Detection of Human Papillomavirus in Multiple Eccrine Poromas in a Patient With Chronic Graft-vs-Host Disease and Immunosuppression

A poroma is a benign sweat gland tumor composed of cells with terminal ductal differentiation of either apocrine or eccrine origin. Poromas are usually solitary, slow-growing, skin-colored, sometimes pedunculated papules or plaques. Multiple poromas, or eccrine poromatosis, rarely develop in a widespread distribution: 2 cases of eccrine poromatosis have been reported in the setting of chronic immunosuppression.3–5 Three additional reports document the development of multiple eccrine poromas after external irradiation.3–5

Report of a Case. Our patient developed multiple eccrine poromas after treatment with an allogeneic stem cell transplant with complications of graft-vs-host disease (GVHD) requiring long-term immunosuppression. The poromas were tested for human papillomavirus (HPV) DNA by nested polymerase chain reaction (PCR), and results were positive for beta-HPV. An acinic keratosis and a squamous cell carcinoma (SCC) in situ tested by nested PCR were negative for beta-HPV. To our knowledge, this is the first reported case of HPV positivity in eccrine poromas.

Our patient was a 53-year-old man with a history of mantle cell lymphoma who was treated with an allogeneic stem cell transplant. Over the next 5 years, his posttransplantation course was complicated by chronic GVHD of the skin, mouth, eyes, liver, and gastrointestinal tract, which was managed with photopheresis and immunosuppression with tacrolimus, systemic corticosteroids, and mycophenolate mofetil. He subsequently developed 6 slow-growing, erythematous papules on his palms, heels, and left elbow (Figure 1). The papules ranged in size from 2 to 6 mm, and all were similar in morphologic characteristics except for the pedunculated papule on the elbow.

Biopsy specimens of the right palm, elbow, and left heel demonstrated dome-shaped epidermal proliferations composed of small, cuboidal (“poroid”) cells with basophilic nuclei emanating from the base of the epidermis and extending into the dermis, which are findings characteristic of eccrine poromas (Figure 2). Findings in situ hybridization studies for low-risk and high-risk alpha-HPV types were negative; however, nested PCR findings for beta-HPV or epidermodysplasia verruciformis (EV) HPV DNA were positive for HPV types 20, 21, and 23 (Figure 3).

Comment. Our patient developed severe multisystem GVHD and multiple HPV-positive eccrine poromas after several years of immunosuppressive therapy, which is the third report to our knowledge of multiple eccrine poromas developing in an immunosuppressed patient. Although we have not found HPV positivity reported in any cases of eccrine poromas, 1 study using immunopercepto...
Human papillomaviruses are double-stranded DNA viruses confined to epithelial cells of the skin and mucous membranes of humans. Isolates from the beta-HPV genus exist in latent form in the general population and are activated under conditions of immune suppression. Our patient’s lesions tested positive for beta-HPV types 20, 21, and 23, which cause mostly benign cutaneous lesions and are commonly associated with lesions in EV or immunosuppression. Transplant patients are more prone to persistent cutaneous HPV infection, and so in our patient, a combination of long-term immunosuppressive therapy and HPV infection may have collectively contributed to the development of multiple poromas. Beta-HPV was not detected in an actinic keratosis and SCC in situ of the perilesional skin, which is compatible with evidence that beta-HPV may not be merely a “passenger” but rather may play an active role in poroma tumorigenesis. It is interesting to postulate that HPV may have induced the development of multiple poromas. The presence of HPV DNA in the poroma biopsy specimens, however, does not definitively establish a direct causal role. More studies are needed to investigate the molecular mechanism by which HPV infection impacts poroma tumorigenesis.

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Botulinum Toxin Type A vs Type B for Axillary Hyperhidrosis in a Case Series of Patients Observed for 6 Months

Although botulinum toxin type B (BT-B) is increasingly used for axillary hyperhidrosis, the effective dose is controversial. We compared the antihyperhidrotic effect of intra-axillary injections of BT-B (NeuroBloc; Eisai Europe Limited, Hatfield, Herts, England) and botulinum toxin type A (BT-A) (Botox; Allergan Inc, Irvine, California).

