Surgical Options For Axillary Contractures

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Abstract

Background: The axilla is one of the most frequently affected areas by post burn contractures with associated cosmetic and functional problems. A variety of therapeutic options exist but when this is not properly chosen or post operative rehabilitation is not properly adhered to, recurrence is often seen. The aim of this paper is to highlight the various management options used in managing these problems in a burn unit and itemize complications commonly encountered.

Materials And Methods: This is a retrospective review of cases of axillary contractures managed at the National Orthopaedic Hospital over a period of 5 years. The sources of information were the operation registers and the case notes of the patients. Information obtained include age, sex, part of the axilla involved, other associated post burn problems, option(s) of treatment, complications and results.

Results: A total of 37 patients presented with axillary contractures involving 42 axillae. Their ages range between 2 and 47 years with a mean of 23.1 years. There were 20 males and 17 females.
Surgical options used includes local fasciocutaneous flaps, 18(42.8%)axillae, single z-plasty in 6 (14.3%) axillae, split thickness skin graft in 6(14.3%) axillae, multiple z-plasty in 3(7.1%)and myocutaneous flaps including latismus dorsi in 5(11.9%), double opposing z-plasty in 2(4.8%) while v-y plasty and 5-flaps z-plasty were used in 1(2.4%) each.

Conclusion: Contracture release with skin grafts has the highest recontracture rate with local flaps in many forms giving good results with minimal complications.

INTRODUCTION

Axillary contractures commonly result from deep burn to the trunk especially when adequate rehabilitation is not given to the patients. It is often seen in our environment following poorly treated burn injuries especially when the conservative approach is the method of achieving cover for a burn wound around the shoulder joint. This often interferes with the ability to feed and perform other important upper extremity functions. Contracture release should therefore encompass the entire axis of rotation of the shoulder to facilitate complete range of motion. A variety of therapeutic methods such as skin grafting, z-plasties, local flaps, island flaps, and free flaps have been reported for treatment of axillary contractures.

A review of options of managing this problem in a burn unit of a developing country is hereby presented with various options and complications following each of the options.

MATERIALS AND METHODS

A retrospective review of all axillary contractures managed surgically in our burn unit at the National Orthopaedic Hospital, Enugu was carried out. The period of study was between 2000-2004. Sources of information were the patients' folders as well as the operation register.

The age, sex, involved axillae; methods of surgical correction and accompanying results of these methods and complications of each method were noted.

RESULTS

A total of 37 patients presented over the study period with axillary contractures involving a total of 42 axillae. Their ages range between 2 years and 47 years with a mean of 23.1 years. There were 20 males and 17 females.

The right axilla was involved in 19(51.4%) patients, left axilla in 14(37.8%) patients while both axillae were involved in 4(10.8%) patients.

Agents responsible for the burn injuries in these patients were flame (48%), corrosive (32%) and scalds (20%).

Anterior axillary fold was involved in 22 axillae, posterior axillary folds in 9 axillae while both axillae were involved in 4 axillae and the apex of the axilla was involved in 2 patients while the part of the axilla affected in one patient was not stated in the folder.

The surgical options used in managing these patients following contracture release includes local fasciocutaneous flap which was the commonest method in 18(42.8%)axillae, single z-plasty in 6 (14.3%) axillae, split thickness skin graft in 6(14.3%) axillae, multiple z-plasty in 3(7.1%), double opposing z-plasty in 2(4.8%) while v-y plasty and 5-flaps z-plasty were used in 1(2.4%) each and myocutaneous flaps including latismus dorsi in 5(11.9%) (Table1).

Figure 1

Table 1: Methods used in releasing axillary contractures.

METHODS	NUMBER OF AXILLAE	PERCENTAGE (%)
Fasciocutaneous flaps	18	42.8
Single z-plasty	6	14.3
Split thickness skin graft	6	14.3
Multiple z-plasty	3	7.1
Myocutaneous flaps	5	11.9
Double opposing z-plasty	2	4.8
V-Y plasty	1	2.4
5-flaps z- plasty	1	2.4
Total	**42**	**100**

Associated problems noted in these patients include mentosternal contractures in 3(8.1%), elbow contractures in 3(8.1%), keloids in 4(10.8%), ulcers in 5(13.5%) and hypertrophic scars in 35(94.6%) patients.

Graft shift, 4(66%) and recontractures, 3(50%) occurred in patients who had skin grafts. Recurrence was also observed in one patient with V-Y flap cover. Tip necrosis was a common problem in patients who had multiple z-plasty and 5 flap z-plasty. Often these healed with minimal intervention and with good results. Epidermolysis was also a common complication among the patients who had multiple z-plasty. These also healed with no problem.

