Post skin graft eczematous dermatitis at the donor and recipient sites: a case of Ruocco's immunocompromised district

Shruti Kulkarni, Keshavmurthy A Adya , Arun Inamadar

Dermatology Venereology and Leprosy, Shri B M Patil Medical College Hospital and Research Centre, BLDE (Deemed to be University), Vijayapur, Karnataka, India

Correspondence to
Dr Arun Inamadar;
aruninamadar@gmail.com

Accepted 21 July 2023

DESCRIPTION

The concept of an immunocompromised district (ICD) was first proposed by Ruocco *et al* in 2009 to indicate focal areas of cutaneous functional impairment due to infections, vascular injury and/or trauma resulting from a variety of causes. ICDs predispose the affected region to the development of a variety of other dermatoses (locus minoris resistentiae) or, occasionally, sparing of the region in generalised dermatoses (locus maioris resistentiae). Regional immune impairment is attributed to lymphatic and/or neural damage. Dermatoses developing at such sites range from infectious and inflammatory conditions to various neoplastic disorders and are strictly confined to the ICDs.[1–3] We present a case of a man in his late 20s who presented with eczematous lesions at the donor and recipient sites following skin grafting as an illustration of Ruocco's ICD.

A man in his late 20s presented with itchy rashes during the previous week which had developed at the donor and recipient sites (right and left anterior thighs, respectively) of split-thickness skin grafting surgery, which he had undergone 6 months previously for a non-healing burn wound. He did not have any personal or family history of atopy nor had he received any form of treatment prior to our consultation. Clinically, the rashes were conspicuously confined to the graft donor and recipient areas, characterised by erythema, erosions, crusting and scaling suggestive of eczematous dermatitis (figure 1A,B). Dermoscopy of both sites showed a pinkish background, clustered non-uniform red dots, yellow-orange structureless areas, erosions and scaling (figure 2), supporting the clinical diagnosis of eczema.[4] The history, clinical and dermoscopic findings collectively suggested an inflammatory dermatosis (eczematous dermatitis) developing at the sites of locally impaired immunity (Ruocco's ICDs) due to surgical trauma at the donor site and the skin graft and/or the previous burn at the recipient site.

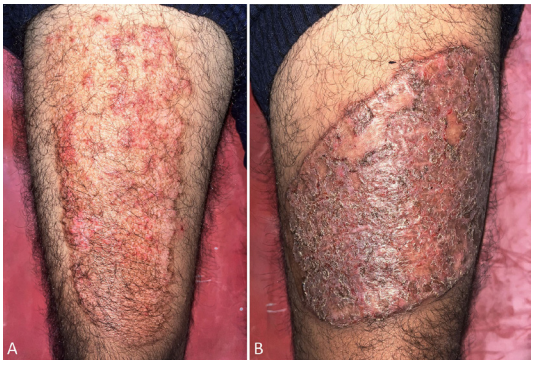

Figure 1 Eczematous dermatitis at the donor (A) and recipient (B) sites 6 months following a split-thickness skin grafting procedure.

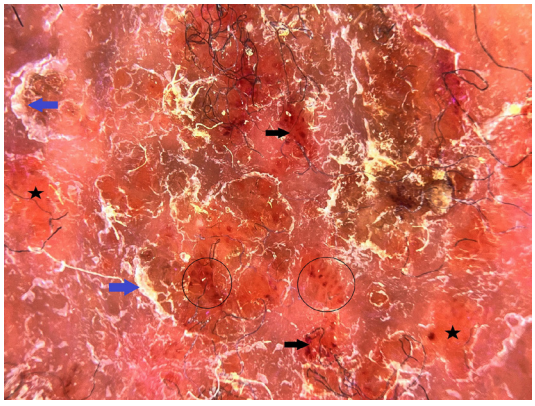

Figure 2 Dermoscopy of the lesions showing clustered non-uniform red dots (black circles), yellow-orange structureless areas (black stars), erosions (black arrows) and scales (blue arrows) over a pinkish background (polarised dermoscopy using DermLite DL3, 3Gen Inc, San Juan Capistrano, California, USA; magnification x10).

