



Hypertrophic scarring of skin graft donor sites in burns patients: Prevalence and risk factors

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INTRODUCTION

Scarring is a common sequelae of burn injuries, resulting in physical and emotional trauma for the patient. Patients who are female, young, or who have delayed wound healing or dark or Asian skin-types, are at an increased risk of their scarring becoming hypertrophic [1, 2]. Scarring can occur not only on the burn site, but the donor site created when split-skin grafts are used [3]. The ideal donor site should match the recipient site, be easy to harvest and care for post-operatively, heal quickly and result in minimal discomfort and scarring [4]. Current research on donor sites has primarily focused on identifying the optimal dressing, with healing time and pain the most common outcome measures used. Few studies have investigated donor site scarring specifically. Low but varied prevalence rates are reported, and little is known about the type of patients affected [5].

AIM

This exploratory study investigated the prevalence of hypertrophic scarring (HS) in donor sites and attempted to identify possible risk factors.

METHODS

A retrospective review of the clinical notes of 70 burns patients who had undergone skin-grafting procedures in 2012 was completed. HS was recorded as present if therapists described the donor site scar as raised and firm. Patient age, gender, and skin-type, and donor site harvesting tool, location, size and healing time were recorded.

RESULTS

Data analysis included 56 patients with 89 separate donor sites; 14 patients were excluded due to non-compliance with follow-up.

- The overall prevalence rate of donor site HS was 34%, however the extent of scarring varied. Some patients experienced hypertrophy to the majority of the donor site (Figure 1), while others had only minimally raised, firm scarring in small areas of the donor site. A common presentation was hypertrophy at the distal edge of thigh donor sites (Figure 2).

- HS was more prevalent in females (36%) compared to males (32%), and in patients with Asian (63%) or dark (38%) skin types, however 28% of Caucasian patients also scarred. The differences between scarring and non-scarring groups for gender ($p=0.393$) and skin-type ($p=0.182$) were not statistically significant.

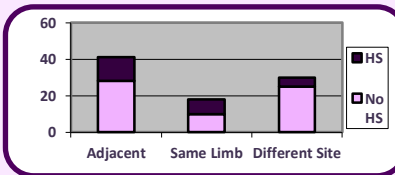
- The age, TBSA and donor site healing time of patients with and without HS were compared:

Variable	HS	No HS	Significance (ANOVA)
Mean Healing Time (Days)	17	13	$p=0.073$
Mean Age (Years)	46	43	$p=0.518$
Mean TBSA (%)	4.9	6.24	$p=0.568$

HS occurred in 38% of patients over 50 years old.



Figure 1. Scarring to back donor site



- Prevalence of HS varied depending on donor site location: arm 75%, back 67%, buttock 33%, thigh 27%, lower leg 23% and abdomen 17%. Location was significantly correlated with healing time ($p=0.028$) and scarring ($p=0.037$).

- Scarring rates differed depending on the proximity of the donor site to the graft site. Donor sites from different body parts to the graft site had the lowest scarring rate, however the differences between the groups were not statistically significant ($p=0.116$).

DISCUSSION

- Prevalence rates for donor site HS corresponded with previously identified risk factors for pathological burn scarring in general, including female gender, dark or Asian skin-type, prolonged healing and upper limb location [1]. However, the rates were not statistically significant. The high prevalence of HS in older patients was an unexpected finding, as pathological scarring is usually associated with younger patients [2, 6].

- A shorter healing time was the variable closest to being protective, however 65% of donor sites that scarred had healed in 14 days or less.

- Scarring at the distal edge of thigh donors was likely due to harvesting technique and may vary with operator experience.

- Healing time was longer the closer the donor site was to the graft (Correlation: $p=0.052$). This may be due to a higher localised inflammatory response closer to the original injury site, which can prolong healing and increase scarring [6].

- HS affected patients of all ages, skin-types and genders, even those that were low risk of pathological scarring. These results highlight the importance of informing all patients about the risks of scarring when selecting donor sites, rather than just those that would be considered high-risk of pathological scarring. Patients should be involved in selecting donor site locations when appropriate.

- Future research can investigate other forms of scarring, such as pigmentation changes, as well as explore the patient's opinion of their scarring. The impact of possible risk factors should be further tested, including donor site locations and proximity to graft sites.



Figure 2. Scarring worse at distal edge of thigh donor

4 months post surgery

6 months post surgery

CONCLUSION

All patients are at risk of developing donor site scarring. Patients should be informed of the risks of scarring when donor sites are selected, and therapists should routinely monitor all donor sites for hypertrophic scarring.

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