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Pretibial lacerations: Experience from a lower limb trauma centre and systematic review

G.E. Glass [a], A. Jain [a,b,*]

[a] *Kennedy Institute of Rheumatology, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, Roosevelt Drive, Oxford, OX3 7FY, UK*
[b] *Department of Plastic and Reconstructive Surgery, Imperial College NHS Foundation Trust, Charing Cross Hospital, Fulham Palace Road, Hammersmith, London, W6 8RF, UK*

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Summary *Background:* Pretibial lacerations are an important and neglected problem among the elderly. Poor management leads to prolonged hospitalisation and terminal decline. This study summarises our experience and evidence from the literature to ascertain an evidence-based rationale for referral and management.
Methods: Our data were obtained from review of a prospectively gathered database. Additionally, Pubmed, Embase, Medline, and the Cochrane Database of Systematic Reviews were searched through July 2013, with eligible studies evaluated using standard methodology.
Results: Seventy-three pretibial lacerations in 73 patients (63 females) were identified. Mean age was 78 ± 14, 1SD. Sixty patients were managed operatively with a mean length of stay of 11 ± 7 days, 1SD when uncomplicated by medical co-morbidity. Seven deaths occurred (4 in-hospital; 2 treated surgically and 2 treated conservatively) and 3 deaths occurred within 3 months of discharge; a death rate more than twice that of matched controls. Donor site "over-grafting" was performed in 19 cases and resulted in accelerated donor site healing (11 ± 9 days, 1SD vs. 29 ± 42 days, 1SD; $P < 0.001$). Negative pressure wound therapy delayed discharge (21 ± 23 days, 1SD vs. 15 ± 14 days, 1SD; $P = 0.028$). Microbiological sampling is unhelpful. Bed rest is unnecessary. "De-fatting" the flap is unproven.
Conclusion: Admissions expose the elderly to physical/functional decline and death. Our findings support a change of practice, minimising admissions for minor (Dunkin type I/II) injuries and rapid, protocol-driven surgical intervention and discharge for Dunkin type III/IV

* Corresponding author. Imperial College NHS Fountation Trust, Department of Plastic Surgery, Charing Cross HospitalFulham Palace Road, Hammersmith, London, W6 8RF, UK. Tel.: +44 02033111234.
E-mail addresses: ajainuk@aol.com, abhilash.jain@ndorms.ox.ac.uk (A. Jain).

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injuries with avoidance of negative pressure wound therapy in all but selected cases.

Introduction

Pretibial lacerations are painful and debilitating and occur as a consequence of age-related loss of dermal collagen, leaving thin, friable skin vulnerable to shear and friction.[1] Tears are often associated with haematomas (exacerbated by a high incidence of warfarin use in this population[2]) which compromises the viability of adjacent tissue.[3] Loss of skin durability is exacerbated by peripheral vascular disease, oedema, corticosteroids and diabetes mellitus by a final common pathway of oxidative stress and matrix metalloproteinase over-expression.[4] Elderly women are most commonly affected.[5] As these injuries often occur during falls or attempts to mount stairs loss of visual acuity and field may be predisposing factors with diminishing mobility both a cause and consequence. Moreover, nutritional deficiencies impair subsequent wound healing.[6] With an ageing population, the current estimated incidence of 40–70 per 100,000 per year,[7] accounting for around 0.5% of all emergency room attendances, is set to rise.[8] The financial burden of these injuries is difficult to quantify but estimates report a mean expenditure of over £3000 ($5000) per acute admission.[2] Often managed in the community, these injuries also find their way to hospital tissue viability services and plastic surgical trauma and out-patient clinics. Consequently, patients are admitted for debridement and skin grafting. Negative pressure wound therapy has been used to manage these cases. It is of vital importance to prevent unnecessary surgery, bed rest, in-hospital stay and antibiotic therapy, all of which can have a detrimental effect of the elderly and vulnerable.[9] However, much of the evidence is based on small, retrospective case series. Our prospectively gathered database of lower limb trauma includes all pretibial lacerations encountered in our clinical practice since 2010. The aim of this article is to evaluate our experience and to review the existing literature systematically to propose a rationale for referral and management of this important, but much neglected problem.

Methods

Our practice

Since January 2010, our prospectively gathered database of lower limb trauma referrals has included pretibial lacerations. Data from our series were extracted from our database; between January 2010 and July 2013 (accessed 2nd August 2013). Additional information was obtained, where necessary, via retrospective case note review.

Systematic review

The systematic review was performed in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses.[10]

Data sources and searches

We searched Pubmed (no date limit), EMBASE (OvidSP), Medline (OvidSP), The Cochrane Database of Systematic Reviews and the Cochrane Central Register of Controlled Trials (searched 20th July 2013) using the MEsH terms "lacerations" and "leg injuries" and combining the search terms "laceration" OR "hematoma/haematoma" OR "degloving" AND "leg" OR "lower extremity" with "fragility" OR "steroid" OR "warfarin" OR "aspirin" OR "mobil$" OR anesth$ OR "classif$" OR "surgery" OR "dress$" OR "VAC" OR "negative pressure wound therapy" OR "topical negative pressure" OR "refer$" OR "antibiotic" OR "micro$". An abstract review was conducted of all articles identified and this formed the basis for selection. References of all articles included were cross-checked for further articles of relevance. Additionally, the online trials register ClinicalTrials.gov and the national research register (NRR) were scrutinised for completed, discontinued and ongoing trials relating to the management of pretibial lacerations.

Study selection

Studies were included if they reported on the referral or management of human pretibial lacerations, haematomas or lower limb degloving.

Data extraction and quality assessment

Extracted data were subdivided into "primary outcomes" and "secondary outcomes". Primary outcomes included demographic data and interventions and protocols. Demographic data included: age, gender, aetiology, co-morbidities and medications. Mediation data of interest included aspirin, clopidogrel, dipyramidole, warfarin and corticosteroids. Interventions and protocols included management, outcomes and any published algorithms. Outcome data included length of in-hospital stay and mortality. Data on mobility and function and pre-operative nutritional status were also sought but no studies addressing these issues were found. Secondary outcome data included existing classification systems and wound geometry, interventional approaches, method of anaesthesia, mobilisation, "over-grafting" of donor sites, negative pressure wound therapy and antibiotics and microbiological sampling. Data were extracted by the two investigators independently (GG and AJ) and discrepancies solved by consensus.