



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Reconstructive considerations following a necrotic spider bite on the face: A case report



Joachim Mikkelsen ^{*},¹, Grethe Schmidt, Rikke Holmgaard

Department of Plastic Surgery, Breast Surgery and Burns Treatment, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen Ø, Denmark

ARTICLE INFO

Article history:

Received 10 December 2016
Received in revised form 13 February 2017
Accepted 13 February 2017
Available online 20 February 2017

Keywords:

Recluse spider bite
Necrotic skin lesion
Facial defect
Reconstructive ladder
Skin graft
Case report

ABSTRACT

INTRODUCTION: Spider bites as the cause of necrotic skin and soft tissue lesions occur very rarely in Central and Northern Europe. Recluse spiders, distributed almost worldwide, are one of two genera of spiders with confirmed capability of causing necrotic lesions. In the facial region, the resulting defects represent a potential reconstructive challenge, especially in younger patients.

METHODS: This case report has been reported in line with the SCARE criteria.

PRESENTATION OF CASE: We describe a case of a 19-year-old female with a suspected bite from a recluse spider sustained during a recreational trip to Guatemala. She was bitten on the right upper aspect of the nose, and within a week developed a large necrotic lesion extending to the medial canthus. Following her return to Denmark the defect was reconstructed with a trimmed full-thickness skin graft. An initially planned second-stage reconstructive procedure was cancelled, as the patient was satisfied with the primary result.

DISCUSSION: Most aspects of the extended reconstructive ladder were evaluated before selecting the optimal reconstruction for this patient. In younger patients, reconstructive surgery requires special considerations, primarily due to age-related limitations combined with generally high expectations to the aesthetic outcome.

CONCLUSION: In the few reported cases of necrotic spider bites in the facial region, active reconstructive measures have resulted in the best outcomes. Tissue expansion of local or regional skin may have a potential role, but in certain patients, simple reconstructive solutions will provide an aesthetically satisfactory result without requiring extensive or multi-stage surgeries, as demonstrated in this case.

© 2017 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Medical doctors in Central and Northern Europe are highly unlikely to encounter necrotic skin and soft tissue lesions caused by spider bites. Most reported cases of confirmed or suspected spider bites resulting in necrotic lesions, have been from North and South America [1,2]. In Europe, the very few cases in comparison have mainly been from Mediterranean countries [3,4].

Recluse spiders, distributed almost worldwide, are one of only two genera of spiders with confirmed capability of causing necrotic lesions through their bite and venom [2,5–8]. They belong to the genus *Loxosceles*, with the brown recluse spider *Loxosceles reclusa* the species most extensively described (Fig. 1). Of relevance to this case, several species of recluse spiders are native to Guatemala [9].

Venom from these spiders contains the cytotoxic enzyme Sphingomyelin phosphodiesterase. The enzyme breaks down sphingomyelin and lysophosphatidylcholine [7] – major constituents of the cell membrane – giving rise to local inflammation resulting in endothelial damage, polymorphonuclear leukocyte infiltration and degranulation into the envenomation site, causing microvascular thrombosis, ischemia and potentially skin necrosis [2,10].

Resulting defects in the facial region represent potential reconstructive challenges, especially in younger patients, due to age-related limitations of regional flap donor sites, increased demand for minimal scarring, and generally high expectations to the aesthetic outcome.

In a case from a university hospital, we outline the process, and discuss the considerations pertaining to reconstruction of a large facial skin defect in a young woman following a suspected recluse spider bite.

2. Methods

This case report has been reported in line with the SCARE criteria [11].

* Corresponding author.

E-mail addresses: jomi@regionsjaelland.dk, joachim@mschumacher.com (J. Mikkelsen), grethe.schmidt@regionh.dk (G. Schmidt), rikke.holmgaard@regionh.dk (R. Holmgaard).

¹ Present address: Department of Plastic Surgery and Breast Surgery, Zealand University Hospital, Sygehusvej 10, 4000 Roskilde, Denmark.



Fig. 1. Brown recluse spider, *Loxosceles reclusa*.



Fig. 2. Necrotic skin lesion on day 2 after spider bite.

3. Presentation of case

A 19-year-old Caucasian female was referred to the Department of Plastic Surgery, Breast Surgery and Burns Treatment, Rigshospitalet, Copenhagen University Hospital, on the day of her return to Denmark from a recreational trip to Guatemala.

