

Acne Keloidalis Nuchae in the Armed Forces

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PRACTICE POINTS

- Acne keloidalis nuchae (AKN) is a chronic inflammatory disorder of the occipital scalp and posterior neck characterized by keloidlike papules, pustules, and plaques that develop following mechanical irritation.
- Military members are required to maintain short haircuts and may be disproportionately affected by AKN.
- In the military population, early identification and treatment, which includes topical steroids, oral antibiotics, UV light therapy, lasers, and surgical excision, can prevent further scarring, permanent hair loss, and disfigurement from AKN.

Acne keloidalis nuchae (AKN) is a chronic inflammatory skin disease characterized by the development of keloidlike papules, pustules, and plaques on the occipital scalp and posterior neck following mechanical trauma and irritation. First-line therapy involves avoidance of aggravating factors including short and frequent haircuts. Medical treatments—from topical and intralesional steroids, oral antibiotics, and UV light to laser and surgical excision—have demonstrated varying degrees of efficacy. The active-duty military population faces unique challenges in the treatment of AKN because personal appearance and grooming standards restrict avoidance of the very factors that promote this disease process. In this population, early identification and treatment are critical to reducing overall patient morbidity and ensuring continued operational and medical readiness. This article reviews the clinical features, epidemiology, and treatments available in the management of AKN, with a special focus on the active-duty military population.

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Acne keloidalis nuchae (AKN) is a chronic inflammatory disorder most commonly involving the occipital scalp and posterior neck characterized by the development of keloidlike papules, pustules, and plaques. If left untreated, this condition may progress to scarring alopecia. It primarily affects males of African descent, but it also may occur in females and in other ethnic groups. Although the exact underlying pathogenesis is unclear, close haircuts and chronic mechanical irritation to the posterior neck and scalp are known inciting factors. For this reason, AKN disproportionately affects active-duty military servicemembers who are held to strict grooming standards. The US Military maintains these grooming standards to ensure uniformity, self-discipline, and serviceability in operational settings.¹ Regulations dictate short tapered hair, particularly on the back of the neck, which can require weekly to biweekly haircuts to maintain.¹⁻⁵

First-line treatment of AKN is prevention by avoiding short haircuts and other forms of mechanical irritation.^{1,6,7} However, there are considerable barriers to this strategy within the military due to uniform regulations as well as personal appearance and grooming standards. Early identification and treatment are of utmost importance in managing AKN in the military population to ensure reduction of morbidity, prevention of late-stage disease, and continued fitness for duty. This article reviews the clinical features, epidemiology, and treatments available for management of AKN, with a special focus on the active-duty military population.

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Clinical Features and Epidemiology

Acne keloidalis nuchae is a chronic inflammatory disorder characterized by the development of keloidlike papules, pustules, and plaques on the posterior neck and occipital scalp.⁶ Also known as folliculitis keloidalis nuchae, AKN is seen primarily in men of African descent, though cases also have been reported in females and in a few other ethnic groups.^{6,7} In black males, the AKN prevalence worldwide ranges from 0.5% to 13.6%. The male to female ratio is 20 to 1.⁷ Although the exact cause is unknown, AKN appears to develop from chronic irritation and inflammation following localized skin injury and/or trauma. Chronic irritation from close-shaved haircuts, tight-fitting shirt collars, caps, and helmets have all been implicated as considerable risk factors.⁶⁻⁸

Symptoms generally develop hours to days following a close haircut and begin with the early formation of inflamed irritated papules and notable erythema.^{6,7} These papules may become secondarily infected and develop into pustules and/or abscesses, especially in cases in which the affected individual continues to have the hair shaved. Continued use of shared razors increases the risk for secondary infection and also raises the concern for transmission of blood-borne pathogens, as AKN lesions are quick to bleed with minor trauma.⁷

Over time, chronic inflammation and continued trauma of the AKN papules leads to widespread fibrosis and scar formation, as the papules coalesce into larger plaques and nodules. If left untreated, these later stages of disease can progress to chronic scarring alopecia.⁶