DISCUSSION

Eczematous cutaneous reactions developing at the donor and/or the recipient sites of skin grafting have occasionally been described.[5–8] Lymphatic obstruction and altered neuromediator pathways due to trauma contribute to the development of ICDs at these sites. Furthermore, split-thickness grafts are different from normal skin in having impaired barrier properties and an absence of adnexal structures, contributing to the development of ICDs, in addition to trauma, at the recipient sites.[3] Eczema developing at the donor and recipient sites is attributed to impaired barrier properties and altered immune function. As there was no personal or family history of atopy, impaired barrier function and/or the altered local immunological properties possibly facilitated development of eczema due to exogenous factors in our case. Verma *et al* reported a similar case to ours in a patient with an eczematous reaction at both the donor and recipient sites following split-thickness skin grafting.[5] They noted that the eczema was more severe at the recipient site than at the donor site, which they attributed to

To cite: Kulkarni S, Adya KA, Inamadar A. *BMJ Case Rep* 2023;**16**:e255883. doi:10.1136/bcr-2023-255883

more tissue damage at the recipient site. We also noted a similar difference.

Being functionally and immunologically different from the normal skin, the donor and recipient sites following skin grafting procedures can transform into ICDs, as highlighted in this case. Hence, the need for meticulous postoperative wound management cannot be overemphasised to prevent the possibility of development of ICDs. In this regard, appropriate wound dressings and judicial and optimal use of topical and systemic measures should be used to address the altered barrier properties as well as to prevent wound infection, thereby facilitating unhindered and optimal wound healing and early restoration of local functional and immunological properties of the donor and recipient sites.

Learning points

- Cutaneous immunocompromised districts (ICDs) are focal areas with impaired normal functional and immunological properties of apparently normal skin over which a variety of dermatoses may develop.
- Following a skin grafting procedure, the donor site loses its normal functional and immunological properties due to surgical trauma. In addition to surgical trauma, the skin graft itself is functionally and structurally different from normal skin, which contributes to the alteration in the functional and immunological properties at the recipient site. As a result, these areas are prone to transform into ICDs.
- Eczema developing at the donor and recipient sites of skin grafting has occasionally been reported, illustrating the phenomenon of ICD.

Contributors Supervision of manuscript preparation: AI. Manuscript preparation: SK, KAA, AI. Review and final approval of the manuscript: SK, KAA, AI.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Consent obtained directly from patient.

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

ORCID iDs
Keshavmurthy A Adya http://orcid.org/0000-0003-4411-1979
Arun Inamadar http://orcid.org/0000-0002-8877-3723

REFERENCES

1 Ruocco V, Brunetti G, Puca RV, *et al*. The immunocompromised district: a unifying concept for lymphoedematous, herpes-infected and otherwise damaged sites. *J Eur Acad Dermatol Venereol* 2009;23:1364–73.
2 Ruocco V, Ruocco E, Piccolo V, *et al*. The immunocompromised district in dermatology: a unifying pathogenic view of the regional immune dysregulation. *Clin Dermatol* 2014;32:569–76.
3 Vojvodic A, Tirant M, Di Nardo V, *et al*. Immunocompromised districts of skin: a case series and a literature review. *Open Access Maced J Med Sci* 2019;7:2969–75.
4 Errichetti E. Dermoscopy of inflammatory dermatoses (inflammoscopy): an up-to-date overview. *Dermatol Pract Concept* 2019;9:169–80.
5 Verma SB, Wollina U, Ruocco E, *et al*. Eczema of recipient and donor skin graft sites: another example of "Ruocco's immunocompromised district" *Dermatol Ther* 2019;32:e13076.
6 Sahin C, Noyan N, Ergun O, *et al*. Eczema in full-thickness skin graft. *J Burn Care Res* 2013;34:e58.
7 Harnack K, Miemiec E, Waldau W. Endogenous eczema in a split-thickness skin graft. *Dermatol Monatsschr* 1972;158:28–32.
8 Constantini N. Eczema of Thiersch's graft following radical surgery. *Arcisp S Anna Ferrara* 1954;7:169–79.