The patient presented with a soft tissue defect on the right upper aspect of the nose extending to the medial canthus, completely exposing the underlying muscles (Fig. 3A). She informed that she had recently received treatment for a suspected spider bite.

Twelve days prior to her return to Denmark she reported waking up in the morning, scratching her nose because of an itching, tickling sensation. She initially did not feel any discomfort or pain and did not see a spider, but was aware she had been bitten by something. During the following two days she experienced increasing pain at the bite site and developed local swelling and redness, which soon spread to the rest of the cheek and periorbital area. The bite site turned necrotic during the second day (Fig. 2).

One week after the bite the patient was seen at a local Guatemalan hospital, where medical doctors examined the necrotic lesion and made a clinical diagnosis of a spider bite, based on the initial presentation and progression of the lesion. She underwent surgery twice with local excision of the necrotic tissue and revision of the defect.

On her return to Denmark she was feeling well with no signs or symptoms of general illness. The defect measured approximately 37 × 37 millimeters, involving the right upper dorsal part of the nose, extending laterally to the infraorbital margin, and reaching within a few millimeters to the medial canthus. The underlying muscles were visible and confined the deep extension of the defect (Fig. 3A). She was still taking a twelve-hourly prophylactic dose

of oral Azithromycin 500 mg prescribed by the medical doctors in Guatemala. There were no signs of ongoing infection in the defect or surrounding tissue. A wound swab culture revealed no pathogenic bacteria, including MRSA.

We decided to offer the patient surgical reconstruction scheduled shortly after her return.

A two-stage reconstruction was initially planned using a trimmed full-thickness skin graft (FTSG) harvested from the proximal, medial aspect of the thigh to provide a temporary cover for future second-stage reconstruction with a skin graft or flap more closely resembling the nasal skin, likely after tissue expansion of local or regional skin.

First stage of the planned reconstruction took place 14 days after the patient's return to Denmark, to ensure that any remaining inflammatory reaction from the spider venom had subsided, and any foreign bacterial colonization or subclinical infection, including MRSA, had been cleared. The defect had healed well from initial presentation but far from completely, measuring approximately 17 × 19 millimeters after gentle wound revision prior to skin grafting (Fig. 3B).

A FTSG was harvested and trimmed to match the thickness and level of the skin surrounding the defect. It was secured to the margins of the defect with single interrupted 6-0 PROLENE® sutures and covered with a sterile dressing.

The patient was referred to the outpatient clinic for dressing and suture removal at five days postoperatively, where the skin graft appeared vital with no signs of skin necrosis or infection (Fig. 4). At follow-up three months (Fig. 5A) and 14 months (Fig. 5B) after the first and so far final stage of reconstruction, the trimmed FTSG had

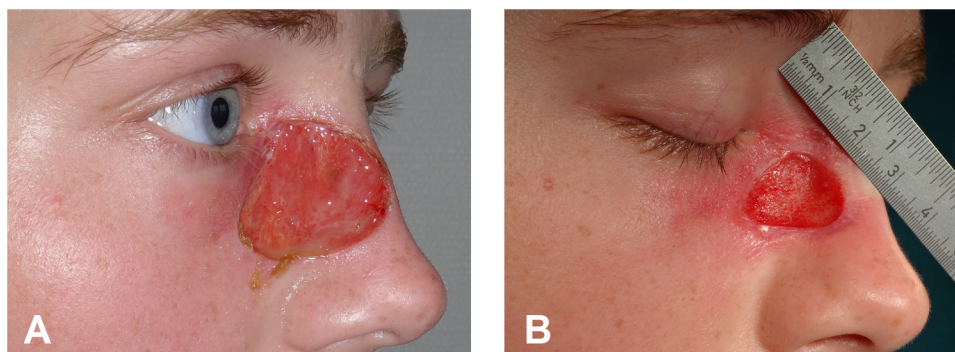


Fig. 3. Defect on day 12 (A) and day 26 (B) after spider bite.



Fig. 4. Adherent skin graft at 5 days postoperatively.

engrafted nicely with only slightly raised edges and minor color mismatch to the surrounding skin.

The patient was satisfied with the result. She could completely conceal the scars with make-up, and did not request further reconstructive surgery.

