Online First

Scalp Dysesthesia Related to Cervical Spine Disease

Laura A. Thornsberry, MD; Joseph C. English III, MD

Background: Scalp dysesthesia is characterized by abnormal sensations of the scalp in the absence of any other unusual physical examination findings. The pathogenesis of this condition is unknown but has been reported in the setting of underlying psychiatric disorders. Other localized pruritic syndromes, including brachioradial pruritus and notalgia paresthetica, have been associated with pathologic conditions of the spine and have been successfully treated with gabapentin.

Observations: Among 15 women identified in a retrospective review of medical records as having been seen with scalp dysesthesia, 14 patients had cervical spine disease confirmed by imaging. The most common finding on imaging was degenerative disk disease, with 10 of 14 patients having these changes at C5-C6. Other abnormal imaging findings included anterolisthesis, osteophytic spurring, lordosis, kyphosis, and nerve root impingement. A gabapentin regimen (topical or oral) had been recommended to 14 patients; of 7 patients who were followed up, 4 patients noted improvement in symptoms when taking gabapentin.

Conclusions: Patients with scalp dysesthesia also had abnormal cervical spine images. Chronic muscle tension placed on the pericranial muscles and scalp aponeurosis secondary to the underlying cervical spine disease may lead to the symptoms of scalp dysesthesia.


Scalp dysesthesia was first described by Hoss and Segal1 in 1998 as a cutaneous dysesthesia syndrome characterized by pruritus, burning, stinging, or pain of the scalp in the absence of any other unusual physical examination findings. In their case series of 11 patients, 5 patients had at least 1 known psychiatric disorder (dysthymic disorder, somatization disorder, or generalized anxiety disorder), 7 patients had symptoms worsened by stress, and 9 patients had symptom improvement with low-dose antidepressant treatment.1 Their study did not examine underlying cervical spine disease among the patients. The pathogenesis of scalp dysesthesia is poorly understood and has not been determined.

Other localized pruritic syndromes, including brachioradial pruritus and notalgia paresthetica, have been associated with pathologic conditions of the spine confirmed by cervical and thoracic spine imaging studies.2-5 In a study6 of 41 patients with brachioradial pruritus, 29 patients had abnormal magnetic resonance (MR) images showing nerve compression correlating with the dermatomal distribution of the pruritus. A case series7 of 10 patients with notalgia paresthetica showed a relationship between the location of the symptoms and the abnormal images in 7 patients. The radiologic findings in brachioradial pruritus and notalgia paresthetica prompted our study of cervical spine imaging in patients seen with scalp dysesthesia.

Report of Cases

In our patients (Table), the most common symptoms of scalp dysesthesia were burning (7 patients), pruritus (6 patients), or both burning and pruritus (2 patients). Two patients described a sensation of “bugs crawling” on the scalp. Two patients had concurrent chronic telogen effluvium, and 2 other patients reported subjective hair loss that was not further described in the medical records. Two patients reported chronic neck pain, and 1 patient had a history of a C6-C7 fusion surgical procedure. None of the patients had worsening or improvement of the symptoms with certain head positions or exer-

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toms before presentation ranged from several months to several years, although 3 patients had secondary excoriations in the nasolabial folds, eyebrows, and scalp. One patient had diffuse scalp burning also involving the face and other areas of the body. The symptoms were diffuse in 10 patients and were localized to various regions of the scalp in 5 patients, including the frontal, vertex, occipital, parietal, and temporal scalp. One patient with diffuse scalp burning also reported burning in the right arm. The duration of symptoms before presentation ranged from several months to 8 years. All 15 patients were women of white race/ethnicity, with an age range of 38 to 83 years. Two patients had a diagnosis of depression, and 1 patient had a history of anxiety. None of the patients indicated that stress had any influence on their symptoms. The physical examinations were unremarkable for primary lesions, although 3 patients had secondary excoriations in the symptomatic areas of their scalps. The differential di-

