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IMMUNOHISTOCHEMICAL CHARACTERIZATION OF T-LYMPHOCYTES AND MACROPHAGES IN POST-BURN HYPERTROPHIC SCAR

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INTRODUCTION

- ❖ Hypertrophic scarring is a **distressing sequelae** of burn injury. Incidence rates in post-burn patients range from 33% to 91%. Deep dermal and full-thickness burns often result in **hypertrophic scar** formation. Characterized by **excessive collagen deposition, chronic inflammation, functional limitation,** and **psychosocial morbidity**.
- ❖ Immunological mechanisms driving post-burn Hypertrophic scar remain poorly understood. The **aim** is to study the immunohistochemical characterization of immune cells (CD4, CD8, and Macrophages) in **Indian post-burn hypertrophic scar patients**.

METHODS

- ❖ This cross-sectional study included 42 histopathologically confirmed cases of post-burn hypertrophic scars.
- ❖ 6 mm punch biopsies were processed and stained for CD4, CD8, and CD68 using standard immunohistochemistry protocols.
- ❖ Positively stained cells counted in 5 HPFs across papillary and reticular dermis.
- ❖ Statistical analysis: SPSS v25.0; $p < 0.05$ significant.

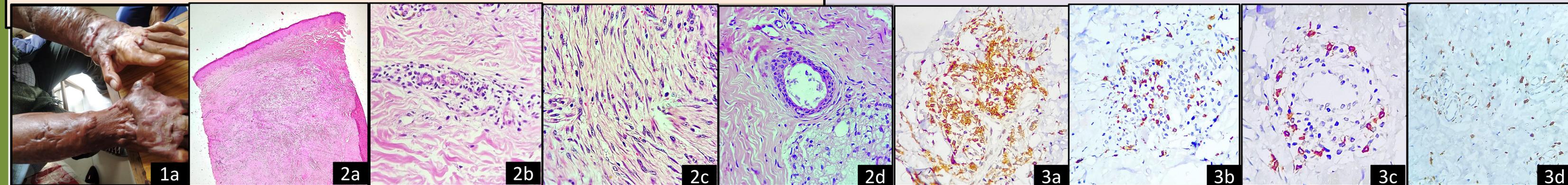


Fig 2a) well-circumscribed hypocellular dermal lesion with thinned epidermis, H&E(100x) Fig 2b) perivascular lymphomononuclear infiltrate with collagen bundles, H&E(400x) Fig 2c) Immature scar with plump fibroblasts, H&E(400x) Fig 2d) Entrapped eccrine glands within parallel collagen bundles, H&E(400x) Fig 3a) CD4⁺ T-cells in reticular dermis, IHC(400x) Fig 3b,c) Perivascular CD4⁺ and CD8⁺ T-cells, IHC (400x) Fig 3d) Perivascular CD68⁺ macrophages, IHC (400x)

RESULTS

- ❖ **Mean age:** 31.5 ± 9.9 years; slight male predominance; thermal burns commonest (71.4%); **forearm** most common scar site{**Fig 1(a)**}; scars developed ~1.9 months post-burn; TBSA ≤0.5%.
- ❖ **CD4⁺ T cells:** Median **36.5** (21.5–74.5); reticular > papillary dermis; perivascular distribution(**Fig 3a,b**)
- ❖ **CD8⁺ T cells:** Median **28** (19.25–47); consistently fewer than CD4⁺; perivascular distribution(**Fig 3c**)
- ❖ **CD4⁺:CD8⁺ ratio:** Papillary 1.86:1; reticular 1.48:1; **overall ~1.6:1** ($p < 0.01$)
- ❖ **CD68⁺ macrophages:** Median 57.5 (31.25–96.75); reticular predominance(**Fig 3d**)

CONCLUSION

- ❖ **CD4⁺ T-cell predominance** → suggests a **pro-fibrotic immune environment**.
- ❖ **Relative CD8⁺ paucity** → scope for restoring anti-fibrotic immune balance.
- ❖ **Abundant CD68⁺ macrophages** → rationale for **macrophage-directed therapies**.
- ❖ **Perivascular immune clustering** → opportunity for **targeted local drug delivery**.
- ❖ Immunohistochemical profiling aids scar pathogenesis understanding and supports **targeted anti-fibrotic immunomodulatory therapy** development.

REFERENCES

Mulder PP, Vlig M, Fasse E, Stoop MM, Pijpe A, van Zuijlen PP, Joosten I, Boekema BK, Koenen HJ. Burn-injured skin is marked by a prolonged local acute inflammatory response of innate immune cells and pro-inflammatory cytokines. *Frontiers in immunology*. 2022 Nov 14;13:1034420.