some protocol changes could help in setting up a center of high volume wherein high-quality care can be delivered at an affordable cost—they are enumerated.

Goal 1: Mutilated Hand Injuries Must Reach the Appropriate Center for Their Primary Care

Experience in managing mutilated hand injury has taught that the ultimate outcome depends on the quality of initial débridement and primary skeletal stabilization, which lay the foundation for early soft tissue cover. If an injured limb requires revascularization, the needs become emergent. All these factors are dependent on the primary treating surgeon. When the injury happens, the decision, Where to go? becomes important because time is crucial in many instances (Fig. 2). After an amputation, the chances of replantation being attempted and the success rate depend on the center treating the patient. This finding is based on experience worldwide.[25–27] Shale and colleagues,[28] after a nationwide review, in the United