Prevention

In the general population, first-line therapy of AKN is preventative. The goal is to break the cycle of chronic inflammation, thereby preventing the development of additional lesions and subsequent scarring.⁷ Patients should be encouraged to avoid frequent haircuts, close shaves, hats, helmets, and tight shirt collars.⁶⁻⁸

A 2017 cross-sectional study by Adotama et al⁹ investigated recognition and management of AKN in predominantly black barbershops in an urban setting. Fifty barbers from barbershops in Oklahoma City, Oklahoma, were enrolled and interviewed for the study. Of these barbers, only 44% (22/50) were able to properly identify AKN from a photograph. Although the vast majority (94% [47/50]) were aware that razor use would aggravate the condition, only 46% (23/50) reported avoidance of cutting hair for clients with active AKN.⁹ This study, while limited by its small sample size, showed that many barbers may be unaware of AKN and therefore unknowingly contribute to the disease process by performing haircuts on actively inflamed scalps. For this reason, it is important to educate patients about their condition and strongly recommend lifestyle and hairstyle modifications in the management of their disease.

Acne keloidalis nuchae that is severe enough to interfere with the proper use and wear of military equipment

(eg, Kevlar helmets) or maintenance of regulation grooming standards does not meet military admission standards.^{10,11} However, mild undiagnosed cases may be overlooked during entrance physical examinations, while many servicemembers develop AKN after entering the military.¹⁰ For these individuals, long-term avoidance of haircuts is not a realistic or obtainable therapeutic option.

Treatment

Topical Therapy—Early mild to moderate cases of AKN—papules less than 3 mm, no nodules present—may be treated with potent topical steroids. Studies have shown 2-week alternating cycles of high-potency topical steroids (2 weeks of twice-daily application followed by 2 weeks without application) for 8 to 12 weeks to be effective in reducing AKN lesions.^{8,12} Topical clindamycin also may be added and has demonstrated efficacy particularly when pustules are present.^{7,8}

Intralesional Steroids—For moderate cases of AKN—papules more than 3 mm, plaques, and nodules—intralesional steroid injections may be considered. Triamcinolone may be used at a dose of 5 to 40 mg/mL administered at 4-week intervals.⁷ More concentrated doses will produce faster responses but also carry the known risk of side effects such as hypopigmentation in darker-skinned individuals and skin atrophy.

Systemic Therapy—Systemic therapy with oral antibiotics may be warranted as an adjunct to mild to moderate cases of AKN or in cases with clear evidence of secondary infection. Long-term tetracycline antibiotics, such as minocycline and doxycycline, may be used concurrently with topical and/or intralesional steroids.^{6,7} Their antibacterial and anti-inflammatory effects are useful in controlling secondary infections and reducing overall chronic inflammation.

When selecting an appropriate antibiotic for long-term use in active-duty military patients, it is important to consider their effects on duty status. Doxycycline is preferred for active-duty servicemembers because it is not duty limiting or medically disqualifying.^{10,13-15} However, minocycline, is restricted for use in aviators and aircrew members due to the risk for central nervous system side effects, which may include light-headedness, dizziness, and vertigo.

UV Light Therapy—UV radiation has known anti-inflammatory, immunosuppressive, and antifibrotic effects and commonly is used in the treatment of many dermatologic conditions.¹⁶ Within the last decade, targeted UVB (tUVB) radiation has shown promise as an effective alternative therapy for AKN. In 2014, Okoye et al¹⁶ conducted a prospective, randomized, split-scalp study in 11 patients with AKN. Each patient underwent treatment with a tUVB device (with peaks at 303 and 313 nm) to a randomly selected side of the scalp 3 times weekly for 16 weeks. Significant reductions in lesion count were seen on the treated side after 8 ($P=.03$) and 16 weeks ($P=.04$), with no change noted on the control

side. Aside from objective lesion counts, patients completed questionnaires (n=6) regarding their treatment outcomes. Notably, 83.3% (5/6) reported marked improvement in their condition. Aside from mild transient burning and erythema of the treated area, no serious side effects were reported.¹⁶

