Challenges Posed by Delayed Presentation of Mutilating Hand Injuries

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KEYWORDS

• Mutilating hand injuries • Late presentation • Debridement • Component loss in the hand
• Restoration of hand function

KEY POINTS

- Debridement and elimination of infection are the keys to success, with a multipronged strategy of radical debridement, early soft tissue cover, and appropriate antibiotic therapy.
- A detailed assessment and charting of intact structures is essential for planning further treatment; individualized treatment is essential.
- Skin cover with flaps is preferable to grafts. For complex reconstructions composite free flaps may be used.
- Adequate splinting and rest, combined with dynamic physiotherapy are required at all stages.

Man being naturally destitute of corporeal weapons, as also of any distinctive art, has received a compensation, in the gift of that particular instrument the hand, secondly is the gift of reason; by the employment of which gifts he arms and protects his body in every mode, and adorns his mind with the knowledge of every art

—Galen[1]

INTRODUCTION

In many parts of the world, a large number of patients with mangled hands receive incomplete or improper primary treatment, and eventually reach a specialist when they are unable to use the hand. Even in such instances, it is important to aim to obtain a hand that can perform basic functions and allow the individual to lead an independent life. According to Pinal, an acceptable hand is one with 3 fingers with near normal length, near normal sensation, and a functioning thumb.[2] This should serve as a basic benchmark for the reconstructive surgeon. Timing of presentation of hand injuries greatly influences the final outcome of hand function. Proper initial assessment is important to plan the sequence of reconstruction.[3]

The following features are commonly present in delayed presentation of mutilated hand injuries: inadequate initial assessment and patient counseling, inadequate debridement leading to infection, inappropriate stabilization of skeletal injuries, missed injuries, inadvertent ligation of vessels/nerves, a failure to recognize impending compartment syndrome, and improper mobilization resulting in stiffness.

Late presentations, apart from leading to poor functional outcome, also have a serious

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socioeconomic impact on the patient and the family; most of the time, the patient himself is the sole breadwinner for the family. Multiple surgeries and a long duration of rehabilitation mean loss of work hours and wages. A prolonged absence from work may cause loss of job itself. Lack of financial or family support is one of the reasons for patients not complying with a rehabilitation protocol.

Pathophysiology of Hand Injuries in Delayed Presentation

Various factors affect the course of events, modalities of treatment, progress, results of treatment, and prognosis in patients who present late at the appropriate facility.[4] The nature of injury causes certain anatomic disruptions that in turn lead to functional deficits. Inadequate fixation results in malunion and nonunion secondarily affecting other joints and movement. Patients present with chronic pain, stiffness, malpositioning, scissoring, and sometimes severe deformities (**Fig. 1**). The onset of infection and secondary problems lead to certain sequelae (**Table 1**).

EVALUATION OF THE INJURED HAND

Evaluation of the injured hand starts with of obtaining a proper history and knowing the hand dominance and nature of job performed by the individual. Although one follows the same sequence of examination as when hand injuries present early, in delayed presentation the assessment of loss in various tissue components can only be made at the time of debridement. Basic investigations like wound swabs for culture and antibiotic sensitivity, radiographs are done for all patients. Soft tissue ultrasound imaging, complex imaging like computed tomography or MRI, and assessment of vascular status by Doppler ultrasonography and angiography are done if necessary.[5–8]

Management

Proper assessment of damage is the cornerstone for planning the reconstruction of a mutilated hand injury. In delayed presentation, the usual tests may not be possible because of edema and pain owing to raw areas and inadequately stabilized bony injuries. So, the stage of debridement becomes even more critical in the overall management of the mutilated hand. This has to be done by a senior surgeon who will also be involved in the execution of the various stages of treatment and in the overall management until rehabilitation.

Debridement and Infection Control

Debridement is the key step for the prevention of infection. Often in delayed presentation, if the wound is already infected, radical debridement still is the key to success. The aim is to achieve primary healing of the wound. Debridement is considered conventionally to be removal of

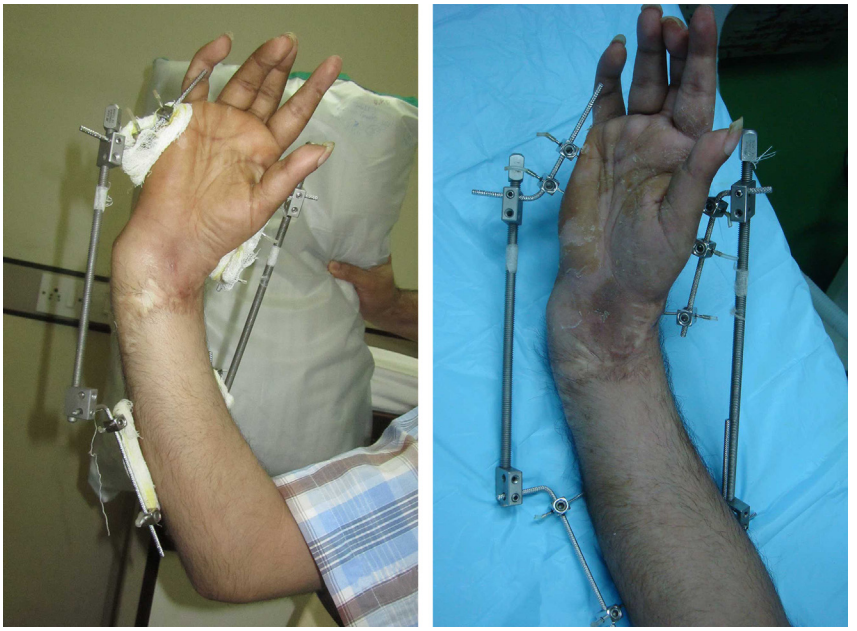

Fig. 1. Examples of malpositioning of bones owing to improper initial fixation of mangled hands.