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Management of Scalp Injuries in the Geriatric Population: A Case Report and Literature Review

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Abstract

Falls in elderly populations are a major public health concern, representing the leading cause of injury-related morbidity and mortality in individuals aged 65 years and older. Head trauma, particularly involving the scalp, is frequently encountered in these incidents and may range from minor abrasions to deep lacerations and potentially life-threatening intracranial injuries. Scalp injuries such as contused lacerated wounds (CLWs), abrasions, and hematomas not only pose diagnostic and management challenges due to the anatomical and physiological changes of aging skin but also serve as potential indicators of more serious underlying pathology. Geriatric patients are uniquely susceptible to both external and intracranial injuries due to a combination of factors including cerebral atrophy, vascular fragility, polypharmacy (especially antithrombotic use), and impaired physiological reserve.

This paper presents and contrasts two clinical cases to underscore these differences: a 65-year-old male who sustained a 5 cm × 3 cm CLW from a workplace fall, and an 80-year-old female with a 4 cm × 3 cm abrasion and 2 cm × 2 cm CLW following a ground-level fall at home. The elderly case explores the broader implications of age-related anatomical, pharmacological, and social determinants that influence injury pattern, diagnosis, and healing. This article synthesizes current understanding of the epidemiology, anatomical considerations, risk factors, diagnostic workup, imaging thresholds, and treatment strategies for scalp injuries in elderly fall patients.

Ultimately, this article aims to equip frontline healthcare providers with a practical, age-sensitive framework for evaluating and managing scalp injuries in elderly fall victims, with an emphasis on early detection of serious injury, optimal wound care, and preventive interventions that span the healthcare continuum.

Keywords: Scalp injury, Contused lacerated wound, Head injury, Sutures

Introduction

The demographic shift toward an older population is unprecedented: projections estimate that by 2050, individuals aged ≥60 years will number 2.1 billion worldwide, representing over 20% of the global populace[1]. This evolution carries profound implications for healthcare systems, particularly regarding injury prevention and management. Among geriatric injuries, falls stand out as the leading cause of both fatal and non-fatal trauma in older adults. In those aged ≥65, falls account for approximately one-third of injury-related hospital admissions and comprise over half of all TBIs in this age group[2,3]. The economic burden is substantial: in the United States, annual direct medical costs of fall injuries are exceedingly high, with projections rising as the population ages[4]. More importantly, falls often precipitate a decline in functional status, loss of independence, and reduced quality of life[5].

Head injuries are particularly concerning in elderly fallers. Even ground-level or low-energy impacts can incite significant intracranial hemorrhage due to age-related brain atrophy, increased subdural space, and fragile bridging veins[6]. Moreover, a considerable proportion of seniors are on antithrombotic or anticoagulant therapy for cardiovascular comorbidities, further heightening hemorrhagic risk[7]. Medical adherence issues, polypharmacy, and frailty compound this vulnerability. Concomitantly, geriatric skin undergoes hallmark changes—dermal thinning, reduced collagen cross-linking, and loss of subcutaneous fat—culminating in dermatoporosis: a clinical syndrome of cutaneous fragility that predisposes to large bruises and skin tears from minor trauma[8].

Scalp injuries in elderly patients are thus more than cosmetic wounds; they require a high index of suspicion for serious underlying injury. Scalp lacerations and abrasions are easily recognized in the ED, but they may overshadow occult intracranial pathology. The rich vascular supply of the scalp can lead to significant bleeding and hematoma formation, complicating both evaluation and closure[9]. As such, clinicians must integrate knowledge of geriatric physiology, comprehensive assessment protocols, and evidence-based closure techniques to optimize outcomes.

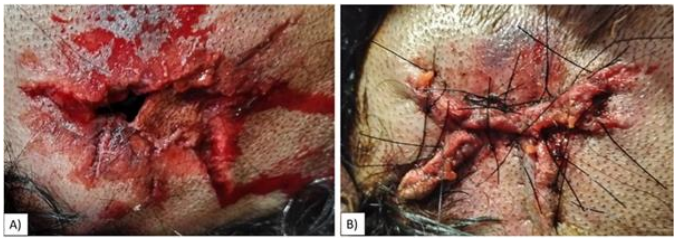
This paper presents two contrasting cases—a middle-aged adult and an elderly faller—to highlight age-specific considerations in scalp trauma. Building on these clinical vignettes, we review the literature (2000–2025) on epidemiology, anatomy and pathophysiology, risk stratification, imaging criteria, wound management strategies, rehabilitation, and preventive measures tailored to the elderly. Our aim is to furnish healthcare providers with a clear, structured approach to diagnosing, treating, and preventing scalp injuries in a growing geriatric population.

Case Report

Patient 1: Middle-Aged Comparator. A 55-year-old warehouse worker with no significant medical history, slipped at work and struck his occiput against a metal railing. He denied loss of consciousness but reported mild headache. Examination revealed stable vital signs and a single 5 cm × 3 cm contused lacerated wound with moderate bleeding and no bony step-off (Fig.1A). A focused neurological exam (Glasgow Coma Scale 15)

was unremarkable. After local anesthesia, the wound was irrigated with saline, debris removed, and closure achieved with interrupted nylon sutures and subcutaneous closure was done using polyglactin 910 (Fig 1B). Hemostasis was satisfactory, tetanus status updated, and the patient discharged with analgesics and wound care instructions. The suture removal was done at day 10 and wound was observed. After two week of follow up the wound had healed with a thin linear scar and no complications[9,10].

