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POST BURNS CONTRACTURES: OVERVIEW AND MANAGEMENT

Plastic Surgery

Dr. Monali Makadia Professor, Plastic surgery, P.D.U Medical College, Rajkot

Dr. Richa Patel* Resident doctor, Burns and Plastic surgery department, Civil hospital, Ahmedabad
*Corresponding Author

ABSTRACT

Post burns contractures increase the morbidity of burns victims severely. There are various functional, rehabilitation, and aesthetic concerns. Prevention of post burns scars and contractures is extremely important, however these cases are very common. This article highlights the indications and need for surgical correction as well as their outcomes.

KEYWORDS

Burns, Post burns contractures, release.

INTRODUCTION:

Burns is a leading cause of morbidity all over the world. In acute setting, it can be devastating and may lead to death. Patients who are salvaged from this acute trauma are faced with long term complications such as post burns scars and contractures, at this stage the restoration of pre-injury status in terms of function, cosmesis and social acceptance is important.

Post burns scars are inevitable. Scarring depends on the depth of burns and extent of injury. All deeper burns i.e. 2nd degree deep dermal burns and full thickness burns lead to scarring. In early period these can be minimized by physiotherapy and splints. The incidence of Post burns contractures is extremely high in our country. It is not uncommon to see multiple contractures in the same patient. Primary burns management is taken by varied service providers and not only by plastic surgeons specialized in this training, whose primary aim is to treat raw area. Management of post burns contractures starts right from their prevention at this early stage. These patients have contractures and resultant defects and disfigurements.

Review:

The healing of burns wound is by complete regeneration (restitution) or by substitution. In deep burns the tissues are all burnt and thus final healing is by fibrosis and scarring. Full thickness loss of skin, wound contraction and epithelialization from the margin leads to contracture formation.

Contraction is a normal process by which raw area is reduced by concentric reduction in wound size. This process is mediated by interaction of fibroblasts, myofibroblasts and collagen deposition. When deeper tissues are involved, there is shortening of musculotendinous and neurovascular units. The joints may be subluxated or dislocated. The bones may get deformed especially in young children.

These contractures can be prevented by proper physical exercise and custom – made pressure garments. The healed areas should be prevented from sunlight exposure. There are a number of therapies to reduce contractures including intra-lesional corticosteroid injection, antihistamines, hydrotherapy, dynamic or static splinting, laser therapy, compression therapy, and surgical excision and reconstructionHowever once the contracture develops physical therapy may not be possible without surgical release. Similarly, contractures with raw areas or unstable scars need surgical intervention. Wide excision is recommended for long standing scars with ulcers, which are suspicious of Marjolin's ulcer. The post burns contracture may be associated with hypertrophic, atrophic, or depigmented scars. These may need excision for optimal functional and aesthetic results. Involvement of deeper structures and subsequent musculotendinous contractures and neurovascular shortening restricts the complete release of contractures. The distal neurovascular deficit especially in cases of limb should also be considered an taken into account. Orthopedic consultation may be required for bone and joint involvement. For post burns contracture of neck and face, orthodontic and orthognathic measures may be required.

Most effective method to prevent wound contraction is to give early coverage with split-skin thickness grafts, either after early tangential excisions or over granulating areas. Ideal is to cover the raw area with full thickness graft as this prevents scar contraction. However this may not be feasible in burns patients. So split skin thickness grafts are used with meshing for expansion. Thicker grafts contract less. The collagen and elastin in scars are relatively un-crosslinked and malleable during initial stages. Gentle exercises at this stage helps lengthening the scar bands and thus increases the range of motion.

Principles of surgical correction by contracture release:

Usually the contractures are released only once the scars are stable. It is not done in an active phase of wound healing i.e when it is vascular and immature. The scar should be mature, soft and supple before operating for contracture release. Highly vascular scar beds prevent good uptake of grafts and lead to poor results. Sometimes it may be possible to manage immature scars non surgically. It is important to consider several cases of post burns contracture where we do not wait for scars to mature before release like lid ectropion (especially upper eyelid) as there is risk of keratoconjunctivitis, corneal ulceration and scarring, and chances of loss of vision (Figure 1 a & b). Severe neck contractures with microstomia with incapacitate daily activity and hygiene should be released early (Figure 2 a & b). Crippling and deforming contractures of the hand may be operated early in order to prevent permanent damage (Figure 3 a & b). Bilateral knee contractures, elbow contractures (Figure 4 a & b) incapacitating contractures, infected contractures and contractures with raw areas should be operated early.