Bulkiness of the latismus dorsi used in this review was also a problem necessitating a secondary procedure. No free flaps were used as there were no facilities for this in our centre.

Figure 2

Figure 1: Axillary contracture involving both anterior and posterior axillary folds with the dome

Figure 3

Figure 2: Following release using 5-flap z-plasty on both sides

Figure 4

Figure 3: Linear anterior axillary contracture

Figure 5

Figure 4: Following multiple z-plasty release

DISCUSSION

The rehabilitation of patients who have suffered burns in the large joint, in particular, the shoulders remains a difficult problem in reconstructive surgery. Spontaneous epithelialization of burn wounds and late skin grafting results in various kinds of scar deformation and contractures. This significantly restricts physical and social rehabilitation[1]. Skin scar contractures related to destruction of skin, subdermal fat, and fascia are very frequent.

The axilla is one of the most frequent sites affected by contractures after severe burns and it often causes cosmetic problems and functional deficiency. Secondary contractures involve muscles and tendons (shortening, serous induration and scarring of tissues around a joint), after which joint contractures develop. Primary arthro-osseous contractures result from direct deep burns in a joint, leading to severe and irreversible processes[2].

Kurtzman[3] and stern have classified axillary contractures as

- Type 1A- Anterior axillary fold involved
- Type 1B –Posterior axillary fold involved
- Type 2 – Both Anterior and Posterior axillary folds involved
- Type 3- type 2 plus axillary dome

The purpose of reconstructive operations in a shoulder joint with post burn contractures is therefore the removal of scarring, the elimination of contractures and the restoration of full movement to a joint without the relapses of contractures. The particular method used in releasing these contractures and covering them depends on the class of the contractures as observed above.

For example skin graft is difficult to apply to the concave surface of the axilla and prolonged splinting in abduction for up to 6 months is necessary to prevent recontracture.

Local flaps tend to be required for types1 & 2 viz; single or multiple Z-plasties, or five-flap Z-plasty whereas regional fasciocutaneous and myocutaneous flaps are usually considered for type 3 axillary contractures.

Successful use of medial fasciocutaneous flaps in reconstructing axillary contractures have been reported[4]. Two of our patients had this option of surgery with good results. In other instances, correction of axillary burn scar contracture with the thoracodorsal perforator-based cutaneous island flaps[5], seven-flap plasty[6], axial bilobed flaps[7] have all been reported. Nisanci et al[8] used a variety of surgical treatments for reconstruction of axillary contracture, covering defects with simple things such as grafting, Z-plasties and locally pedicled flaps and found that the island scapular flap is a good choice for reconstruction of all types of axillary contractures, releasing defects with satisfactory results in terms of function and cosmesis. The concept of a triceps muscle flap has been recently proven valid[9]. By using only the long head portion, necessary function preservation may be achieved.

Ogawa's[10] review shows free skin grafts, local flap transfers including skin elongation procedures such as z-plasty, regional flap transfers, i.e. pedicled axial local flap transfers, latissimus dorsi flaps, para-scapular flaps, superficial

cervical artery flaps (SCA flap) and bilateral combined scapular flaps, free flaps and scarring flaps with generally satisfactory results.

The use of multiple z-plasties where applicable gave good result in our current series. These are useful only in linear anterior or posterior axillary contractures. It was also used successfully in linear contractures affecting both sides of the axilla.

Parascapular flap was also used as local transposition fasciocutaneous flaps and five flap z-plasty in linear contracture with good results. Flap tip necrosis was the commonest complication observed in these flaps though this is usually minimal and less than 1cm needing no further surgery.

We also observed the recurrence rate was high among patients who had skin grafting because the patients' compliance on the continuous use of axillary splints for a long time was poor. This option is commonly used therefore where other options are not readily available or as a result of severe burns involving the entire axilla including the dome. Bulkiness of the myocutaneous flaps necessitated secondary procedure of debulking and this should be considered seriously in the use of such flaps. We did not use any free flap in our series as we do not have microvascular facilities.

In conclusion, various methods of releasing post burn axillary contractures abound. Some of the factors to be considered in choosing the best option for a particular contracture include the type of contracture and the expertise of the surgeon. However, flap cover gives the best result with minimal or no flap loss and better range of joint movement and reduced recontracture rate.

While early eschar excision, wound grafting, and rehabilitation of the joint would help in preventing this morbidity, the choice of flaps rather than skin grafts when reconstruction is needed is recommended.

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