Methods. In a bilateral paired, single-blinded, randomized study, 10 patients (7 women and 3 men; age range, 23-54 years) with idiopathic focal axillary hyperhidrosis since childhood unresponsive to other nonsurgical treatments received BT-A unilaterally and BT-B contralaterally. None of the patients had other diseases or had received previous BT injections during the past year. All patients underwent a pretreatment clinical examination and objective quantification of sweat production at rest. The hyperhidrotic area was defined using the quinizarin sweat test then measured and photographed.\(^1\) Sweat production was evaluated by gravimetric measure over 5 minutes.\(^2\) Patients were assessed before treatment, at 1 and 2 weeks, and at 1, 3, and 6 months after BT injections. The human subjects committee of the Department of Neurology, Cit-tadella Hospital, approved the protocol, and all subjects gave their informed consent.

Each patient was injected in one axilla with 50 U of BT-A diluted with 1 mL of 0.9% sterile physiologic saline without preservative and in the contralateral axilla with 2500 U of BT-B diluted with 0.5 mL of 0.9% sterile physiologic saline without preservative. The identified hyperhidrotic area was pen marked and subdivided into 2×2-cm squares (4 cm\(^2\)). The toxin was injected in amounts of 0.025 mL (BT-B) and 0.050 mL (BT-A) intradermally using a 30-gauge needle; 20 injections were given in each axilla. All patients received the same amount of toxins divided among the same injection points. Subjective examination included questionnaires eliciting the beginning and duration of benefit and global assessment of treatment satisfaction scale.\(^2\)

All data are expressed as means (SDs). Paired \(t\) tests were used to compare baseline rates of sweat production and area of sweating in the 2 axillae. A nonparametric test for paired data (Wilcoxon test) was used to compare sweat production and area of sweating (percentage change from baseline) and global assessment of treatment satisfaction at each of the 5 considered time points after BT-A and BT-B injection. \(P<.05\) was considered statistically significant. We determined that a sample size of 10 patients would have 94% power to detect the clinically important difference of 10% at \(\alpha = .05\).

Results. All patients reported a reduction in axillary sweat production. Mean (SD) pretreatment sweat production rates and areas were similar bilaterally: rates, 217.0 (22.8) mg per 5-minute interval for BT-A and 206.0 (21.9) mg per 5-minute interval for BT-B; area, 31.4 (5.8) cm\(^2\) for BT-A and 31.0 (8.1) cm\(^2\) for BT-B. After BT injections, patients responded to treatment until month 6. At 1 and 2 weeks and 1, 3, and 6 months after treatment, sweat weight and area decreased significantly more in the BT-B side than in the BT-A side (\(P<.01\)).

Patients’ treatment satisfaction scores were significantly higher for the BT-B than for BT-A treatment (\(P<.05\)) until month 3 (Table). According to patients’ subjective reports, treatment began acting earlier in the BT-B side than in the BT-A side: mean (SD) time to ini-

### Table. Changes in Gravimetric Sweat Production, Colorimetric Areas of Sweat Production, and Satisfaction Scores for Axillae Treated With BT-A and BT-B\(^a\)

<table>
<thead>
<tr>
<th>Measurement Interval</th>
<th>Sweating Weight, %</th>
<th>Sweating Area, % Area</th>
<th>Satisfaction Score(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BT-A</td>
<td>BT-B</td>
<td></td>
</tr>
<tr>
<td>0 d</td>
<td>100</td>
<td>100</td>
<td>NA</td>
</tr>
<tr>
<td>1 wk</td>
<td>68.0 (32.1)</td>
<td>14.9 (20.3)</td>
<td>.01</td>
</tr>
<tr>
<td>2 wk</td>
<td>16.6 (9.2)</td>
<td>4.1 (7.2)</td>
<td>.04</td>
</tr>
<tr>
<td>1 mo</td>
<td>15.7 (17.3)</td>
<td>4.3 (4.1)</td>
<td>.04</td>
</tr>
<tr>
<td>3 mo</td>
<td>66.3 (38.4)</td>
<td>30.6 (24.3)</td>
<td>.03</td>
</tr>
<tr>
<td>6 mo</td>
<td>90.7 (10.1)</td>
<td>56.2 (25.4)</td>
<td>.02</td>
</tr>
</tbody>
</table>

Abbreviations: BT-A, botulinum toxin, type A; BT-B, botulinum toxin, type B; NA, not applicable.

*Unless otherwise indicated, data are mean (SD) values.

*The scale score ranged from −4 to +4 and included patients’ description of a 0% reduction or increase in sweating (unchanged) or a mean (SD) reduction of 25% (1%), 50% (2%), 75% (3%), or 100% (4%).