Figure 1 a & b

Figure 2 a & b

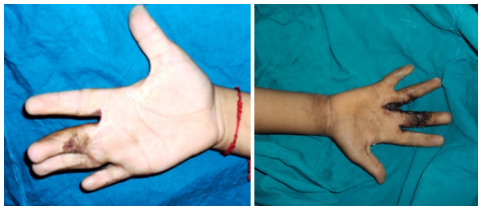

Figure 3 a & b

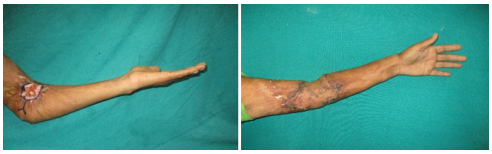

Figure 4 a & b

In patients with multiple contractures, priority or the sequence of release of contracture is important. It depends on the severity, site, availability of healthy donor skin and tissue, number of total procedures that may be required and the desired functional and cosmetic result. It also depends on the patient's age and the presence of attendant. The ectropion should be treated on priority, followed by severe neck contractures and dorsal contractures of the hand.

Surgical procedures:

The essential steps for management of post burns contracture involve the release of contracture, followed by skin coverage and adequate postoperative care. Proper planning and tissue selection are essential to minimize donor site morbidity optimizing outcomes. The principle of burn reconstructive surgery requires that the defects after release should be replaced with donor tissues which have matching texture and colour as well as enough pliability. The release of contracture should be such that no underlying tissue should be damaged. There should be sufficient resurfacing of the scarred tissues. The contracture is present in all directions however, the release begins with the point of maximum tension. The incision can be infiltrated with 1:200,000 adrenaline solution for a relatively bloodless field. Limb contractures can be released under tourniquet for better control of blood loss. The incision is deepened till the unscarred normal tissue. Darting is done at the ends and as required as the contracture spans in other directions.

Release can be by incision or excision. Incision is the preferred method as it decreases the need for skin cover. Excision is important and may be needed in cases where scars are unstable and suspicious of malignancy, or when adjacent depigmented/ hyperpigmented areas are interfering with final aesthetic outcome. Gradual release may be done in severe contractures aided by serial splintage, skin/skeletal traction or distractor. After full release of contracture, the area is covered with skin graft or skin flaps. Sheet grafts are preferred. Meshing should be limited. More graft should be fed into the defect in order to prevent inevitable secondary contractures. The graft should be immobilized with either tie-over dressing, plaster of Paris splints, crepe bandages, or external fixators (Figure 5 a & b).

Figure 5 a & b

Coverage by skin flaps may be required in areas where joint spaces are likely to open up, or bone, tendons or neurovascular structures are likely to be exposed. It may also provide a more aesthetically better result. Local flaps in the form of Z plasty, V-Y plasty, V-M plasty may be used with caution. They may adequately cover the defects by repositioning of local tissues, however there is a danger of necrosis of the flaps as surrounding tissue is also usually scarred. They are useful only in cases of lesser degrees of contractures. Pedicled or perforator flaps or even distant free flaps may also be used. These provide aesthetically superior results.

Postoperative care:

The released/ corrected position should be maintained properly till the graft becomes completely taken up and is stable and the flap margins have healed. This usually occurs by 3 weeks. Static or dynamic splints may be used interspersed with periods of appropriate physical therapy to ensure normal range of movements for joints and functional outcome. This treatment should continue till the grafts have matured and complete range of movement is achieved.

CONCLUSIONS:

surgical correction should be accurate and followed up with intense postoperative care. Full thickness skin grafts and local flaps give better results. The selection of surgical procedure for release of contracture and subsequent choice of cover for the defect determines the cosmetic outcome in cases of post burns contracture. Functional outcome depends on the surgical procedure as well as the physical therapy and splints that the patients follows on routine basis later.

Conflicts of interest: none

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