4. Discussion

Necrotic lesions in the facial region caused by spider bites are an uncommon presentation. A case series by Wright et al. [1] including 111 patients reported the anatomical distribution of suspected and confirmed brown recluse spider bites. They dominated on the extremities (78%) with the face amounting to just 3%. Of the 111 patients only three (2.7%) required skin grafting, of whom none had facial lesions.

Conservative initial management with RICE (Rest, Ice, Compression, Elevation) and healing by secondary intention if necroses develop, seems generally agreed upon [1,2]. However, healing by secondary intention has unfortunately been shown to be quite slow in many necrotic lesions, taking several weeks or months. Moreover, the vast majority of the patients reported did not have lesions on the face, which makes it difficult to justify generalization of conservative treatment principles, when based almost exclusively on non-facial lesions.

Defects in the facial region can be aesthetically disfiguring, and often require active reconstructive measures when long-lasting conservative management is unacceptable for the patient.

In six reported cases of necrotic lesions in the facial region caused by recluse spider bites (four on the eyelid, one on the chin and one on the ear), two patients underwent active reconstruction with a local flap and delayed suturing respectively, following an initial bout of healing by secondary intention. Complete healing in these two cases happened in 2 and 3 weeks respectively [12,13]. Time to complete healing in the remaining four cases exclusively let to heal by secondary intention, was 2 months (one patient; healed with no scarring [4]) and 6 months respectively (three patients; healed with scarring [10,14]).

Thus considerations were many in planning the optimal reconstructive course for our patient.

First of all the patient was very young and exhibited age-related insufficient skin laxity for local flap reconstruction, and lacked wrinkle lines to conceal a donor site scar, e.g. if using a paramedian forehead flap. Secondly, selecting the optimal donor site outside areas of aesthetic concern for a probable skin graft reconstruction also demanded consideration. Finally the patient requested the minimal amount of surgery required.

Most aspects of the extended reconstructive ladder were evaluated before finally selecting the optimal reconstruction: *Healing by secondary intention* and *direct suturing* were both considered suboptimal solutions in the present case. The former due to the anticipated extensive scar formation and potential discomfort to the patient. The size of the defect meant direct suturing was impossible.

Tissue expansion of regional skin, in this case pre-expansion of a hairless part of post-auricular skin, had initially been planned in order to provide a FTSG more closely resembling the periorbitonasal skin (when compared to classic donor sites not requiring pre-expansion, such as the skin overlying the clavicles) for a second-stage resurfacing of the defect. The plan was abandoned on the day of surgery as the defect had decreased to a size where the risks and potential complications of expander implantation outweighed the benefits.

Consequently, we decided to reconstruct the defect with a simple skin graft from a donor site not necessitating pre-expansion. The proximal, medial aspect of the thigh was considered a suitable donor site, as an area of less aesthetic concern with scars easily concealed. A FTSG with the dermis trimmed to match the thickness and level of the surrounding skin was considered the optimal solution for a first-stage reconstruction. The possibility also existed that it could serve as a standalone final reconstruction.

5. Conclusion

In the few reported cases of necrotic spider bites in the facial region, active reconstructive measures have resulted in the best outcomes. In younger patients the reconstructive options are lim-



Fig. 5. Follow-up 3 months (A) and 14 months (B) postoperatively.

ited, primarily due to age-related factors. Tissue expansion of local or regional skin may have a potential role, but in certain patients simple reconstructive solutions will provide an aesthetically satisfactory result without requiring extensive or multi-stage surgeries, as demonstrated in this case.

Conflicts of interest

None.

Funding

None.

Ethical approval

Not applicable.

Author contribution

Joachim Mikkelsen: conception and design of the study, acquisition of data, analysis and interpretation of data, drafting the article, revising the article critically for important intellectual content, final approval of the version to be submitted.

Grethe Schmidt: conception and design of the study, acquisition of data, analysis and interpretation of data, revising the article critically for important intellectual content, final approval of the version to be submitted.

Rikke Holmgaard: conception and design of the study, analysis and interpretation of data, drafting the article, revising the article critically for important intellectual content, final approval of the version to be submitted.

Consent

Written and informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Guarantor

Joachim Mikkelsen.
Grethe Schmidt.
Rikke Homgaard.