Figure 1:

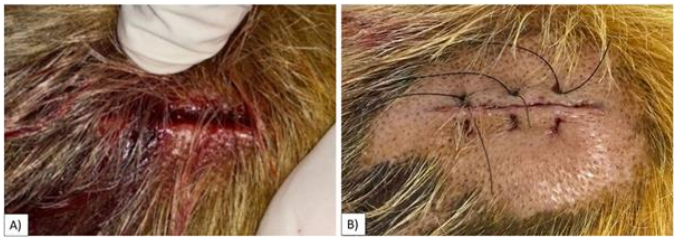


Patient 2: Elderly Focus

An 80-year-old retired male with hypertension tripped over a loose rug and fell backward onto the home's tiled floor. He experienced transient dizziness and a mild headache but remained conscious and oriented. On arrival to the ED, her blood pressure was 140/80 mm Hg, heart rate 78 bpm, and GCS 15. Two occipital injuries were observed: a 4 cm × 3 cm abrasion with surrounding ecchymosis and a 2 cm × 2 cm contused laceration with irregular margins and brisk bleeding (Fig. 2A). There was no skull deformity, neurological deficit, or focal weakness.

Given her advanced age, a non-contrast head CT was performed, revealing no acute intracranial hemorrhage or skull fracture. Laboratory tests showed normal hemoglobin (12.8 g/dL), platelets (200 × 10^9/L), PT/INR 1.0, and PTT within reference range. The scalp was shaved locally, irrigated with sterile saline, and hemostasis achieved with manual pressure and epinephrine-soaked pledgets. The laceration was closed with layer by suturing and the abrasion dressed with a hydrocolloid dressing (Fig.2B) Tetanus immunization was verified. He was admitted for overnight observation, focusing on neurological monitoring and pain control with acetaminophen. No re-bleeding or neurological changes occurred; Suture removal was done on day 10 with orderly healing. At three-week follow-up, the wounds exhibited satisfactory epithelialization and minimal scarring, without infection or hematoma formation [11–13].

Figure 2:



Discussion

Falls in geriatric populations stem from intrinsic factors (balance impairment, sarcopenia, visual decline) and extrinsic hazards (poor lighting, loose rugs, uneven flooring). The global incidence of falls among those ≥65 years ranges from 400 to 600 per 1,000 person-years, with recurrent falls in 30–40% of those who fall once [14]. In addition to immediate injury costs, fallers face a 30% increased mortality risk within one year, related to both injury severity and post-fall deconditioning[15]. Furthermore, the psychological aftermath—fear of falling—leads to activity restriction and social isolation, compounding frailty and dependency[16]. The scalp's rich vascular network (supratrochlear, supraorbital, superficial temporal, posterior auricular, and occipital arteries) ensures robust perfusion but predisposes to brisk hemorrhage when lacerated[17]. In elderly patients, vessel walls lose elasticity, and microvascular networks shrink, leading to fragile capillaries that rupture under minimal stress[7]. Coupled

with antithrombotic medication effects, even minor scalp lacerations may lead to extensive bleeding and large subgaleal hematomas, which can complicate assessment and closure.

A thorough primary survey in elderly trauma must consider geriatric syndromes: delirium, polypharmacy, and functional baseline[18]. Red flags warranting immediate imaging include GCS <15, focal neurological signs, persistent vomiting, coagulopathy, anticoagulant/antiplatelet therapy, and suspected skull fracture[19]. Clinical decision instruments, while validated in broadly adult populations, demonstrate lower specificity in geriatric subgroups, prompting some centers to adopt age ≥60 as a universal CT indication [20]. Assessment should include baseline cognitive screening (e.g., Mini-Cog) to differentiate acute change from chronic impairment.

Emerging modalities—rapid MRI sequences, CT perfusion, and blood biomarkers (GFAP, UCH-L1)—show promise in detecting subtle brain injury, particularly in anticoagulated seniors where CT can miss microbleeds[21]. Early studies correlate GFAP levels with intracranial hemorrhage risk, potentially guiding imaging decisions and reducing unnecessary scans in low-risk patients.

Nuanced Wound Management Strategies

Preparation and Antisepsis: Pre-closure scalp preparation balances hair preservation (for apposition) against need for a clean field. Chlorhexidine gluconate is the preferred antiseptic; alcohol-based solutions should be avoided near open skull defects[22].

Hemostatic Adjuncts: Newer agents—kaolin-impregnated gauze, chitosan dressings—rapidly achieve hemostasis and may reduce closure time, particularly useful in high-bleed scenarios[23].

Closure Algorithm

- **Small (<2 cm) straight lacerations in hair-bearing areas:** Hair apposition technique with cyanoacrylate glue.
- **Moderate (2–8 cm) wounds:** Staples offer rapid, secure closure.
- **Complex or gaping wounds:** Sutures with deep dermal Polyglactin 910 and superficial nylon to optimize edge alignment.
- **Patients on high-dose anticoagulants:** Consider delaying non-emergent closures until coagulation status optimized, and use of absorbable staples or adhesives to minimize re-entries[24].

Pain Control and Comfort

Topical anesthesia (EMLA cream) may reduce injection pain, especially in distressed seniors. Oral analgesics (acetaminophen) are preferred over NSAIDs to avoid bleeding risk and renal impairment.

Long-Term Surveillance and Sequelae

Following isolated scalp injuries, clinicians should counsel patients regarding signs of chronic subdural hematoma—subacute headache, cognitive decline, gait instability—given the delayed presentation in 10–20% of elderly head injuries[17]. Structured follow-up via primary care or geriatric clinics enhances early detection and reduces morbidity.

Conclusion

Scalp injuries in elderly fall victims are sentinel events that necessitate comprehensive, multidisciplinary care. Detailed knowledge of geriatric physiology, structured assessment protocols, and judicious use of imaging and closure methods are essential to minimize complications. Preventive and rehabilitative strategies should be integrated across healthcare continua to reduce fall incidence and improve outcomes.

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