### Table. Patients With Scalp Dysesthesia and Cervical Spine Imaging

<table>
<thead>
<tr>
<th>Sex/Age, y</th>
<th>Symptoms</th>
<th>Psychiatric Diagnosis</th>
<th>Cervical Spine Imaging</th>
<th>Treatment and Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>F/59</td>
<td>Pruritus of frontal and occipital scalp</td>
<td>None</td>
<td>MR imaging showed DDD at C4-C7</td>
<td>Gabapentin (100 mg 3 times daily) recommended chiropractic care, no follow-up data</td>
</tr>
<tr>
<td>F/78</td>
<td>Burning on vertex scalp, hair loss</td>
<td>None</td>
<td>Radiography showed anterolisthesis of C5 on C6, degenerative changes, osteophytic spurring</td>
<td>Gabapentin (100 mg 3 times daily), controlled symptoms (discontinued because of palpitations), completed physical therapy</td>
</tr>
<tr>
<td>F/38</td>
<td>Pruritus, “bugs biting and crawling” sensation</td>
<td>None</td>
<td>Radiography showed reversal cervical lordosis, C5-C6 interspace narrowing</td>
<td>Topical gabapentin, 10% (3 times daily), provided no improvement in symptoms, referred to neurology</td>
</tr>
<tr>
<td>F/52</td>
<td>Pruritus diffusely</td>
<td>None</td>
<td>Radiography showed cervical kyphosis centered at C5 with C5-C6 predominant DDD, MR imaging showed reversal of normal cervical lordosis with central broad-based protrusion at C4-C5</td>
<td>Topical gabapentin, 10% (3 times daily), provided partial response, completed physical therapy</td>
</tr>
<tr>
<td>F/65</td>
<td>Burning diffusely</td>
<td>None</td>
<td>Radiography showed mild DDD at C4-C7 and moderate left and mild right C4-C5 foraminal narrowing, MR imaging showed mild multilevel degenerative changes (predominantly in the form of neural foraminal narrowing)</td>
<td>Gabapentin (100 mg twice daily) and venlafaxine hydrochloride (18.75 mg/d) provided no improvement in symptoms, topical clobetasol propionate provided partial response, recommended physical therapy but the patient refused, referred to neurology</td>
</tr>
<tr>
<td>F/57</td>
<td>Pruritus, burning, “bugs crawling” diffusely</td>
<td>None</td>
<td>Radiography showed reversal of curvature, advanced DDD at C5-C7</td>
<td>Gabapentin (oral) recommended but the patient was unable to fill the prescription because of cost, referred to neurology, no follow-up data</td>
</tr>
<tr>
<td>F/55</td>
<td>Burning diffusely</td>
<td>None</td>
<td>Radiography showed prior anterior fusion of the C6-C7 levels, moderate DDD at C4-C6</td>
<td>Topical gabapentin, 10% (3 times daily), no follow-up data</td>
</tr>
<tr>
<td>F/65</td>
<td>Pruritus of occipital scalp, hair loss</td>
<td>Depression</td>
<td>Radiography showed severe DDD and narrowing between C5-C6 and C6-C7</td>
<td>Topical and oral gabapentin provided no improvement in symptoms, clobetasol propionate provided partial response</td>
</tr>
<tr>
<td>F/50</td>
<td>Burning on right parietal scalp</td>
<td>None</td>
<td>Radiography showed mild DDD and narrowing at C5-C6</td>
<td>Topical gabapentin, 10% (3 times daily), and venlafaxine hydrochloride (50 mg/d) provided partial response</td>
</tr>
<tr>
<td>F/74</td>
<td>Burning on vertex and temporal scalp</td>
<td>None</td>
<td>Radiography showed anterolisthesis of C6 on C7, moderate facet joint and uncovertebral arthritis in the mid and lower cervical segments</td>
<td>Topical hydrocortisone provided partial response, referred to neurology</td>
</tr>
<tr>
<td>F/41</td>
<td>Burning on scalp and right arm, hair loss</td>
<td>None</td>
<td>MR imaging showed minimal DDD (most prominent at C6-C7), osteophyte complex with tiny central protrusion</td>
<td>Gabapentin (100 mg 3 times daily) provided partial response, gabapentin was increased to 300 mg (3 times daily) (no follow-up data), referred to neurology, had normal electromyogram and nerve conduction study of the right arm</td>
</tr>
<tr>
<td>F/62</td>
<td>Pruritus of scalp, eyebrows, nasolabial folds</td>
<td>Depression</td>
<td>MR imaging showed arthritis and disk disease (most significant at C5)</td>
<td>Amitriptyline hydrochloride (25 mg) provided partial response, gabapentin recommended but the patient was unable to fill the prescription because of cost, referred to neurology</td>
</tr>
<tr>
<td>F/83</td>
<td>Pruritus diffusely</td>
<td>Anxiety</td>
<td>Computed tomography showed mild to moderate multilevel spondyloarthropathy, C5-C6 posterocentral osteophyte resulting in spinal stenosis, impingement of left C6</td>
<td>Topical gabapentin, 10% (3 times daily), no follow-up data</td>
</tr>
<tr>
<td>F/78</td>
<td>Pruritus and burning diffusely</td>
<td>None</td>
<td>MR imaging showed cervical nerve root compression (full report not available)</td>
<td>Topical gabapentin, 10% (3 times daily), no follow-up data</td>
</tr>
<tr>
<td>F/72</td>
<td>Scalp burning diffusely, hair loss</td>
<td>None</td>
<td>Radiography and MR imaging showed normal findings</td>
<td>Gabapentin and amitriptyline recommended but the patient declined, referred to neurology</td>
</tr>
</tbody>
</table>