Acknowledgements

The authors would like to thank Richard S. Vetter, M.S., Staff Research Associate at the Department of Entomology, University of California, Riverside, for permission to use his photograph of a brown recluse spider (Fig. 1) in this article.

References

- [1] S.W. Wright, K.D. Wrenn, L. Murray, D. Seger, Clinical presentation and outcome of brown recluse spider bite, *Ann. Emerg. Med.* 30 (1997) 28–32.
- [2] R.S. Vetter, Spiders of the genus *Loxosceles* (Araneae, Sicariidae): a review of biological, medical and psychological aspects regarding envenomations, *J. Arachnol.* 36 (2008) 150–163.
- [3] M.P. Stefanidou, M. Chatzaki, K.G. Lasithiotakis, D.J. Ioannidou, A.D. Tosca, Necrotic arachnidism from *Loxosceles rufescens* harboured in Crete, Greece, *J. Eur. Acad. Dermatol. Venereol.* 20 (2006) 486–487, <http://dx.doi.org/10.1111/j.1468-3083.2006.01486.x>.
- [4] S.G. Bilgili, A.S. Karadag, R. Karadag, I. Cecen, O. Calka, A case of Spider bite localized to the eyelid, *Cutan. Ocul. Toxicol.* 32 (2013) 83–85, <http://dx.doi.org/10.3109/15569527.2012.656294>.
- [5] G.K. Isbister, H.W. Fan, Spider bite, *Lancet Lond. Engl.* 378 (2011) 2039–2047, [http://dx.doi.org/10.1016/S0140-6736\(10\)62230-1](http://dx.doi.org/10.1016/S0140-6736(10)62230-1).
- [6] G. Newlands, P. Atkinson, Review of southern African spiders of medical importance, with notes on the signs and symptoms of envenomation, *South Afr. Med. J. Suid-Afr. Tydskr. Vir Geneesk.* 73 (1988) 235–239.
- [7] D.M. Lajoie, P.A. Zobel-Thropp, V.K. Kumirov, V. Bandarian, G.J. Binford, M.H.J. Cordes, Phospholipase D toxins of brown spider venom convert lysophosphatidylcholine and sphingomyelin to cyclic phosphates, *PLoS One* 8 (2013) e72372, <http://dx.doi.org/10.1371/journal.pone.0072372>.
- [8] P.H. Lopes, R. Bertani, R.M. Gonçalves-de-Andrade, R.H. Nagahama, C.W. van den Berg, D.V. Tambourgi, Venom of the Brazilian spider *Sicarius ornatus* (Araneae, Sicariidae) contains active sphingomyelinase D: potential for toxicity after envenomation, *PLoS Negl. Trop. Dis.* 7 (2013) e2394, <http://dx.doi.org/10.1371/journal.pntd.0002394>.
- [9] J.C. Schuster jschuste@uvg.edu.gt, Laboratorio de Entomología Sistemática, Universidad del Valle de Guatemala, Re: Recluse spider bite in patient travelling to Guatemala, (Personal communication).
- [10] J. Leach, B. Bassichis, K. Itani, Brown recluse spider bites to the head: three cases and a review, *Ear Nose Throat J.* 83 (2004) 465–470.
- [11] R.A. Agha, A.J. Fowler, A. Saeta, I. Barai, S. Rajmohan, D.P. Orgill, SCARE Group, The SCARE Statement: Consensus-based surgical case report guidelines, *Int. J. Surg. Lond. Engl.* 34 (2016) 180–186, <http://dx.doi.org/10.1016/j.ijsu.2016.08.014>.
- [12] J.J. Edwards, R.L. Anderson, J.R. Wood, Loxoscelism of the eyelids, *Arch. Ophthalmol.* 98 (1980) 1997–2000 (Chic. Ill. 1960).
- [13] D.C. Madion, M.K. Marshall, C.D. Jenkins, G.M. Kushner, Brown recluse spider bite to the face, *J. Oral Maxillofac. Surg.* 63 (2005) 1774–1778, <http://dx.doi.org/10.1016/j.joms.2005.08.012>.
- [14] R.M. Jarvis, M.V. Neufeld, C.T. Westfall, Brown recluse spider bite to the eyelid, *Ophthalmology* 107 (2000) 1492–1496.

Open Access

This article is published Open Access at sciedirect.com. It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.