Targeted UVB phototherapy has limited utility in an operational setting due to accessibility and operational tempo. Phototherapy units typically are available only at commands in close proximity to large medical treatment facilities. Further, the vast majority of servicemembers have duty hours that are not amenable to multiple treatment sessions per week for several months. For servicemembers in administrative roles or serving in garrison or shore billets, tUVB or narrowband UV phototherapy may be viable treatment options.

Laser Therapy—Various lasers have been used to treat AKN, including the CO₂ laser, pulsed dye laser, 810-nm diode laser, and 1064-nm Nd:YAG laser.⁶ Kantor et al¹⁷ utilized a CO₂ laser with a focused beam for surgical excision of a late-stage AKN case as early as 1986. In these patients, it was demonstrated that focused CO₂ laser could be used to remove fibrotic lesions in an outpatient setting with only local anesthesia. Although only 8 patients were treated in this report, no relapses occurred.¹⁷

CO₂ laser evaporation using the unfocused beam setting with 130 to 150 J/cm² has been less successful, with relapses reported in multiple cases.⁶ Dragoni et al¹⁸ attempted treatment with a 595-nm pulsed dye laser with 6.5-J/cm² fluence and 0.5-millisecond pulse but faced similar results, with lesions returning within 1 month.

There have been numerous reports of clinical improvement of AKN with the use of the 1064-nm Nd:YAG laser.^{6,19} Esmat et al¹⁹ treated 16 patients with a fluence of 35 to 45 J/cm² and pulse duration of 10 to 30 milliseconds adjusted to skin type and hair thickness. An overall 82% reduction in lesion count was observed after 5 treatment sessions. Biopsies following the treatment course demonstrated a significant reduction in papule and plaque count ($P=.001$ and $P=.011$, respectively), and no clinical recurrences were noted at 12 months posttreatment.¹⁹ Similarly, Woo et al²⁰ conducted a single-blinded, randomized, controlled trial to assess the efficacy of the Nd:YAG laser in combination with topical corticosteroid therapy vs topical corticosteroid monotherapy. Of the 20 patients treated, there was a statistically significant improvement in patients with papule-only AKN who received the laser and topical combination treatment ($P=.031$).²⁰

Laser therapy may be an available treatment option for military servicemembers stationed within close proximity to military treatment facilities, with the Nd:YAG laser typically having the widest availability. Although laser therapy may be effective in early stages of disease, servicemembers would have to be amenable to limitation of future hair growth in the treated areas.

Surgical Excision—Surgical excision may be considered for large, extensive, disfiguring, and/or refractory lesions.

Excision is a safe and effective method to remove tender, inflamed, keloidlike masses. Techniques for excision include electrosurgical excision with secondary intention healing, excision of a horizontal ellipse involving the posterior hairline with either primary closure or secondary intention healing, and use of a semilunar tissue expander prior to excision and closure.⁶ Regardless of the technique, it is important to ensure that affected tissue is excised at a depth that includes the base of the hair follicles to prevent recurrence.²¹

Final Thoughts

Acne keloidalis nuchae is a chronic inflammatory disease that causes considerable morbidity and can lead to chronic infection, alopecia, and disfigurement of the occipital scalp and posterior neck. Although easily preventable through the avoidance of mechanical trauma, irritation, and frequent short haircuts, the active-duty military population is restricted in their preventive measures due to current grooming and uniform standards. In this population, early identification and treatment are necessary to manage the disease to reduce patient morbidity and ensure continued operational and medical readiness. Topical and intralesional steroids may be used in mild to moderate cases. Topical and/or systemic antibiotics may be added to the treatment regimen in cases of secondary bacterial infection. For more severe refractory cases, laser therapy or complete surgical excision may be warranted.

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