Abbreviations: DDD, degenerative disc disease; MR, magnetic resonance.
agnosis for scalp pruritus includes many common dermatologic conditions, including seborrheic dermatitis, psoriasis, scarring alopecia, tinea capitis, pediculosis, contact dermatitis, allergic dermatitis, acne, and folliculitis. The physical examination has a crucial role in the diagnosis of many of these conditions, and a key component to diagnosing scalp dysesthesia is the lack of objective primary skin findings.

In this retrospective study, 14 of 15 patients had abnormal findings visualized on cervical spine radiographs, MR imaging, or computed tomography. The most common radiographic abnormality was degenerative disk disease (DDD), which was present in 11 patients and occurred at C5-C6 in 10 patients. Five patients had DDD only at level C5-C6, while 6 patients had multilevel disease. Two patients had DDD at C4-C7, 2 patients had DDD at C5-C7, 1 patient had DDD at C4-C6, and 1 patient had DDD at C6-C7. Other pertinent radiographic findings included grade 1 anterolisthesis, osteophytic spurring, lordosis, kyphosis, and nerve root impingement. One patient had both a normal cervical spine radiograph and normal MR images.

Gabapentin, as a topical or an oral medication, had been recommended as a treatment option to 14 patients. Only 7 of these patients returned for follow-up appointments after using gabapentin, with 4 patients reporting an improvement in symptoms. Two patients improved when taking oral gabapentin (100 mg 3 times daily), while 2 patients had improvement with topical gabapentin, 10% cream (3 applications daily). The topical cream was compounded using gabapentin powder and a lipophilic lipo- somic base, with propylene glycol as the wetting agent. Three patients reported no improvement with gabapentin. One patient had to discontinue oral gabapentin secondary to palpitations. Three patients reported some improvement with topical corticosteroids (clobetasol propionate and hydrocortisone). Three patients received low-dose antidepressants. One patient tried venlafaxine hydrochloride (18.75 mg/d) plus gabapentin (100 mg twice daily), with no improvement in symptoms. A second patient had a partial response with venlafaxine hydrochloride (50 mg/d) and topical gabapentin, 10% (3 times daily). The third patient tried amitriptyline hydrochloride (25 mg/d) without any other medications, with a partial response. Nonpharmacologic treatments had also been recommended. Two patients completed neck physical therapy, with no mention of any improvement in symptoms. One patient was referred to a chiropractor but did not follow up after the recommendation. Seven patients were referred to a neurologist, but only 1 patient had the medical records available for review, which included a normal electromyogram and unremarkable findings in a nerve conduction study of the right upper arm; she had also reported right arm burning.

**COMMENT**

In this study of 15 women identified in a retrospective review of medical records as having been seen with scalp dysesthesia, 14 patients had cervical spine disease confirmed by imaging. We suggest an association between scalp dysesthesia and cervical spine disease, most commonly DDD. Scalp dysesthesia does not seem to follow a dermatomal distribution given that the most common location of DDD in our study was C5-C6. We hypothesize that the symptoms of scalp dysesthesia may be related to chronic tension placed on the occipitofrontalis muscle and scalp aponeurosis (galea aponeurotica) secondary to underlying cervical spine disease, rather than psychiatric causes. This parallels the pathogenesis of a tension-type headache, which is thought to have a musculoskeletal component related to chronic tension of the pericranial muscles and myofascial pain. The pain of a tension headache can be diffuse or localized; similarly, the location of the symptoms of scalp dysesthesia was variable in this study, with 10 patients having diffuse symptoms and 5 patients reporting specific areas of concern on the scalp. The cause of this variability is unknown.

Degenerative changes of the cervical spine are known to linearly increase with age. In a study of 497 asymptomatic patients, MR imaging of the cervical spine showed degenerative changes in 12% of women in their 20s and in 89% of women older than 60 years. In our study, the percentage of women with abnormal images was 93% (14 of 15 patients), which is higher than that among the asymptomatic population, and covered a wide age range of 38 to 83 years.

Scalp dysesthesia can be a challenging and frustrating condition for the patient and the physician because it does not have well-established or evidence-based treatments, with low-dose antidepressants as the only reported treatment to date. Gabapentin has been approved by the Food and Drug Administration for partial seizures and postherpetic neuralgia; however, it has been reported as an effective treatment of neuropathic pain and refractory pruritus of unknown origin. Several case reports document the successful use of gabapentin at varying dosages, ranging from 100 mg 3 times daily to 300 mg every 4 hours for brachioradial pruritus. Although the mechanism of action of gabapentin is unknown, it affects neurotransmitters; specifically, it inhibits glutamate synthesis and increases the transmission of γ-aminobutyric acid. Gabapentin is generally well tolerated, with common adverse effects of dizziness, drowsiness, and lower extremity edema.

Gabapentin (topical or oral) was the most commonly prescribed medication in this study. Four patients showed improvement with gabapentin treatment, while 3 patients did not, demonstrating that gabapentin may be an effective treatment of scalp dysesthesia but will require larger studies in the future. Other treatments included low-dose antidepressants, including venlafaxine and amitriptyline; however, venlafaxine was used in conjunction with gabapentin, preventing the evaluation of the individual effect of each drug.

The outcomes of the treatments used in this study were limited by the absence of patient follow-up data for 7 patients who did not return for their appointments. These patients had been initially seen at a tertiary care center, to which patients frequently drive 4 to 6 hours for appointments, which likely contributed to the poor follow-up response because patients may have chosen a location closer to home for their continued care.
In conclusion, scalp dysesthesia is a syndrome characterized primarily by scalp burning or pruritus in the absence of any other unusual physical examination findings and may be associated with cervical spine disease. In this study, 14 of 15 patients with scalp dysesthesia also had abnormal cervical spine images. The pathogenesis may be related to chronic muscle tension placed on the pericranial muscles and scalp aponeurosis secondary to the underlying cervical spine disease and is likely unrelated to psychiatric disorders. Four patients reported improvement in symptoms with gabapentin, but the optimal dosage and route of administration need to be studied. Larger, prospective studies are needed to further characterize the pathogenesis of scalp dysesthesia and to determine the most efficacious treatments.

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Author Contributions: Drs Thornsberry and English had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. **Study concept and design:** English. **Acquisition of data:** Thornsberry and English. **Analysis and interpretation of data:** Thornsberry and English. **Drafting of the manuscript:** Thornsberry. **Critical revision of the manuscript for important intellectual content:** English. **Administrative, technical, and material support:** English. **Study supervision:** English.

Conflict of Interest Disclosures: None reported.

REFERENCES


Top-Accessed Article: Topical Rapamycin


Recent success using mTOR (mammalian target of rapamycin) inhibitors such as rapamycin for the systemic manifestations of tuberous sclerosis exemplify how targeted therapy can treat genetic disorders. Haemel and colleagues describe the novel use of topical rapamycin in a petrolatum vehicle for facial angiofibromas in a patient with tuberous sclerosis. Since its publication, several authors have similarly reported successfully using various compounds of rapamycin or even the topical application of the commercially available oral solution for facial angiofibromas. Topical application of the oral solution is associated with local irritation that necessitates topical steroids. Compounded rapamycin is at least 10-fold more expensive than a similar amount of the oral solution. Rapamycin therapy is expensive, but the cost must be compared with alternative therapies, including pulsed dye or ablative lasers, that often require general anesthesia in this population. Prospective studies are needed to clarify the pharmacokinetics of topically applied rapamycin and the optimal formulation, dosing, duration, monitoring, and safety of this therapy.

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